Perceived stress, smartphone dependency, coping behaviors, and psychological well-being among undergraduate students in Malaysia

by

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The student author, whose presentation of the scholarship herein was approved by the program of study committee, is solely responsible for the content of this dissertation. The Graduate College will ensure this dissertation is globally accessible and will not permit alterations after a degree is conferred.

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ABSTRACT

Well-being is essential to promote students' development. The present research investigated the association between life events, perceived stress, smartphone dependency, coping behaviors, and psychological well-being. This cross-sectional study employed convenience sampling, and the sample consisted of 303 undergraduates at one public university in Malaysia. Most of the participants were Malay (74.6%), followed by Chinese (15.8%), Indian (6.9%), and other ethnic groups (2.6%). Several types of analyses were used: descriptive statistics, bivariate correlations, mean differences, and structural equation modeling.

Descriptive research indicated that the five most common life events were "family get-together," "getting an unjustified low grade on a test," "vacation with parents," "minor financial problems," and "vacation alone/with friends." The analyses yielded significant gender and year of study differences in perceived stress. Women had higher perceived stress levels than men. Perceived stress was significantly lower for first-year students than second- and third-year students. Next, there was a significant effect of ethnicity on psychological well-being and daily life disturbance. Specifically, psychological well-being was significantly lower for Malay than Non-Malay students. In contrast, daily life disturbance was significantly higher for Malay than Non-Malay students. In addition, there was a significant interaction between gender and ethnicity on life events and problem focused-coping. Non-Malay men experienced fewer life events than Malay women, Malay men, and Non-Malay women. Non-Malay men were less likely to utilize problem-focused coping than Non-Malay women, Malay men, and Malay women.

The measurement and structural model fit very well after allowing some modifications of the models. Results of the structural equation model indicate that experiencing higher levels of life events may lead to higher levels of perceived stress. Higher levels of perceived stress predicted lower levels of psychological well-being. Perceived stress had significant effects on smartphone dependency, emotion-focused, and avoidance-focused coping. In addition, problem-focused had a significant effect on psychological well-being. In terms of mediation effects, perceived stress fully mediated the association between life events and psychological well-being. Perceived stress partially mediated the relationship between life events and avoidance-focused coping. However, there were no mediation and moderation effects of smartphone dependency and coping behaviors on the association between perceived stress and psychological well-being. The results have implications for college students' well-being programs and give insights for future researchers, counselors, educators, and policymakers. The results confirm the validity of concepts, appropriateness in a different culture, and enrich the cross-cultural literature.

CHAPTER 1. GENERAL INTRODUCTION

Stressful experiences by college students result from an adjustment from school and home to independent living of university settings (Burris, Brechting, Salsman, & Carlson, 2009). Nisa and Nizami (2014) had identified several stressors that led to a high level of stress, such as academic problems, family conflict, peer pressure, interpersonal issues, financial difficulties, and lack of resources. College students who practice good coping skills reported a better adjustment in their well-being than those who do not (Coiro, Bettis, & Compas, 2017; Morton, Mergler, & Boman, 2014). However, even though coping assists individuals in their adjustment and well-being, coping is not stable over time (Diehl, Chui, Hay, Lumley, Grühn, & Labouvie-Vief, 2014). Within the Lazarus and Folkman (1984) perspective, coping is linked to the relationship between a person and the environment. Hence, it is essential to examine the environmental aspects of today's college students' lifestyle, especially technology issues. In addition, smartphone dependency is a unique issue for studying a new generation of young adults in Malaysia. Samaha and Hawi (2016) had noted that a high level of smartphone dependency led to lower levels of adjustment and well-being of college students.

As such, the present study primarily investigated the association between life events, perceived stress, smartphone dependency, coping behaviors, and psychological well-being. The participants in this current study were college students at a Malaysian University. The Eleventh Malaysia Planning (2016-2020) indicated that college students are professional human resources who are responsible for developing the nation in the future (Unit Perancang Ekonomi, 2015). This strategic planning challenges the university to produce the next generation of potential catalysts for the country. Hence, being

sensitive to the students' well-being has become one of the essential elements in strategic planning. Also, an empirical study in Malaysia showed that college students experience poor well-being (Yee & Yusoff, 2013). Some of the factors which might be contributing to this condition are the education system such as an exam-driven curriculum and a large number of assignments that pushes students to work hard and put more effort in meeting the demands of the system (Bullare, Rathakrishnan, & Ismail, 2009). Besides, the way students cope with stress was a significant factor in determining the level of psychological well-being (Jaffar et al., 2014). According to Gross (2013), it is important for individuals to manage emotions effectively in dealing with stress to avoid negative consequences. This concept is known as emotion-regulation. For example, a study found that utilizing emotion-focused coping such as positive reframing is adaptive because it is associated with positive outcomes (Garnefski & Kraaij, 2006). In contrast, under specific circumstances, some types of emotion-focused coping (e.g., denial, self-blame, and venting) are maladaptive or may be less effective in dealing with stress because they are linked with adverse psychological outcomes (Kelly, Tyrka, Price, & Carpenter, 2008).

In other countries, such as Lebanon, the United States, and Korea, the increasing trend of smartphone usage among university students is a significant influence on students' psychological well-being (King & Dong, 2017; Park & Lee, 2012; Samaha & Hawi, 2016). In the context of Malaysia, this study is significant for several reasons. First, it can help to highlight a pattern of relationships between life events, perceived stress and psychological well-being among undergraduate students. It also allows examining the role of coping behaviors and smartphone dependency on the association between perceived stress and psychological well-being. Second, the findings of this study

give insight into the students' psychological well-being especially for professionals who are working with college students, such as educators, counselors, and researchers who plan intervention programs.

Finally, this study is significant because of its cross-cultural perspective, particularly because the concepts of life events, perceived stress, psychological well-being, and coping behaviors in this proposed study were derived from Western perspectives. Therefore, examining the cross-cultural aspect of these concepts might help improve the validity of stress related concepts, reviewing their appropriateness in a different culture, and enriching the cross-culture literature. Furthermore, smartphone dependency was a unique predictor in determining the well-being of Malaysian students. The following sections in this paper will provide an in-depth understanding of the proposed study.

Statement of Problem

Psychological well-being is a growing public health concern that affects individual development over one's life span. According to the National Health Morbidity Survey II, the prevalence of psychological problems among adults in Malaysia showed an increasing trend from 10.7% in 1996 to 29.6% in 2015 (Institute for Public Health, 2015). Psychological problems referred to a low level of mental health measured by the General Health Questionnaire (GHQ). The prevalence of psychological problems was higher among the younger generation compared to other age groups. For example, the percentages of psychological problems of young adults aged 20-24 years old (32.1%) were higher than that of older adults aged 50-54 years old (24.8%).

Furthermore, young adults in higher education are more likely to experience poor psychological well-being than young adults in the general population (Institute for Public

Health, 2015). According to previous studies, poor psychological well-being among university students was associated with a lack of coping skills in dealing with a stressful situation (Giancola, Grawitch, & Borchert, 2009; Hunt & Eisenberg, 2010). People who use avoidant coping and emotional coping behaviors when dealing with stress have a high tendency to experience poor psychological well-being (Deatherage, Servaty-Seib, & Aksoz, 2014).

Meanwhile, a recent study demonstrated that students who reported more perceived stress also showed high levels of smartphone dependency (Samaha & Hawi, 2016). Smartphone dependency is found to be linked with internet addiction (Jun, 2015) and social media networking (Darcin et al., 2016), and this situation consequently contributes to poor psychological well-being (Hong, Chiu, & Huang, 2012). In Malaysia, an internet user survey conducted in 2016 showed that 80% of internet users used a smartphone to connect with social media including Facebook, WeChat, Instagram, and YouTube (Malaysian Communications and Multimedia Commission, 2016). The young adult group, which attends college or a university, is identified as the highest group of internet users.

Based on the statistics and previous studies above, there is a need for researchers to examine factors that influence the psychological well-being of university students in Malaysia. University students in Malaysia were recruited because this group shows a high tendency to experience poor psychological well-being (Swami et al., 2007). Although psychological well-being has been studied among university students in Malaysia, little is known about the mediating and moderating effect of coping behaviors and smartphone dependency on the association between stress and psychological well-

being. To date, research on smartphone dependency has only focused on the development and validation of the instruments to measure problematic smartphone use in Malaysia (Ching et al., 2015).

Therefore, the main purpose of this study was to identify the associations between life events, perceived stress, coping behaviors, smartphone dependency, and psychological well-being among undergraduate students in Malaysia. Specifically, the research objectives were to:

1. Identify the relationship between life events, perceived stress, smartphone dependency, coping behaviors (i.e., problem-focused coping, emotional-focused coping, and avoidance-focused coping), and psychological well-being among undergraduate students.
2. To test any mediating effects of perceived stress on the relationship between life events, smartphone dependency, coping behaviors, and psychological well-being among undergraduate students.
3. To test any mediating effects of coping behaviors and smartphone dependency on the relationship between perceived stress and psychological well-being among undergraduate students.
4. To examine any moderating effects of coping behaviors and smartphone dependency on the relationship between perceived stress and psychological well-being among undergraduate students.

CHAPTER 2. LITERATURE REVIEW

The literature review begins with a discussion of stress and coping theory as well as development theory. Second, the literature regarding the association between life events, perceived stress, and psychological well-being are summarized. Third, I review the association between coping behaviors, perceived stress, and psychological well-being. Lastly, I examine the association between smartphone dependency, perceived stress, and psychological well-being.

Theoretical Framework

The stress and coping theory (Lazarus & Folkman, 1984) provides a fundamental conceptual model for this study (Figure 1). The model assumes that stressful life events predict perceived stress, and perceived stress is associated with psychological well-being. Coping behaviors are assumed to mediate the association between stress and psychological well-being. In the conceptual model, coping behaviors consist of two types: problem-focused and emotion-focused coping. First, stress is hypothesized to increase problem-focused coping, which then leads to higher psychological well-being. Second, stress is hypothesized to increase emotion-focused coping which then leads to poor psychological well-being. The two relevant theories and related literature about this conceptual model will be explained in more detail.

First, the stress and coping theory (Lazarus & Folkman, 1984) explains the association between life events, perceived stress, coping, and psychological outcomes (e.g., well-being, anxiety, depression, and loneliness). In this model, life events refer to

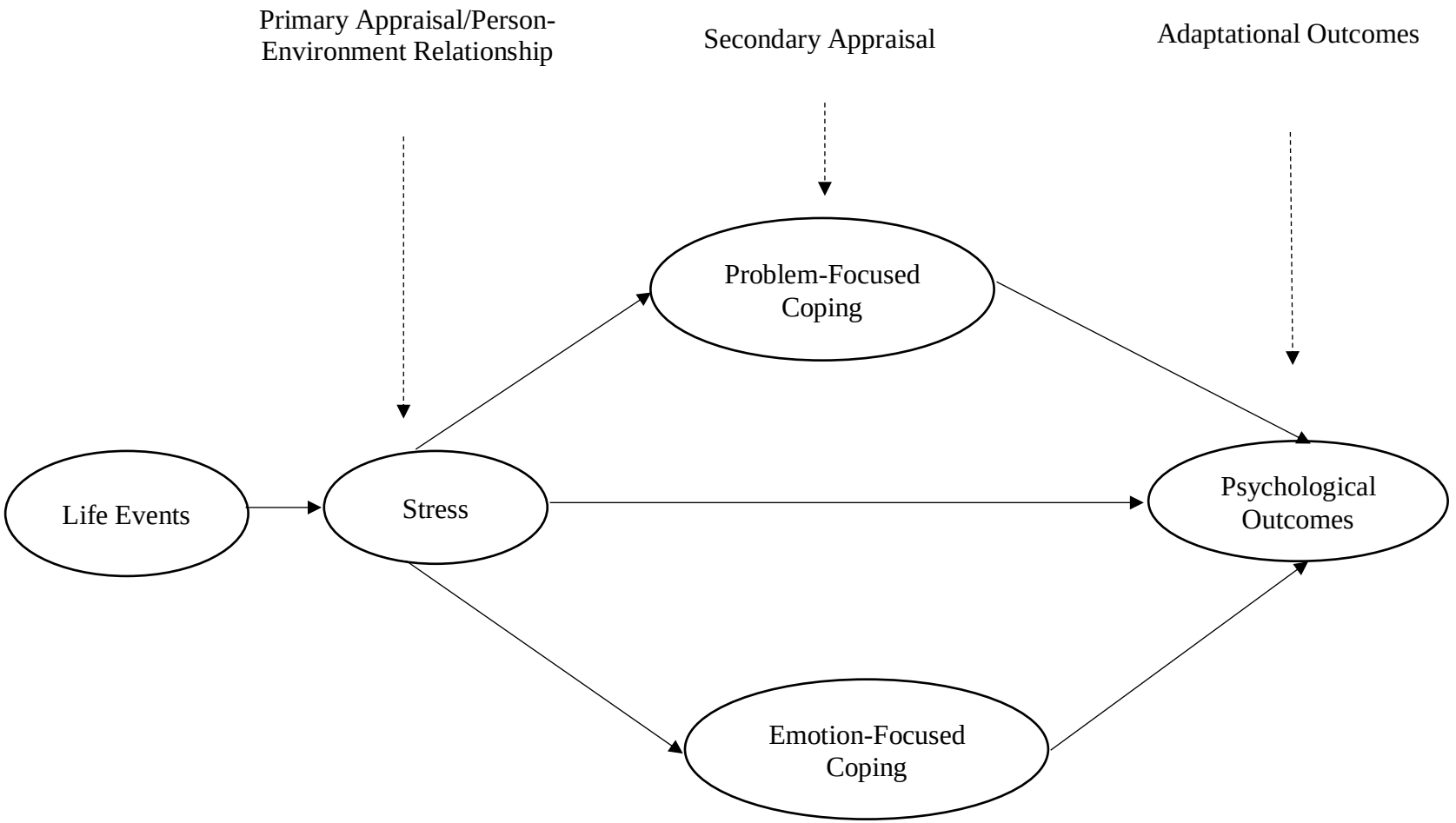


Figure 1. Life events, stress, coping, and psychological outcomes (adapted from Lazarus and Folkman, 1984).

potential stressors or an individual's environmental events (Lazarus, DeLongis, Folkman, & Gruen, 1985). Meanwhile, stress is described as "a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and as endangering his or her well-being" (Lazarus & Folkman, 1984, p. 19). This definition leads to secondary appraisal and involves two processes as central mediators within the person-environment transaction (i.e., cognitive appraisal and coping). Cognitive appraisal refers to "a process through which the person evaluates whether a particular encounter with the environment is relevant to his or her well-being, and if so, in what way" (Lazarus et al., 1985, p. 992). Appraising stress as a challenge is likely to produce positive outcomes because it facilitates effective problem-focused coping and promotes good morale. In contrast, a threat appraisal may lead an individual to utilize emotion-focused coping and reduces problem solving.

Based on an empirical study conducted among medical students in Malaysia, students utilized more problem-focused coping than other types of coping behaviors (Al-Dubai, Al-Naggar, Alshagga, & Rampal, 2011). Thus, I hypothesize that a high level of perceived stress leads to high level of problem-focused coping. Students who utilized high levels of problem-focused coping to respond to stress would show high levels of psychological well-being. Second, I hypothesized that high levels of perceived stress lead to high levels of emotion-focused coping. Students who utilize high levels of emotion-focused coping to respond to stress would show high levels of psychological well-being.

As such, the concept of stress and coping theory is significant for the objectives of this study to give a fundamental understanding on how undergraduate students perceive their stress and thus consequently determine how they cope with stress. According to

Folkman, Lazarus, Gruen, and DeLongis (1986), coping refers to "a person's cognitive and behavioral efforts to manage (e.g., reduce, minimize, master, or tolerate) the internal and external demands of the person-environment transaction that is appraised as taxing or exceeding the person's resources" (p. 572). Lazarus and Folkman (1984) introduced two categories that characterize the coping process: problem-focused and emotion-focused coping. Problem-focused coping involves an interpersonal effort to alter or manage the current problem. Emotion-focused coping involves an effort to manage an individual's own experience of negative emotion resulting from the current problem. However, Folkman and Moskowitz (2004) debated that relying on these two categories can misrepresent important coping categories.

Therefore, alternatives in coping research suggest that coping not only involves these two categories. Several researchers have used three basic dimensions: problem-focused, emotion-focused, and avoidance-focused coping (Ivory & Kambouropoulos, 2012; Mackay & Pakenham, 2012; Schnider, Elhai, & Gray, 2007). Avoidance-focused coping refers to an individual's efforts or behaviors to disengage from stressful situations. For example, avoiders tend to increase wishful thinking (e.g., hope and courage) and delay seeking solutions (Roth & Cohen, 1986). According to Roth and Cohen (1986), utilizing avoidance-focused coping may allow an individual to reduce stress temporarily but may increase a recognition of threat or negative outcome. In this dissertation, I measure coping behaviors by examining three specific behaviors: problem-focused, emotion-focused, and avoidance-focused coping.

Today, smartphones are found to be one way of dealing with stressors. The term stressor refers to actual or perceived threats to external circumstances (Selye, 1956). A

study found that the usage of the smartphone is seen as a maladaptive way in dealing with stress (Thomée, Härenstam, & Hagberg, 2011). The usage of the smartphone is seen as one behavior that distracts individuals from the stressor. Folkman, Lazarus, Dunkel-Schetter, DeLongis, and Gruen (1986) mentioned that when individuals try to avoid a stressor by distracting themselves by doing other activities, individuals are seen utilizing emotion-focused coping. However, smartphone dependency has been linked with negative outcomes of psychological well-being. For instance, David, Roberts, and Christenson (2018) reported that smartphone usage is associated with feelings of depression and anxiety.

Second, Arnett (2000) and Erikson (1950) argued that young adults are searching for intimacy and mutuality among their friends. This process sometimes leads to stressful situations because young adults sometimes are challenged to form healthy relationships with others. If stress is seen as a challenge, healthy relationships may be developed. In contrast, if stress is seen as a threat, unhealthy relationships may occur. Prior to the invention of social media, young adults communicated with their friends through face-to-face interactions. Today, younger millennials more frequently interact with their friends using a variety of social media channels via smartphones (Décieux, Heinen, & Willems, 2018). However, the dependency to their smartphones can have a negative impact on their psychological well-being. For example, a study found that social networking sites such as Facebook can make an individual feel worse after visiting the site (Kross et al., 2013). In addition, the increased access to social networking sites through smartphone use is associated with poor psychological well-being (Darcin et al., 2016).

In summary, both the theoretical perspectives and previous studies discussed above provide a basic understanding of how coping behaviors and smartphone dependency are associated with perceived stress and can predict psychological well-being. However, it is unclear whether this association is applied to undergraduate students. First, smartphone usage is unstable or even increasing every year for many college students (Jeong & Lee, 2015), and there are new applications for smartphones, which make the students utilize their smartphones more often (Lepp, Barkley, Sanders, Rebold, & Gates, 2013). Thus, it is important to evaluate how smartphone dependency may change the association between stress and psychological well-being. Second, not all coping strategies are effective in dealing with stress, and coping behaviors are relatively stable (Carver, Scheier, & Weintraub, 1989; Diehl et al., 2014).

Therefore, this study aimed to identify the mediating roles of coping behaviors and smartphone dependency on the association between perceived stress and psychological well-being. Also, this study aimed to identify the mediating effect of perceived stress between life events and psychological-well-being. Then, this study aimed to examine whether coping behaviors and smartphone dependency moderate relationships between perceived stress and psychological well-being. Figure 2 illustrates the proposed psychological well-being model for undergraduate students, which was used in this study. It is a modified version of Lazarus and Folkman's (1984) stress, coping, and psychological well-being model.

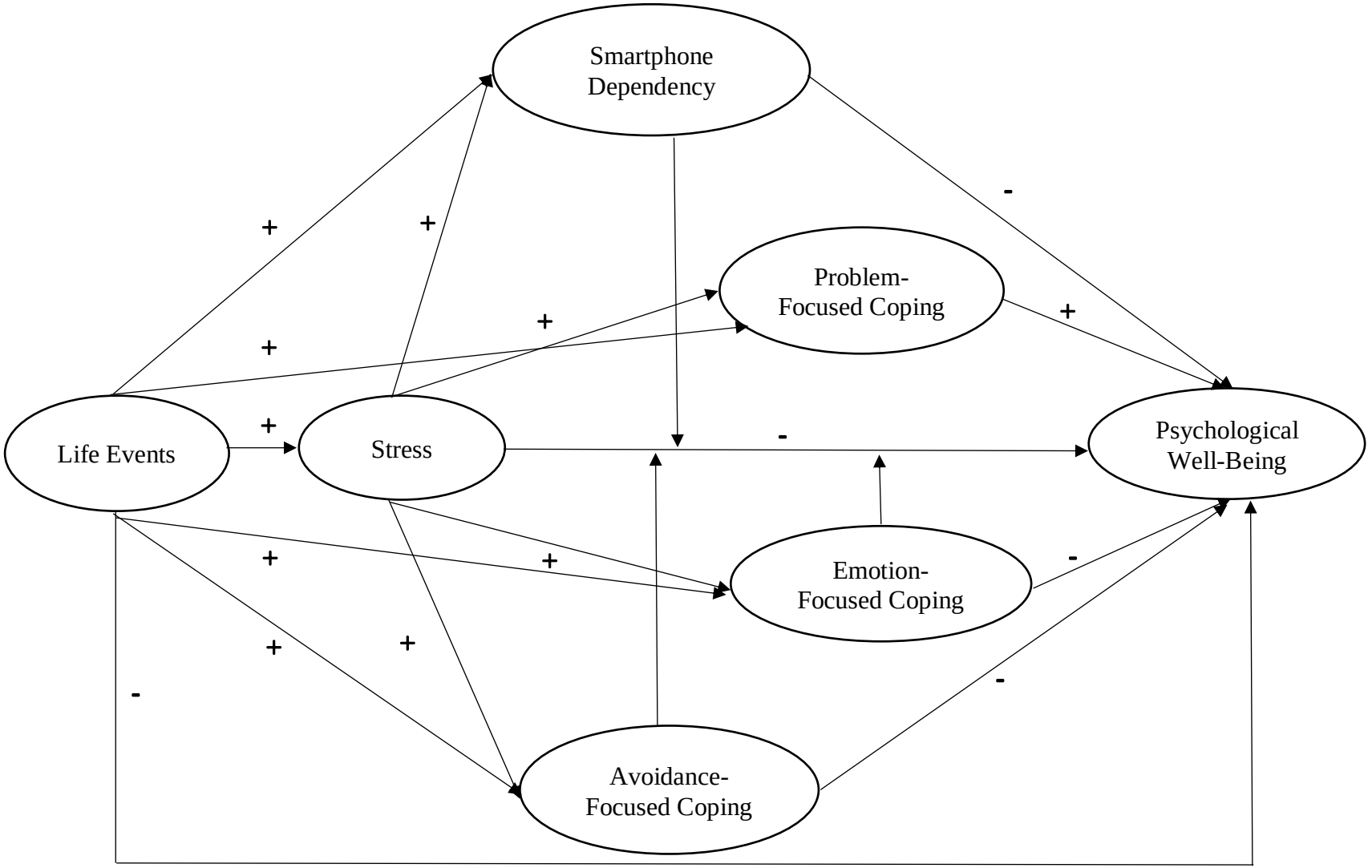


Figure 2. Proposed psychological well-being model.

Furthermore, many recent studies have used Lazarus and Folkman's (1984) theoretical framework as their conceptual model to understand the stress and coping process (Garcia, 2010; Garriott & Nisle, 2018; Gnilka, Ashby, Matheny, Chung, & Yuhsuan Chang, 2015; Hawken, Turner-Cobb, & Barnett, 2018; Labrague, McEnroe–Petitte, De Los Santos, & Edet, 2018; Sladek, Doane, Luecken, & Eisenberg, 2016). In this study, the proposed model considers smartphone dependency as a unique mechanism for dealing with stress, which can help predict psychological well-being of Malaysian undergraduate students. In addition, the investigation whether coping behaviors and smartphone dependency moderate the relationship between stress and psychological well-being is a significant contribution to the understanding of stress and coping.

Life Events, Perceived Stress and Psychological Well-Being

University students are in transition from dependent living of school and home environment to independent living in a university setting. The students experience various stressors during their university years. For instance, in Malaysia, a survey conducted among students at four public universities found that the ten highest stressors included examinations, large amount of content to be learned, poor grades, lack of time to review what had been learned, self-expectation, falling behind in reading schedule, not enough medical skills practice, heavy workload, having difficulty to understand the content, and unable to answer the questions from teachers (Yusoff et al., 2011). In addition, students perceived stressors from relationships (e.g., family, peer, romantic, and relationship with faculty), lack of resources (e.g., time, money, support, skills and technology), academics, environments (e.g., unfamiliar and being in a different country), expectations, diversity, and transitions (Hurst, Baranik, & Daniel, 2013). In the present study, I used the Life Events Scale for Students (LESS) developed by Linden (1984).

This scale consisted of 36 items to measure life events for college students. Even though it was developed in 1984, it is still used by current empirical studies such as Bilevicius et al. (2018) and Buri (2018). Buri (2018) only used ten items in Linden's scale to measure negative life events among students, and he reported that the most common negative life events among students were "having experienced serious conflict/arguments/disagreements with your best friends," "having serious breakup with your boyfriend or girlfriend," "serious illness or injury to a close family member," "serious personal illness or injury to yourself," and "personally coping with an addiction or some other psychological/emotional problem."

Dusselier, Dunn, Wang, Shelley, and Whalen (2005) reported that stressors such as conflict with roommates and faculty members were significant predictors of stress. This, in turn, can affect a student's psychological well-being. A previous study consisting of 1257 students at the University of Geneva, Switzerland, found that higher levels of perceived stress were associated with poor psychological well-being (Bovier, Chamot, & Perneger, 2004). In this proposed study, I view the concept of psychological well-being as subjective well-being (Diener, 1984). Psychological well-being also refers to "lives going well. It is the combination of feeling good and functioning effectively" (Huppert, 2009, p. 137). In summary, I proposed that life events will be negatively associated with stress and stress will be negatively associated with psychological well-being.

Coping Behaviors, Perceived Stress and Psychological Well-Being

Coping behaviors can play an important role in determining the psychological well-being of university students. For instance, a recent study found that high use of avoidant focused coping is significantly associated with high levels of stress and lower

psychological well-being (Gautam & Madnawat, 2017). Other previous studies conducted among college seniors from a public university in the Midwest of the United States found that avoidant-emotional coping was positively associated with perceived stress, and active-emotional coping was negatively associated with perceived stress (Deatherage et al., 2014). Another study found that less problem-focused coping is associated with poor psychological well-being (Julal, 2013).

In Malaysia, a study conducted among 148 students (Chinese = 140 and other ethnic groups = 8) found that avoidant-coping and social support coping behaviors were positively associated with perceived stress In addition, a survey conducted among 100 international students aged 18-30 years old found that coping behaviors (e.g., positive reinterpretation and growth, venting, humor, behavioral disengagement, and substance use) were predictors of psychological outcome (Sapranaviciute, Padaiga, & Pauzienė, 2013).

In summary, this study investigated associations between coping behaviors and perceived stress to understand psychological well-being by examining respondents' use of adaptive coping (problem-focused coping) and maladaptive coping (avoidant-focused and emotion-focused coping). In addition, I hypothesized that the three coping behaviors mediate and moderate the association between perceived stress and psychological well-being. High problem-focused, low emotion-focused, and low avoidant-focused coping may buffer against stress associated with psychological well-being.

Smartphone Dependency, Perceived Stress and Psychological Well-Being

Nowadays, college students are more likely to be exposed to all types of current technology in order to meet the demands of their academic and social lives (Browning, Gerlich, & Westermann, 2011). The technologies that are frequently used by college students to actively engage in many types of online activities include social networking, online learning, texting, blogging, and much more (Browning et al., 2011). Online activities can be connected via various devices such as laptops, tablets, desktop computers, and cell phones.

The smartphone has become an important lifestyle tool for college students in order for them to connect with a variety of social networking sites (SNS) such as Facebook, Twitter, LinkedIn, Google+, and YouTube (Al-Harrasi & Al-Badi, 2014; Cassidy et al., 2011; Hingorani, Askari-Danesh, & Woodard, 2012). Moreover, 51% of undergraduate students in the United States expressed the importance of mobile social networking sites because it makes them feel connected to others (Dahlstrom & Bichsel, 2014). In a survey of 6240 college students at Sam Houston State University (SHSU), Cassidy et al. (2011) found that 98.8% of respondents owned a smartphone. The features of a smartphone allow users easy access to the internet. This is because a smartphone can be held in a hand and stored in a pocket compared to other technology devices such as a laptop or a desktop computer.

Although the smartphone provides many advantages to users especially in usage of mobile SNS, there are some disadvantages of using a smartphone. One of the disadvantages is in terms of smartphone overuse. The increased use of smartphones can lead to increased use of SNS usage which in turn may result in a problematic smartphone use (Pearson & Hussain, 2016). The overuse of smartphones for social purposes has a

tendency to develop smartphone habits faster and consequently is linked with addictive smartphone behavior (van Deursen, Bolle, Hegner, & Kommers, 2015). The overuse of smartphones refers to "uncontrollable use of one's smartphone, preferring to conduct searches using one's smartphone to asking help from other people, always preparing one's charging pack, and feeling the urge to use one's smartphone again right after one stopped using it" (Kwon et al., 2013, p. 17). The term "smartphone overuse" is also known as smartphone dependency, compulsive smartphone overuse or smartphone addiction (Billieux, Linden, D'Acremont, Ceschi, & Zermatten, 2007; Chóliz, 2010; Lin et al., 2014).

Thomée et al. (2011) assessed the mobile phone use in terms of frequency of calls, SMS messages, being awakened at night by the mobile phone, perceived demands on availability, and perceived accessibility via mobile phone with the consequence of additional stress, and overuse. The study found that a high frequency of mobile phone use was negatively associated with psychological well-being outcomes (i.e., current stress, sleep disorder, and symptoms of depression, Thomée et al., 2011). In addition, problematic smartphone use was positively associated with depression symptoms (Elhai, Dvorak, Levine, & Hall, 2017). Elhai, Dvorak et al. (2017) assessed problematic smartphone use with a scale known as the Smartphone Addiction Scale (SAS) developed by Kwon et al. (2013). According to previous studies, smartphone usage was positively associated with perceived stress among university students (Chiu, 2014; Kim, Liu, & Shan, 2017; Samaha & Hawi, 2016; Younes et al., 2016). A survey conducted among 267 college seniors found that going online because it is exciting and fun reduces the stress level because it helps with stress relief and to forget the problems that increase stress

(Deatherage et al., 2014). Another study conducted among 600 students at Saint-Joseph University, Lebanon, found that internet addiction was correlated with anxiety and depression (Younes et al., 2016). Also, a survey conducted among female undergraduate students from three universities in Taiwan found that smartphone addiction was associated with anxiety (Hong et al., 2012).

In summary, the previous studies above triggered my interest in identifying the relationships between life events, perceived stress, smartphone dependency, coping behaviors, and psychological well-being. Table 1 summarizes the hypotheses. First, based on the literature, students face various stressors and psychological changes. Adjusting to these changes requires students to be flexible and develop effective coping skills which are common during this period in their lives. Second, today's younger generation is more likely to interact with their friends through a variety of social networking sites via smartphone rather than using face-to-face interactions such as previous generations. Based on previous studies, high levels of smartphone dependency have been linked with adverse psychological outcomes. Therefore, I conducted this study among college students at one public university in Malaysia.

Research Questions

The following research questions and corresponding hypotheses were guided by the existing literature:

Table 1

Research Questions and Hypotheses

	Research Questions (RQ)	**Hypotheses (H)**
RQ1	Is there a significant relationship between life events and perceived stress among undergraduate students in Malaysia?	H1: Life events will be positively associated with perceived stress among undergraduate students in Malaysia.
RQ2	Is there a significant relationship between perceived stress and psychological well-being among undergraduate students in Malaysia?	H2: Perceived stress will be negatively associated with psychological well-being among undergraduate students in Malaysia.
RQ3	Is there a significant relationship between life events and psychological well-being among undergraduate students?	H3: Life events will be negatively associated with psychological well-being among undergraduate students in Malaysia.
RQ4	Is there a significant relationship between perceived stress and smartphone dependency among undergraduate students?	H4: Perceived stress will be positively associated with smartphone dependency among undergraduate students in Malaysia.

Table 1 *continued*

Research Questions (RQ)		**Hypotheses (H)**
RQ5	Is there a significant relationship between perceived stress and coping behaviors (i.e., problem-focused, emotion-focused, and avoidance-focused coping) among undergraduate students in Malaysia?	H5a: Perceived stress will be positively associated with problem-focused coping among undergraduate students in Malaysia; H5b: Perceived stress will be positively associated with emotion-focused coping among undergraduate students in Malaysia; and H5c: Perceived stress will be positively associated with avoidance-focused coping among undergraduate students in Malaysia.
RQ6	Is there a significant relationship between smartphone dependency and psychological well-being among undergraduate students in Malaysia?	H6: Smartphone dependency will be negatively associated with psychological well-being among undergraduate students in Malaysia.
RQ7	Is there a significant relationship between coping behaviors (i.e., problem-focused, emotion-focused, and avoidance-focused coping) and psychological well-being among undergraduate students in Malaysia?	H7a: Problem-focused coping will be positively associated with psychological well-being among undergraduate students in Malaysia; H7b: Emotion-focused coping will be negatively associated with psychological well-being among undergraduate students in Malaysia; and H7c: Avoidance-focused coping will be negatively associated with psychological well-

Table 1 *continued*

Research Questions (RQ)		**Hypotheses (H)**
		being among undergraduate students in Malaysia.
RQ8	Does perceived stress mediate the relation between life events, smartphone dependency, coping behaviors, and psychological well-being among undergraduate students in Malaysia?	H8a: The relationship between life events and psychological well-being will be mediated by perceived stress. That is, life events lead to increased perceived stress which in turn leads to poor psychological well-being. H8b: The relationship between life events and smartphone dependency will be mediated by perceived stress. That is, life events lead to increased perceived stress which in turn leads to increased smartphone dependency. H8c: The relationship between life events and problem-focused coping will be mediated by perceived stress. That is, life events lead to increased perceived stress which in turn leads to increased problem-focused coping. H8d: The relationship between life events and emotion-focused coping will be mediated by perceived stress. That is, life events lead to increased perceived stress which in turn leads to increased emotion-focused coping.

Table 1 *continued*

Research Questions (RQ)		**Hypotheses (H)**
		H8e: The relationship between life events and avoidance-focused coping will be mediated by perceived stress. That is, life events lead to increased perceived stress which in turn leads to increased avoidance-focused coping.
RQ9	Does smartphone dependency mediate the relation between perceived stress and psychological well-being among undergraduate students in Malaysia?	H9: The relationship between perceived stress and psychological well-being will be mediated by smartphone dependency. That is, stress leads to increased smartphone dependency which in turn leads to poor psychological well-being.
RQ10	Do coping behaviors (i.e., problem-focused, emotion-focused, and avoidance-focused coping) mediate the relation between perceived stress and psychological well-being among undergraduate students in Malaysia?	H10a: The relationship between perceived stress and psychological well-being will be mediated by problem-focused coping. That is, perceived stress leads to increased problem-focused coping, which in turn leads to healthy psychological well-being; H10b: The relationship between perceived stress and psychological well-being will be mediated by emotion-focused coping. That is, perceived stress leads to increased emotion-focused coping, which in turn leads to poor psychological well-

Table 1 *continued*

Research Questions (RQ)		**Hypotheses (H)**
		being; and H10c: The relationship between perceived stress and psychological well-being will be mediated by avoidance-focused coping. That is, perceived stress leads to increased avoidance-focused coping, which in turn leads to poor psychological well-being.
RQ11	Does smartphone dependency moderate the relation between perceived stress and psychological well-being among undergraduate students in Malaysia?	H11: Low level of smartphone dependency weakens the association between perceived stress and psychological well-being.
RQ12	Do coping behaviors (problem-focused coping, emotion-focused-coping, and avoidance-focused coping) moderate the relation between perceived stress and psychological well-being among undergraduate students in Malaysia?	H12a: High levels of problem-focused coping weakens the association between perceived stress and psychological well-being; H12b: Low levels of emotion-focused-coping weakens the association between perceived stress and psychological well-being; and H12c: Low levels of avoidance-focused-coping weakens the association between perceived stress and psychological well-being.

CHAPTER 3. METHODOLOGY

This chapter highlights the research design, sample, procedure, measures, and data analyses. The main objective of this study was to identify the relationships between life events, perceived stress, coping behaviors, smartphone dependency, and psychological well-being among undergraduate students at Universiti Malaysia Pahang, Malaysia. Besides, the present study addressed also the mediating and moderating effects of coping behaviors and smartphone dependency on the relation between perceived stress and psychological well-being among undergraduate students at the UMP. Therefore, this study utilized a cross-sectional and quantitative approach to explain the relationship between life events, perceived stress, smartphone dependency, coping behaviors (i.e., problem-focused, emotional-focused, and avoidance-focused coping), and psychological well-being. Undergraduate students completed surveys that measured demographic information (e.g., age, gender, ethnicity, year of study, school, and so forth), life events, perceived stress, smartphone dependency, coping behaviors, and psychological well-being.

Sample

In the present study, the sample was collected at two UMP campuses (i.e., Gambang and Pekan). Historically, the UMP was formerly known as Kolej Universiti Kejuteraan dan Teknologi Malaysia (KUKTEM). This university was established as a public technical university by the Malaysian government on 16 February 2002. On October 2006, KUKTEM was renamed to Universiti Malaysia Pahang. There are nine colleges in the university (i.e., Chemical and Natural Resources Engineering, Civil Engineering and Earth Resources, Computer Systems and Software Engineering,

Industrial Sciences and Technology, Engineering Technology, Industrial Management, Electrical and Electronics Engineering, Manufacturing Engineering, and Mechanical Engineering). In 2017, the total population of UMP consisted of 12,104 students, including undergraduate and postgraduate students. Approximately 11,113 of the total population consisted of undergraduate students.

I used a convenience sampling design to recruit the participants and computed several preliminary analyses before analyzing the data. First, I examined missing data. Of the 304 students who completed the survey, one participant was removed because the student failed to respond to all items on perceived stress. Overall, 20 out of 303 participants had missing data. Furthermore, not more than 20 variables had missing data, and no participant had more than three missing data. Therefore, I used individual mean substitution to replace the missing data. Also, there was a student who wrote that her ethnicity was Indian Muslim but coded it as "4" (other ethnic). Thus, I changed the code to "3" (Indian). Table 2 displays frequencies, percentages, minimum, maximum, mean, and standard deviation for age, gender, ethnicity, year of study, and college. The descriptive data reported in this study are based on 303 participants. The average age of the students was 21 years old, ranging from 19 to 28 years. About 52.8% of this sample was between 21 and 22 years old, followed by 30% between 19 and 20, and the remaining 17.2% were between 23 and 28 years old. Of the 303 undergraduate students, 60.4% were female and 39.6% were male. In 2011, the distribution between men and women at this university was 54% and 46%, respectively.

Regarding ethnicity of the sample, the majority of the students were Malay (74.6%), followed by Chinese (15.8%), Indian (6.6%), and others (3%). The other ethnic

Table 2

Summary of Descriptive Statistics

Variables	Frequency	(%)	Min	Max	Mean	*SD*
Age			19	28	21.29	1.60
19-20	91	(30.0)				
21-22	160	(52.8)				
23-28	52	(17.2)				
Total	303	(100.0)				
Gender						
Female	183	(60.4)				
Male	120	(39.6)				
Total	303	(100.0)				
Ethnicity						
Malay	226	(74.6)				
Chinese	48	(15.8)				
Indian	21	(6.9)				
Other Ethnics	8	(2.6)				
Total	303	(99.9)				
Year of Study						
First Year	130	(42.9)				
Second Year	82	(27.1)				
Third Year	16	(5.3)				
Fourth Year	75	(24.8)				
Total	303	(100.1)				
College						
CSSE	68	(22.4)				
MFE	61	(20.1)				
EEE	55	(18.2)				
CNRE	32	(10.6)				
MCE	31	(10.2)				
CEER	24	(7.9)				
ET	14	(4.6)				
IM	14	(4.6)				
IST	4	(1.3)				
Total	303	(99.9)				

Note. *N* = 303. CSSE = Computer Systems and Software Engineering; MFE = Manufacturing Engineering; EEE = Electrical and Electronics Engineering; CNRE = Chemical and Natural Resources Engineering; MCE = Mechanical Engineering; CEER = Civil Engineering and Earth Resources; ET = Engineering Technology; IM = Industrial Management; IST = Industrial Sciences & Technology. Percentages may not add up to 100 dues to rounding.

groups included Bajau, Iban, Kadazan-Dusun, Melanau, Murut, and Siam. Furthermore, the sample were first year (42.9%), second year (27.1%), third year (5.3%), and fourth year (24.8%) students. The percentage of third year students were small, perhaps because the survey was conducted during their industrial training and many were off-campus. In terms of college, 22.4% of the participants were from the school of Computer Systems and Software Engineering followed by Manufacturing Engineering (20.1%), Electrical and Electronics Engineering (18.2%), Chemical and Natural Resources Engineering (10.6%), Mechanical Engineering (10.2%), Civil Engineering and Earth Resources (7.9%), Engineering Technology (4.6%), Industrial Management (4.6%), and Industrial Sciences and Technology (1.3%).

Procedure

Before data collection began, the Institutional Review Board (IRB) approved all procedures used in this study (Appendix A). Also, before proceeding with data collection, I obtained a permission letter from the UMP. This letter is essential for verification purpose that allows data collection to be conducted at the university. First, I connected with the potential participants with the help of the UMP's administration. Information about the survey was advertised through an online announcement. Interested participants contacted graduate students and came to a specific venue, date, and time to participate in the survey. Second, a trained graduate student met all the participants and distributed consent forms that were attached to the questionnaires.

As guided by the IRB, I provided an alternative training through a virtual meeting platform about ethics and procedures of data collection to the graduate student and a data entry research staff prior data collection. Before answering the survey, the trained graduate student verbally explained the purpose of the study, the rights of the

respondents, the way the questionnaires would be answered, and the confidentiality of the respondents. During this stage, the participants had an opportunity to discuss any questions related to the consent form, and the trained graduate student was assuring of participants' rights to voluntary participation. Only then, the students signed the informed consent forms, answered the surveys, and returned them to the graduate student. After completing the data collection, the graduate students sent all the questionnaires for data capture and imaging service. Through this service, the raw data were transferred into PDF format and recorded into an SPSS file. Finally, all the PDF and SPSS files were transmitted electronically.

Measures

This section summarizes the measurements: the demographic variables, Perceived Stress Scale, Life Event Scale for Students, Smartphone Addiction Scale, Brief COPE, and Satisfaction with Life Scale. A copy of the measurements including the English and Malay versions can be found in the Appendix.

Demographic Variables

The demographic variables collected consisted of age, gender, ethnicity, year of study, school, and so forth (see Appendix B). In this study, the coding for gender variable was 1 (*female)* and 2 *(male)*. For descriptive statistics, I used four groups to describe ethnicity in this sample. I collapsed the ethnicity variable into four groups and then coded the four groups as 1 *(Malay)*, 2 *(Chinese)*, 3 *(Indian)*, and 4 (*other ethnicity).* For mean differences, I collapsed ethnicity into two groups (i.e., Malay and Non-Malay) due to the small sample size of Chinese, Indian, and other ethnic groups. Then, the year of study variable was coded into 1 *(first year)*, 2 *(second year*), 3 *(third year)*, and 4 *(fourth year)*. The school variable was coded in nine ways: 1 *(Chemical and Natural Resources*

Engineering), 2 *(Civil Engineering and Earth Resources)*, 3 *(Computer Systems and Software Engineering)*, 4 *(Industrial Sciences & Technology)*, 5 *(Engineering Technology)*, 6 *(Industrial Management)*, 7 *(Electrical and Electronics Engineering)*, 8 *(Manufacturing Engineering)*, and 9 *(Mechanical Engineering)*. Then, a single question asked, "Do you have a social networking account?" with 0 *(no)* and 1 *(yes)*. If the participants specified yes, then they were asked, "What types of social networking account do you use?" A dichotomous classification with 0 *(no)* and 1 *(yes)* was created for Facebook, Twitter, Instagram, Snapchat, and others. If participants specified 4 *(other)*, they had an opportunity to share the different types of social networking they use by filling in a blank space. Finally, participants' reasons to use a smartphone was assessed with dichotomous classification with 0 *(no)* and 1 *(yes)* for internet, social networking sites, games, telephone calls, and learning.

Life Event Scale for Students

I used the Life Event Scale for Students (LESS) to measure participants' life events (Linden, 1984). The LESS is a measure to obtain information relative to the college students' life events with a 36-dichotomous item response set. The original instrument of the LESS measured Canadian college students' life events. Therefore, as part of a validity check, I removed seven items (i.e., jail term, pregnancy, seeking psychological or psychiatric consultation, sex difficulties with boy/girlfriend, getting your own car, getting kicked out of school, and beginning an undergraduate program at the university) to make this measurement appropriate to the Malaysian context. As a result, there were 29 items to measure life events among participants. The Malay version of this scale was translated using a standard forward and backward method by two bilingual translators (see Appendix C). Participants indicated whether they had

experienced certain life events over the past six months, with a value of 0 indicating "*no*" and 1 "*yes*." I computed a summary score of the LESS with a higher score on this scale reporting more life events. I used the LESS for describing life events among students at UMP.

Perceived Stress Scale

This study used the Perceived Stress Scale (PSS) developed by Cohen, Kamarck, and Mermelstein (1983). This scale has been used to measure the degree to which situations are appraised as stressful among medical students at a private university in Malaysia (Al-Dubai, Alshagga, Rampal, & Sulaiman, 2012; Al-Dubai, Barua, Ganasegeran, Jadoo, & Rampal, 2014). The Malay version of the PSS is a valid and reliable measurement to assess perceived stress among Malaysian university students (Al-Dubai et al., 2012). The Malay version (see Appendix D) has been translated by two bilingual language experts using a forward and backward translation procedure. Cronbach's alpha value for the Malay version was .72 (Al-Dubai et al., 2014). The PSS consists of 10 items ranging from 0 *(never)* to 4 *(very often).* There are two subscales in the PSS which are "positive" (4 items), and "negative" (6 items). Sample items include, "In the last month, how often have you been upset because of something that happened unexpectedly?" (negative) also, "In the last month, how often have you felt that things were going your way?" (positive). Scores were computed by reversing the positive items and then average scores were summed with a higher score corresponding to more perceived stress. The mean score of this scale was used to compute ANOVA and Pearson correlation analyses. Then, a latent variable for PSS was created for confirmatory factor analyses, structural equation modeling, and latent variable interaction terms.

Smartphone Addiction Scale

The 33 items of Smartphone Addiction Scale (SAS) was used to measure smartphone dependency (see Appendix E). The SAS was developed by (Kwon et al., 2013) and showed an excellent Cronbach's alpha value of .97. Also, it has been used in Malaysia, and the Malay version yielded a Cronbach's alpha value .94 (Ching et al., 2015). Ching et al. (2015) found that this scale was a valid scale for assessing smartphone dependency in Malaysian undergraduate students. A standard forward and backward translation procedure was performed to translate the scale from English into the Malay language by two bilingual language experts (Ching et al., 2015). The SAS consisted of six dimensions which are cyberspace-oriented relationship (α = .88), daily life disturbance (α = .84), primacy (α = .86), overuse (α = .84), positive anticipation (α = .87), and withdrawal (α = .87). The majority of the components in the Malay version was reported as the same as the original version of the SAS accept for "primacy" which is different from the "tolerance." Sample items include, "Missing planned work due to smartphone use" (daily life disturbance), "Feeling calm and cozy while using smartphone" (positive anticipation), "Won't be able to stand not having a smartphone" (withdrawal), "Feeling great meeting more people via smartphone" (cyberspace-oriented relationship), "My fully charged battery does not last for one whole day" (overuse), "There is nothing other than smartphone use that is fun to do in my life" (primacy). All the items were rated on a 6-point-Likert scale ranging from 1 *(strongly disagree)* to 6 *(strongly agree)*. A summary score for daily life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse, and primacy was created. The mean score of the six dimensions was used to compute mean differences. A higher score on the SAS indicates greater smartphone dependency. I used 33 items of this scale to

create a latent variable for smartphone dependency and to compute confirmatory factor analyses, structural equation modeling, and latent interaction terms.

Coping Behaviors Scale

The Brief COPE (Carver, 1997) was used to measure coping behaviors. This scale consisted of 28 items (see Appendix F) and was rated based on a 4 point-Likert scale ranging from 1 *(I haven't been doing this at all)* to 4 *(I've been doing this a lot)*. This scale is comprised of 14 subscales: active coping (α = .68), planning (α = .73), positive reframing (α = .64), acceptance (α = .57), humor (α = .73), religion (α = .82), using emotional support (α = .71), using instrumental support (α = .64), self-distraction (α = .71), denial (α = .54), venting (α = .50), substance use (α = .90), behavioral disengagement (α = .65), and self-blame (α = .69). However, in this study three factors were used: problem-focused coping (active coping, planning, instrumental support, and religion scales), emotion-focused coping (venting, positive reframing, humor, acceptance, and emotional support scales), and avoidance-focused coping (self-distraction, denial, behavioral disengagement, self-blame, and substance use scales). Sample items included "I've been concentrating my efforts on doing something about the situation I'm in" (problem-focused coping), "I've been getting emotional support from others" (emotion-focused coping), and "I've been saying things to let my unpleasant feelings escape" (avoidance-focused coping). The Brief COPE has been validated for the Malay version (Yusoff, 2011). Two bilingual experts translated the Malay version using forward and backward procedure.

The full Cronbach's alpha value for the Malay version was .83. Yusoff (2011) computed factor analysis using principal component analysis with promax rotation to assess the construct validity of the Brief COPE Inventory. About 71.5% of the total

variance was accounted for by nine factors. The nine factors were factor 1 (self-blame and behavioral disengagement), 2 (use of emotional support and use of instrumental support), 3 (positive reinterpretation and planning), 4 (Religion), 5 (Self-distraction), 6 (Active Coping and Acceptance), 7 (Humor), 8 (Venting), and 9 (Denial). In this current study, I used the three factors as described by Schnider et al. (2007). A summary score for problem-focused, emotion-focused, and avoidant-focused coping was created by computing scores across all items in the problem-focused, emotion-focused, and avoidant-focused coping subscales. A higher score in each of the subscales indicates a higher intensity of using problem-focused, emotion-focused, and avoidant-focused coping. Then, I created a latent variable for problem-focused, emotion-focused, and avoidant-focused coping for computing confirmatory factor analyses, structural equation modeling, and latent interaction terms. In this study, I used the active coping, planning, instrumental support, and religion subscales to create the latent variable for problem-focused coping. Second, I used venting, positive reframing, humor, acceptance, and emotional support subscales to create the latent variable for avoidance-focused coping. Third, I used self-distraction, denial, behavioral disengagement, self-blame, and substance use subscales to create a latent variable for avoidance-focused coping.

Psychological Well-Being Scale

I used the Satisfaction With Life Scale (SWLS) to assess psychological well-being (Diener, Emmons, Larsen, & Griffin, 1985). The SWLS consists of 5 items that were scored on a 7-point Likert scale, ranging from 1 *(strongly disagree)* to 7 *(strongly agree).* Sample items include: “In most ways my life is close to my ideal” and “I am satisfied with my life.” Higher scores indicate higher psychological well-being. The mean score was used to compute ANOVA and Pearson correlation analyses. The SWLS has

been used and validated in the Malaysian context to measure the subjective well-being of undergraduate students (Swami et al., 2007). Cronbach's alpha reported for the Malay version of the SWLS scale was .83 (Swami & Chamorro-Premuzic, 2009). The Malay text has been translated using a standard forward and backward method by two bilingual translators (see Appendix G). Then, a latent variable was created for psychological well-being to compute confirmatory factor analyses, structural equation modeling, and latent interaction terms.

Scale Reliability

I computed reliability tests to find internal consistency of each measurement in this present study. Table 3 displays Cronbach's alpha values for all instruments in this study. Cronbach's alpha ranged from .70 to .92. These are acceptable values for a reliable scale (Field, 2013). All the measurements in this study were above .70. As such, the Cronbach's alpha value were acceptable, and the measurements were reliable.

Table 3

Scale Reliability Coefficient for Study Scales (N =303)

Measurements	Number of Items	Cronbach's α
Perceived Stress Scale	10	.77
Life Event Scale for Student	31	.76
Smartphone Addiction Scale	33	.92
Cyberspace-oriented Relationship	7	.81
Daily Life Disturbance	6	.77

Table 3 *continued*

Measurements	Number of Items	Cronbach's α
Primacy	5	.87
Overuse	7	.82
Positive Anticipation	4	.80
Withdrawal	4	.80
Brief COPE		
Problem-Focused Coping	8	.83
Emotion-Focused Coping	10	.75
Avoidance-Focused Coping	10	.72
Satisfaction with Life Scale	5	.79

Data Analyses

The data in this study were analyzed using the Statistical Package for the Social Science (SPSS version 24) and M*plus* Software. The following sections provide an overview of the analyses.

Descriptive Analyses

Descriptive statistics (i.e., frequency, percentages, means, standard deviations, minimum, and maximum) were computed to describe the information on demographic characteristics (e.g., gender, year of study, faculty, ethnicity, etc.), perceived stress, smartphone dependency (i.e., cyberspace-oriented relationship, daily life disturbance, primacy, overuse, positive anticipation, and withdrawal), coping behaviors (i.e., problem-focused, emotion-focused, and avoidance-focused coping), and psychological well-being among undergraduate students.

Mean Differences

Next, I computed mean differences to identify gender, ethnicity, and year of study differences in perceived stress, smartphone dependency dimensions, three types of coping behaviors, and psychological well-being. First, 2 (gender) X 2 (ethnicity) X 3 (year of study) analyses of variance (ANOVA) were computed to identify mean differences of perceived stress, and psychological well-being. For the mean differences, I divided ethnicity into two groups and coded the two groups as 1 (*Malay*) and 2 (*Non-Malay*). Non-Malay included Chinese, Indian and other ethnic. Then, the year of study variable was coded into 1 (*first year*), 2 (*second year*), and 3 (*third and fourth year)*. Secondly, for the mean differences of 2 (gender) X 2 (ethnicity) X 3 (year of study) of smartphone dependency (i.e., cyberspace-oriented relationship, daily life disturbance, primacy, overuse, positive anticipation, and withdrawal) and coping behaviors (i.e., problem-focused, emotion-focused, and avoidance-focused coping), I performed MANOVA analyses.

Correlation Analyses

Pearson correlations were computed to examine statistical associations among the variables. The following variables were included in the analyses: perceived stress, smartphone dependency (i.e., cyberspace-oriented relationship, daily life disturbance, primacy, overuse, positive anticipation, and withdrawal), coping behaviors (i.e., problem-focused coping, emotion-focused coping, and avoidance-focused coping), and psychological well-being.

Measurement Model

First, I computed confirmatory factor analyses (CFA) using M*plus* to examine the measurement model in this study. At this step, pooled-CFA for all latent constructs was applied and executed at once. Perceived stress, problem-focused, emotion-focused, avoidance-focused coping, smartphone dependency was measured by three item parcels (Table 4). Items were randomly assigned to one of the parcel groups. Because psychological well-being consists of only five predictors, exploratory factor analysis (EFA) was computed to select four items as indicators for the latent variable of the psychological well-being. As a result, I selected item 1, 2, 3, and 4 as indicators of psychological well-being. Next, to determine how well this model fits with the data, I used the goodness of fit indices of a statistical test including the chi-square (χ^2), the root mean squared error of approximation (RMSEA), and the comparative fit index (CFI). A χ^2 with *p* values larger than .05 indicates the model fits with the data. A cut-off value close to .06 or lower for the RMSEA and .95 or higher for the CFI were used as a guideline (Hu & Bentler, 1999) for acceptable fit.

Table 4

Measurement Model for Perceived Stress, Coping Behaviors, Smartphone Dependency, and Psychological Well-Being

Variables	Parcel	Items
Perceived Stress	PSP1	1, 3, 7 & 9
	PSP2	4, 6, & 8
	PSP3	2, 5, & 10
Coping Behaviors		
Problem-Focused Coping	PFCP1	3, 11 & 25

Table 4 *continued*

Variables	Parcel	Items
	PFCP2	4, 19 & 26
	PFCP3	12 & 20
Emotion-Focused Coping	EFCP1	9, 15, 18 & 24
	EFCP2	17, 21 & 23
	EFCP3	10, 16 & 22
Avoidance-Focused Coping	AFCP1	2, 5, &13
	AFCP2	6, 8, & 27
	AFCP3	1, 14, 7 & 28
Smartphone Dependency		
	SDP1	17, 1, 6, 5, 9, 12, 14, 19, 23, 31, & 26
	SDP2	33, 18, 21, 24, 28, 4, 7, 10, 13, 16, & 30
	SDP3	20, 22, 2, 3, 8, 32, 11, 15, 25, 27, & 29
Psychological Well-Being	PW	1, 2, 3, & 4

Note. PSP1, PSP2, PSP3 = Item Parcels of Perceived Stress; PFCP1, PFC2, PFC3 = Item Parcels of Problem-Focused Coping; EFCP1, EFCP2, EFCP3 = Item Parcels of Emotion-Focused Coping; AFCP1, AFCP2, AFCP3 = Item Parcels of Avoidance-Focused Coping; SDP1, SDP2, SDP3 = Item Parcels of Smartphone Dependency; PW = Psychological Well-Being.

Structural Model

Next, I computed the structural model to assess the direction of the relationships between the six constructs and to improve the overall model fit. The variables operationalized in the model derived from the results of the CFA procedure. In this structural model, I tested the direct effect of 1) perceived stress on psychological well-being, three types of coping behaviors (i.e., problem-focused, emotion-focused and

avoidance-focused coping), and smartphone dependency, and 2) three types of coping behaviors (i.e., problem-focused, emotion-focused, and avoidance-focused coping) and smartphone dependency on psychological well-being. At this step, I used the goodness of fit indices of statistical tests (i.e., χ^2, RMSEA, and CFI) to evaluate the overall fit of the psychological well-being model.

Mediation Analyses

I used structural equation modeling with the bootstrapping method in M*plus* to identify the mediation effect of smartphone dependency and coping behaviors (i.e., problem-focused, emotion-focused, avoidance-focused coping) between stress and psychological well-being. The model includes specification of mediators (i.e., problem-focused, emotion-focused, and avoidance-focused coping, smartphone dependency) being predicted by perceived stress, and psychological well-being being predicted by both the mediators and perceived stress.

Moderation Analyses

I used latent interaction terms using M*plus* to test moderation effects of smartphone dependency, problem-focused, emotion-focused, and avoidance-focused coping with perceived stress on psychological well-being. Therefore, I created four latent interaction terms (i.e., perceived stress X smartphone dependency, perceived stress X problem-focused, perceived stress X emotion-focused, and perceived stress X avoidance-focused coping) and regressed psychological well-being on the interaction terms.

Missing Data

To handle missing data in SPSS, I replaced missing data using individual mean estimation. According to Schafer and Graham (2002), the acceptable percentage of missing data should be 5% or less to avoid bias in the statistical analysis. In contrast,

Bennett (2009) mentioned that less than 10% of the data missing is acceptable. However, there is no absolute cut-off point regarding the number of missing data that should be attempted to fill in to avoid bias in statistical analysis (Dong & Peng, 2013). In this study, I chose individual mean substitution to replace the missing data for SPSS file. For evaluating the structural equation model in M*plus*, I used full information maximum likelihood (FIML) as the default method to handle missing data.

CHAPTER 4. RESULTS

This study focused on perceived stress, smartphone dependency, coping behaviors, and psychological well-being among undergraduate students in Malaysia. Analyses were computed in SPSS 24.0 and M*plus* 8.1. First, I analyzed descriptive statistics, mean differences, bivariate correlations and structural equation modelling.

Descriptive Statistics

Social Networking Sites

As reported in Table 5, 98.7% of the students had social networking sites (SNS) accounts. Of these, 90.3% had Facebook, 89.0% had Instagram, 52.5% have Twitter, 27.1% had Snapchat, and 15.1% had other SNS accounts. Finally, most participants reported that they used their smartphone for Internet (91.1%) purposes, followed by social networking sites (81.5%), telephone calls (81.5%), learning (76.9%), and games (48.2%).

Table 5

Frequency of Social Networking Site Use (N = 303)

Variables	Frequency	Percentage (%)
Social networking account		
Yes	299	98.7
No	4	1.3
Total	303	100.0
Types of social networking account		
Facebook		
Yes	270	90.3
No	29	9.7
Total	299	100.0

Table 5 *continued*

Variables	Frequency	Percentage (%)
Instagram		
Yes	266	89.0
No	33	11.0
Total	299	100.0
Twitter		
Yes	157	52.5
No	142	47.5
Total	299	100.0
Snapchat		
Yes	81	27.1
No	218	72.9
Total	299	100.0
Other		
Yes	45	15.1
No	254	84.9
Total	299	100.0
Reason to use smartphone		
Internet		
Yes	276	91.1
No	27	8.9
Total	303	100.0
Social Networking Sites		
Yes	247	81.5
No	56	18.5
Total	303	100.0
Games		
Yes	146	48.2
No	157	51.8
Total	303	100.0
Telephone Calls		
Yes	247	81.5
No	56	18.5
Total	303	100.0
Learning		
Yes	233	76.9
No	70	23.1
Total	303	100.0

Table 6 displays descriptive statistics for perceived stress, life events, smartphone dependency, and psychological well-being.

Table 6

Summary of Study Variables

Variables	Min	Max	Mean	*SD*
Perceived Stress	0	34	21.82	4.56
Life Events	0	24	6.29	3.86
Smartphone Dependency	43	172	107.36	23.10
Overuse	7	42	25.46	6.49
DLD	6	35	20.91	5.56
COR	7	35	18.11	6.01
Positive Anticipation	4	24	16.30	3.47
Primacy	5	30	15.28	5.34
Withdrawal	4	22	11.31	3.86
Coping Behaviors				
Emotion-Focused Coping	12	39	26.93	4.76
Problem-Focused Coping	10	32	24.37	4.25
Avoidance-Focused Coping	10	34	20.36	4.33
Psychological Well-Being	5	35	22.91	5.57

Note. $N = 303$. COR = Cyberspace-oriented Relationship; DLD = Daily Life Disturbance.

First, results show that perceived stress ranged from 0 to 34 and had a mean of 21.82 ($SD = 4.56$). The average value for perceived stress in this sample was a bit higher compared to a study by Al-Dubai et al. (2012) among medical students in Malaysia ($M = 18.9$). Second, participants on average had a mean of 6.29 ($SD = 3.86$) for the life events scale (LESS), with a minimum and maximum value of 0 and 24, respectively. Third, on average, participants scored 107.36 ($SD = 23.10$) for smartphone dependency. Therefore, the average score for smartphone dependency in this sample was somewhat lower ($M =$

127.80) than a South Korean study conducted by Kwon et al. (2013). In term of smartphone dependency dimensions, on average, participants scored high on overuse (*M* = 25.46, *SD* = 6.49), followed by daily-life disturbance (*M* = 20.91, *SD* = 5.56), cyberspace-oriented relationship (*M* = 18.11, *SD* = 6.01), positive anticipation (*M* = 16.30, *SD* = 3.47), primacy (*M* = 15.28, *SD* = 5.34), and withdrawal (*M* = 11.31, *SD* = 3.86). Fourth, students in this sample scored high on emotion-focused coping (*M* = 26.93, *SD* = 4.76), followed by problem-focused coping (*M* = 24.37, *SD* = 4.25) and avoidance-focused coping (*M* = 20.36, *SD* = 4.33). Similarly, if compared to a study among students at a Midwestern U. S. state university, Schnider et al. (2007) indicated the highest coping behavior was emotion-focused coping (*M* = 17.90, *SD* = 5.18). However, compared to this sample, the second highest was avoidance-focused coping (*M* = 14.83, *SD* = 5.31), followed by problem-focused coping (*M* = 13.49, *SD* = 4.37). Finally, psychological well-being had a mean of 22.91 (*SD* = 5.57). The mean value in this sample was lower than a study conducted by Swami et al. (2007) among medical students at a local university in Malaysia (*M* = 24.5, *SD* = 4.80). Thus, this indicated that the level of psychological well-being of engineering students in this sample was lower than for the medical students (Swami et al., 2007).

Table 7 displays summary ratings for the events of LESS given by Malaysian students. Students were asked to indicate whether any of 29 different events had happened to them over the past six months. A higher percentage of students reported getting an unjustified low grade on a test (68.3%), minor financial problems (51.8%), minor violation of the law (29.7%), finding a part time job (29%), and seriously

Table 7

Frequency of Life Events for Malaysian Undergraduate Students

Life Events	Frequency (%)					
	No		Yes		Total	
Family get-together	86	(28.4)	217	(71.6)	303	(100)
Getting an unjustified low mark on a test	96	(31.7)	207	(68.3)	303	(100)
Vacation with parents	142	(46.9)	161	(53.1)	303	(100)
Minor financial problems	146	(48.2)	157	(51.8)	303	(100)
Vacation alone/with friends	151	(49.8)	152	(50.2)	303	(100)
Minor violation of the law (i.e., speeding ticket)	213	(70.3)	90	(29.7)	303	(100)
Finding a part-time job	215	(71.0)	88	(29.0)	303	(100)
Seriously thinking about dropping school	230	(75.9)	73	(24.1)	303	(100)
Failing a number of courses	233	(76.9)	70	(23.1)	303	(100)
Failing a course	233	(76.9)	70	(23.1)	303	(100)
Losing a good friend	238	(78.5)	65	(21.5)	303	(100)
Major and/or chronic financial problems	238	(78.5)	65	(21.5)	303	(100)
Minor car accident	243	(80.2)	60	(19.8)	303	(100)
Major change of health in close family member	246	(81.2)	57	(18.8)	303	(100)
Establishing new steady relationship with partner	253	(83.5)	50	(16.5)	303	(100)
Major personal injury or illness	257	(84.8)	46	(15.2)	303	(100)
Breakup with boy/girlfriend	258	(85.1)	45	(14.9)	303	(100)
Major car accident (car wrecked, people injured)	263	(86.8)	40	(13.2)	303	(100)
Major argument with boy/girlfriend	269	(88.8)	34	(11.2)	303	(100)
Death of your best or good friend	274	(90.5)	29	(9.5)	303	(100)
Death of parent	280	(92.4)	23	(7.6)	303	(100)
Moving out from home	281	(92.7)	22	(7.3)	303	(100)
Parent losing a job	282	(93.4)	20	(6.6)	302	(100)
Major argument with parents	287	(94.7)	16	(5.3)	303	(100)
Break up of parent's marriage/divorce	292	(96.4)	11	(3.6)	303	(100)
Change job	292	(96.4)	11	(3.6)	303	(100)
Moving out to town with parents	293	(96.7)	10	(3.3)	303	(100)
Losing a part-time job	294	(97.0)	9	(3.0)	303	(100)
Switch in program within same college or university	296	(97.7)	7	(2.3)	303	(100)

Note. $N = 303$.

thinking about dropping out of school (24.1%). In addition, students reported failing a number of courses (23.1%), losing a good friend (21.5%), major and/or chronic financial problems (21.5%), a minor car accident (19.8%), major change of health in a close family member (18.8%), establishing a new steady relationship with partner (16.5%), major personal injury or illness (15.2%), breakup with a boy/girlfriend (14.9%), major car accident (13.2%), and major argument with boy/girlfriend (11.2%). A small percentage of students reported a switch in program within the same college or university (2.3%), losing a part-time job (3%), moving out of town with parents (3.3%), break up of parent's marriage/divorce (3.6%), job change (3.6%), major argument with parents (5.3%), parent losing a job (6.6%), moving away from home (7.3%), death of a parent (7.6%), and death of best or good friend (9.5%).

Mean Differences

Analysis of Variance (ANOVA)

I used a 2 (gender) X 2 (ethnicity) X 3 (year of study) analysis of variance to identify mean differences in perceived stress and psychological well-being. Table 8 displays the results. The results yielded a significant main effect of gender on perceived stress, F (1, 291) = 5.41, $p < .05$. Women (M = 1.93) perceived higher stress than men (M = 1.72). Second, year of study had a significant effect on perceived stress, F (2, 291) = 8.65, $p < .001$. As reported in Table 8, a post hoc Tukey test revealed that perceived stress was significantly lower for first-year students than second- and third-year students. I used the Tukey HSD post hoc test because Levene's test found that the variance of perceived stress was equal across groups, F (11, 291) = 1.02, p = .43, and to control for Type I error.

Table 8

Means and Standard Deviations grouped by Gender, Ethnicity, and Year of Study on Perceived Stress, Psychological Well-Being, and Life Events

	Gender			Ethnicity			Year of Study			
	Female	Male		Malay	Non-Malay		First	Second	Third	
	M (*SD*)	*M* (*SD*)	*F*	*M* (*SD*)	*M* (*SD*)	*F*	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*
PS	1.93	1.72	5.41*	1.86	1.82	0.14	1.70_a	1.91_b	2.01_b	8.65***
	0.51	0.49		0.51	0.51		0.48	0.50	0.51	
PW	4.64	4.51	1.74	4.48	4.90	7.98**	4.72	4.50	4.47	1.36
	1.04	1.22		1.08	1.15		1.04	1.21	1.11	
LE	6.28	6.29	0.45	6.31	3.81	.32	5.84	6.96	6.32	.85
	3.65	6.30		3.81	4.10		3.55	4.03	4.08	

Table 8 *continued*

	Female		Male			Female			Male				Malay			Non-Malay			
	M	NM	M	NM		1st	2nd	3rd	1st	2nd	3rd		1st	2nd	3rd	1st	2nd	3rd	
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*
PS	1.95	1.86	1.70	1.78	0.73	1.80	1.94	2.12	1.57	1.83	1.88	0.19	1.71	1.91	2.04	1.68	1.90	1.94	0.11
	0.51	0.50	0.47	0.53		0.48	0.53	0.48	0.45	0.39	0.53		0.49	0.52	0.47	0.45	0.41	0.61	
PW	4.55	4.94	4.35	4.85	0.08	4.74	4.60	4.53	4.69	4.23	4.40	0.29	4.63	4.44	4.28	4.98	4.74	4.90	0.48
	1.00	1.12	1.20	1.20		0.97	1.16	0.98	1.14	1.34	1.25		1.05	1.18	1.00	0.99	1.35	1.23	
LE	6.10	6.97	6.67	5.47	4.24*	5.88	6.87	6.16	5.80	7.24	6.50	0.37	5.84	7.09	6.20	5.82	6.47	6.59	0.62
	3.53	4.02	4.25	3.99		3.58	3.65	3.72	3.54	5.07	4.51		3.46	4.20	3.81	3.85	3.37	4.73	

	Female						Male						
	Malay			Non-Malay			Malay			Non-Malay			
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*
PS	1.84	1.94	2.15	1.67	1.94	2.05	1.52	1.83	1.90	1.69	1.80	1.86	0.76
	0.48	0.56	0.46	0.46	0.44	0.56	0.45	0.41	0.44	0.45	0.34	0.65	
PW	4.66	4.54	4.40	5.00	4.83	4.98	4.59	4.14	4.12	4.95	4.52	4.85	0.02
	0.98	1.05	0.96	0.90	1.56	0.94	1.15	1.49	1.06	1.10	0.76	1.43	
LE	5.53	6.84	6.00	7.13	7.00	6.73	6.30	7.88	6.50	4.59	5.20	6.50	0.61
	3.31	3.68	3.57	4.29	3.71	4.31	3.66	5.58	4.20	3.02	2.17	5.12	

Note. Means with different subscript are significantly different from each other. M = Malay; NM = Non-Malay; PS = Perceived Stress; PW = Psychological Well-Being; LE = Life Events.

Third, there was significant main effect of ethnicity, F (1, 291) = 7.98, $p < .05$ on psychological well-being. Psychological well-being was significantly lower for Malay (M = 4.48) than Non-Malay (M = 4.90). Next, results yielded a significant interaction term for gender and ethnicity on life events, F (1, 291) = 4.24, $p < .05$. Specifically, the mean of life events among Non-Malay women was higher than for Malay men, Malay women and Non-Malay men (Figure 3). However, further analysis using a simple effect analysis demonstrated that the mean of life events among women, F (1, 181) = 1.78, $p > .05$, and men, F (1, 118) = 2.14, $p > .05$, were not significant. To conduct the simple effect analysis, I divided the sample into two groups (i.e., men and women), and tested group differences for men and women only.

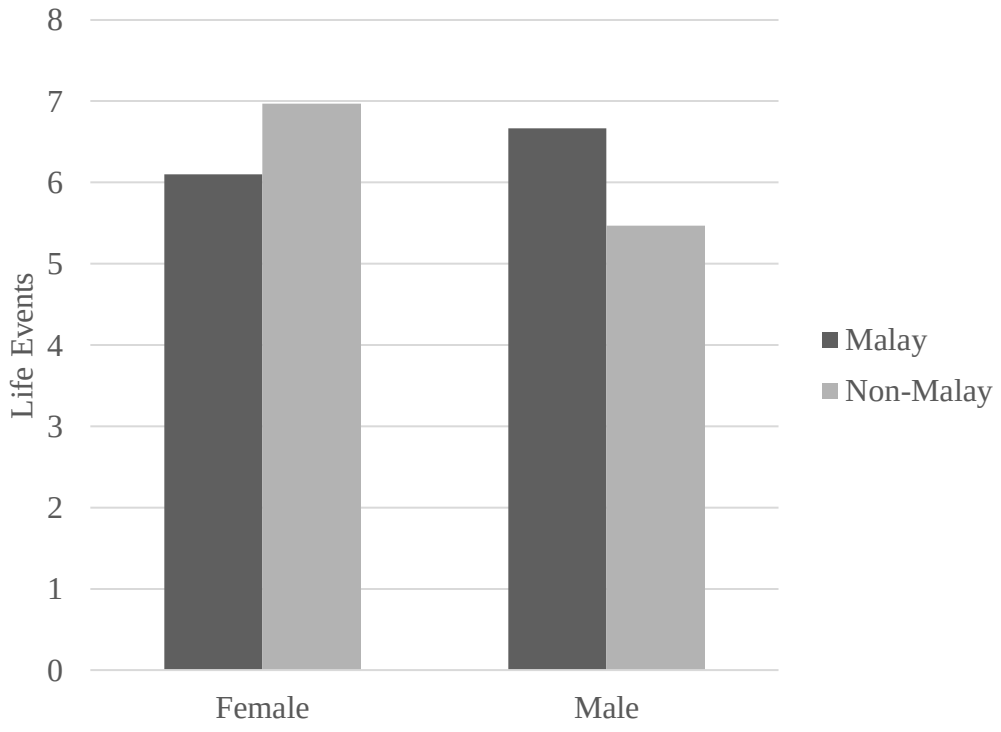


Figure 3. Interaction of gender and ethnicity in life events.

Finally, the three-way independent ANOVA found no significant effect of gender and year of study on psychological well-being and life events. Also, there were no significant differences in ethnicity on perceived stress and life events. Next, there was no significant interaction effect for gender and ethnicity, gender and year of study, ethnicity and year of study, and gender, ethnicity and year of study on perceived stress, psychological well-being, and life events.

Multivariate Analysis of Variance (MANOVA)

Second, I computed multivariate analyses of variance (MANOVA) by 2 (gender) X 2 (ethnicity) X 3 (year of study) to identify mean differences in smartphone dependency (i.e., daily life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse, tolerance) and coping behaviors (i.e., problem-focused, emotion-focused, and avoidance-focused coping dimensions). Table 9 shows the results.

Table 9

Multivariate Analysis of Variance (MANOVA) of the Outcome Variables

	Smartphone Dependency			Coping Behaviors		
Variables	Wilk's lambda	*F*	*p*	Wilk's lambda	*F*	*p*
Gender	.97	1.40	.22	.98	2.09	.10
Ethnicity	.94	3.27	.00	.98	2.44	.06
Year of study	.97	0.73	.72	.97	1.46	.19
G*E	.98	9.21	.48	.97	2.99	.03
G*YS	.96	0.89	.55	.98	0.87	.52
E*YS	.97	0.83	.62	.99	0.66	.69
G*E*YS	.94	1.62	.08	.98	0.92	.48

Note. G = Gender. E = Ethnicity. YS = Year of Study; Outcome Variables = daily life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse, tolerance, problem-focused, emotion-focused, and avoidance-focused coping dimensions.

Using Wilk's lambda, I identified a significant effect of ethnicity on smartphone dependency dimensions (i.e., daily life disturbance, positive anticipation, withdrawal, cyberspace-oriented relationship, overuse, tolerance). Also, results indicated a significant

interaction effects for gender and ethnicity on coping behaviors (i.e., problem-focused, emotion-focused, and avoidance-focused coping). Further results of univariate tests yielded that ethnicity had significant effects on daily life-disturbance F (1, 291) = 9.20, p < .01. Results indicated that the means were significantly higher among Malay (M = 3.61) than Non-Malay (M = 3.12) participants for daily life disturbance (Table 10).

Table 10

Means and Standard Deviations of Smartphone Dependency Dimensions Grouped by Ethnicity

	Ethnicity				
	Malay		Non-Malay		
	M	*SD*	*M*	*SD*	*F*
COR	2.60	0.892	2.57	0.777	0.08
DLD	3.61	0.880	3.12	0.960	9.20**
Primacy	3.09	1.056	2.99	1.102	0.01
Overuse	3.66	0.934	3.57	0.909	0.04
POS	4.09	0.859	4.06	0.923	1.04
Withdrawal	2.88	0.965	2.67	0.956	1.49

Note. COR = Cyberspace-Oriented Relationship; DLD = Daily Life Disturbance; POS = Positive Anticipation.

Finally, univariate tests (Table 11) revealed that there were significant interaction effects for gender and ethnicity on problem-focused coping, F (1, 291) = 4.71, p < .05. As shown in Figure 4 the means of problem-focused coping among Non-Malay men was lower (M = 2.78) than for Non-Malay (M = 3.07) women, Malay men (M = 3.08), and Malay (M = 3.09) women. As a follow-up, I computed a simple effect analysis. The sample was divided into men and women, and then I examined group differences for men and women only. Results indicated that there were no significant differences of problem-focused coping for women, F (1, 181) = .94, p > .05. However, the results demonstrated

that there was a significant difference for men F (1, 118) = 6.64, $p < .05$. Non-Malay men utilized less problem-focused coping than Malay men.

Table 11

Means and Standard Deviations of Coping Behaviors Grouped by Ethnicity and Gender

	Female		Male		
	Malay *M* (*SD*)	Non-Malay *M* (*SD*)	Malay *M* (*SD*)	Non-Malay *M* (*SD*)	*F*
PFC	3.09	3.07	3.08	2.78	4.71*
	0.45	0.58	.55	0.66	
EFC	2.78	2.64	2.65	2.55	3.20
	0.45	0.48	0.48	0.54	
AFC	2.07	1.99	2.01	1.99	2.92
	0.41	0.40	0.44	0.53	

Note. PFC = Problem-Focused Coping; EFC = Emotion-Focused Coping; AFC = Avoidance-Focused Coping.

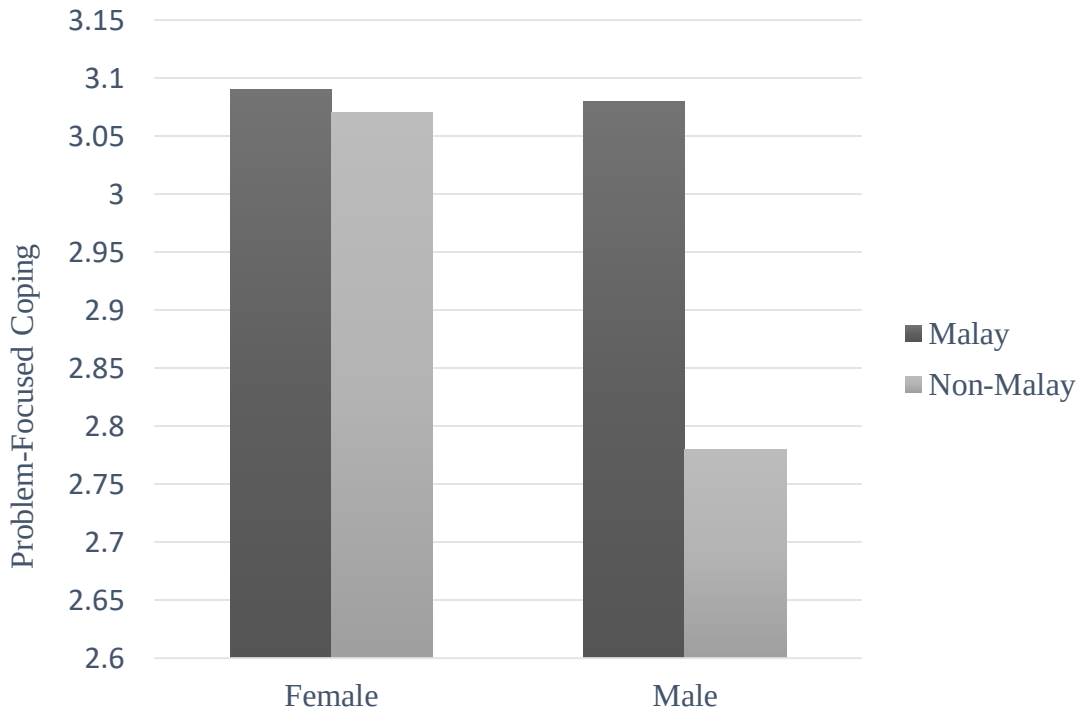


Figure 4. Interaction of gender and ethnicity in problem-focused coping.

Bivariate Correlations

I computed Pearson correlations to examine the relationships between perceived stress, smartphone dependency (i.e., cyberspace-oriented relationship, daily life disturbance, primacy, overuse, positive anticipation, and withdrawal), coping behaviors (i.e., problem-focused, emotion-focused, and avoidance-focused coping) and psychological well-being. First, as expected, perceived stress was negatively correlated with psychological well-being, r (303) = -.28, $p < .01$. In other words, higher stress experienced by students was significantly correlated with lower psychological well-being. Second, perceived stress was positively correlated with smartphone dependency, r (303) = .39, and $p < .01$, indicating that higher perceived stress was correlated with higher smartphone dependency. Also, life events experienced by students was positively correlated with perceived stress, r (303) = .16, $p < .05$. This shows that higher life events were associated with higher perceived stress in this sample. Regarding smartphone dimensions, perceived stress was positively correlated with cyberspace-oriented relationship, r (303) = .35, $p < .01$, daily life disturbance, r (303) = .33, $p < .01$, primacy, r (303) = .26, $p < .01$, overuse, r (303) = .35, $p < .01$, and withdrawal, r (303) = .34, $p < .01$), except for positive anticipation, r (303) = .05, $p > 0.5$. Therefore, higher perceived stress was correlated with higher cyberspace-oriented relationship, daily life disturbance, primacy, overuse, and withdrawal.

The bivariate correlations indicated that perceived stress was not correlated with problem-focused coping and emotion-focused coping, except for avoidance-focused coping, r (303) = .37, $p < .01$. This finding indicated that higher perceived stress correlated with higher avoidance-focused coping. Fourth, smartphone dependency was not correlated with psychological well-being, r (303) = -.08, $p > .05$. However, when

examining the dimension of smartphone dependency, three dimensions of smartphone dependency (i.e., positive anticipation, cyberspace-oriented relationship, and withdrawal) were correlated with psychological well-being. Positive anticipation was positively correlated with psychological well-being, r (303) = .13, $p < .05$. In other words, higher positive anticipation was related with higher psychological well-being in this sample. Furthermore, cyberspace-oriented relationship, r (303) = -.14, $p < .05$ and withdrawal, r (303) = -.16, $p < .01$ were negatively correlated with psychological well-being. This indicated that higher cyberspace-oriented relationship and withdrawal was associated with lower psychological well- being among participants. Finally, problem-focused coping was positively correlated with psychological well-being, r (303) = .30, $p < .01$. Therefore, higher levels of problem-focused coping were correlated with higher levels of psychological well-being. In the present study, emotion-focused coping, r (303) = .09, $p > .05$) and avoidance focused coping, r (303) = -.09, $p > .05$) were not correlated with psychological well-being. Table 12 displays the correlations among all constructs used in the analyses for the psychological well-being model.

Table 12

Bivariate Correlations for Perceived Stress, Smartphone Dependency, Coping Behaviors, and Psychological Well-Being

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1	PS	1												
2	LES	.16*	1											
3	SD	.39**	.15*	1										
4	COR	.35**	.19**	.79**	1									
5	DLD	.33**	.09	.70**	.44**	1								
6	PRIMACY	.26**	.05	.77**	.50**	.31**	1							
7	OVERUSE	.35**	.15*	.84**	.56**	.62**	.49**	1						
8	POS	.05	.07	.55**	.22**	.26**	.52**	.38**	1					
9	WITHD	.34**	.07	.80**	.70**	.37**	.70**	.56**	.28**	1				
10	PFC	-.10	.03	.02	-.13*	.08	-.02	.06	.29**	-.09	1			
11	EFC	.07	.08	.18**	.06	.13*	.15*	.15**	.30**	.04	.67**	1		
12	AFC	.37**	.20**	.36**	.30**	.34**	.23**	.26**	.18**	.27**	.22**	.41**	1	
13	PW	-.28**	-.04	-.08	-.14*	-.02	-.03	-.07	.13*	-.16**	.30**	.09	-.09	1

Note. *$p < .05$. **$p<.01$. PS = Perceived Stress; LES = Life Event; SD =Smartphone Dependency; COR = Cyberspace-oriented Relationship; DLD = Daily Life Disturbance; POS = Positive Anticipation; WITHD = Withdrawal; PFC = Problem-Focused Coping; EFC = Emotion-Focused Coping; AFC = Avoidance-Focused Coping; PW = Psychological Well-Being.

Structural Equation Modeling

Measurement Model

I computed confirmatory factor analyses to test the measurement model. Perceived stress, smartphone dependency, problem-focused, emotion-focused, avoidance-focused coping was measured by three item parcels. First, I assigned items randomly to one of the parcel groups. Next, I included five items in the psychological well-being as indicators. Only then, I tested all the latent variable simultaneously. The initial results of the measurement model did not fit with the data, χ^2 (155) = 1101.15, $p < .001$. The CFI was .78, and the RMSEA was .14. The standardized factor loadings for perceived stress ranged from .53 - .97, smartphone dependency from .57 - .83, problem-focused from .84 - .88, emotion-focused from .47 - .88, avoidance focused from .64 - .85, and psychological well-being from .38 - .85.

Therefore, to develop a better factor solution, I computed exploratory factor analysis to explore any items with non-significant or low loadings on their corresponding factor. As a result, I dropped item 4 ($\lambda = .10$, $p > .05$), 5 ($\lambda = .28$, $p < .001$), 7 ($\lambda = .18$, $p < .01$), and 8 ($\lambda = .12$, $p > .05$) from perceived stress, item 21 ($\lambda = .30$, $p < .001$) and 22 ($\lambda = .11$, $p > .05$) from emotion-focused coping, item 1 ($\lambda = .01$, $p > .05$) and 2 ($\lambda = .17$, $p < .01$) from avoidance-focused coping, and item 5 ($\lambda = .38$, $p < .001$) from the psychological well-being scale. For this step, I conducted separate CFA for each latent variable. Then I created new item parcels for perceived stress, emotion-focused coping, and avoidance-focused coping (Table 13). The results of the second measurement model improved, with a significant difference in that change, $\Delta\chi^2 = 787.63$, Δdf (18), $p < .001$, decreasing the overall chi-square, χ^2 (137) = 313.52, $p < .001$, CFI = .95, and RMSEA = .07. All the standardized loadings were significant.

Table 13

Item Parceling for Perceived Stress, Coping Behaviors, Smartphone Dependency, and Psychological Well-Being

Variables	Parcel	Item
Perceived Stress	PSP1	3 & 9
	PSP2	1, & 6
	PSP3	2, & 10
Coping Behaviors		
Problem-Focused Coping	PFCP1	3, 11 & 25
	PFCP2	4, 19 & 26
	PFCP3	12 & 20
Emotion-Focused Coping	EFCP1	9, 15, & 18
	EFCP2	17, & 23
	EFCP3	10, 16 & 24
Avoidance-Focused Coping	AFCP1	5 &13
	AFCP2	6, 8, & 27
	AFCP3	14, 7, & 28
Smartphone Dependency		
	SDP1	17, 1, 6, 5, 9, 12, 14, 19, 23, 31, & 26
	SDP2	33, 18, 21, 24, 28, 4, 7, 10, 13, 16, & 30
	SDP3	20, 22, 2, 3, 8, 32, 11, 15, 25, 27, & 29
Psychological Well-Being	PW	1, 2, 3, & 4

Note. PSP1, PSP2, PSP3 = Item Parcels of Perceived Stress; PFCP1, PFC2, PFC3 = Item Parcels of Problem-Focused Coping; EFCP1, EFCP2, EFCP3 = Item Parcels of Emotion-Focused Coping; AFCP1, AFCP2, AFCP3 = Item Parcels of Avoidance-Focused Coping; SDP1, SDP2, SDP3 = Item Parcels of Smartphone Dependency; PW = Psychological Well-Being.

Next, I explored modification indices (MI) and allowed correlations between EFCP2 with PFCP2 in the third measurement model. According to Sörbom, (1989), it makes sense allowing a correlated error in a model to improve fit indices rather than abandon/reject poor fit indices. Besides, the practice of correlated error can be considered due to a small sample size of the model. As sample size increases, the fit indices improve, and the likelihood of correlated error decreases in a model. Therefore, it is appropriate to allow correlated errors in this present model rather than to abandon a poor fit of the

model to the data. When allowing for correlated errors, the results of the third measurement model improved, with a significant difference in that change, $\Delta\chi^2 = 35.23$, $\Delta df\ (1)$, $p < .001$, decreasing the overall χ^2-value, $\chi^2\ (136) = 278.29$, $p < .001$. The CFI and RMSEA values were .96 and .06, respectively. In addition, all the factor loadings of the parcels and indicators on the latent variables were statistically significant (Table 14). Therefore, the measurement model adequately fit with the data.

Table 14

Standardized Factor Loadings for the Measurement Model

Measure and Variable	Estimate	*SE*	*t*
Perceived Stress			
PSP1	.75	.03	24.03***
PSP2	.80	.03	28.52***
PSP3	.88	.03	36.33***
Smartphone Dependency			
SDP1	.90	.01	67.37***
SDP1	.93	.01	79.45***
SDP3	.92	.01	75.98***
Problem-Focused Coping			
PFCP1	.88	.02	45.43***
PFCP2	.81	.02	33.18***
PFCP3	.84	.02	38.59***
Emotion-Focused Coping			
EFCP1	.84	.03	31.31***
EFCP2	.61	.04	14.63***
EFCP3	.73	.03	21.52***
Avoidance-focused Coping			
AFCP1	.63	.04	15.27***
AFCP2	.79	.03	24.45***
AFCP3	.87	.03	29.24***

Table 14 *continued*

Measure and Variable	Estimate	*SE*	*t*
Psychological Well-Being			
E1	.73	.03	22.31***
E2	.87	.02	35.87***
E3	.82	.03	30.36***
E4	.58	.04	13.21***

Note. N = 303. PSP1, PSP2, PSP3 = Item Parcels of Perceived Stress; SDP1, SDP2, SDP3 = Item Parcels of Smartphone Dependency; PFCP1, PFC2, PFC3 = Item Parcels of Problem-Focused Coping; EFCP1, EFCP2, EFCP3 = Item Parcels of Emotion-Focused Coping; AFCP1, AFCP2, AFCP3 = Item Parcels of Avoidance-Focused Coping; E1, E2, E3, & E4 = Predictors of Psychological Well-Being. ***p < .001.

Structural Model

I tested the direct effects of latent variables to examine the structural equation model. The direct effects were: 1) life events on perceived stress, perceived stress on psychological well-being; 2) perceived stress on smartphone dependency, problem-focused coping, emotion-focused coping, and avoidance-focused coping; and 3) smartphone dependency, problem-focused coping, emotion-focused coping, and avoidance-focused coping on psychological well-being.

The initial result of the full model indicated that the hypothesized structural model did not yield an optimal fit with the data, χ^2 (159) = 540.75, p < .001, CFI = .89, and RMSEA = .09. Therefore, I allowed some latent variables to correlate in the model (i.e., SD with PFC, SD with EFC, SD with AFC, PFC with EFC, EFC with AFC, and PFC with AFC), resulting in a significant decrease in the fit index, $\Delta\chi^2$ = 225.47, Δdf (10), p < .001. The fit indices improved with χ^2 (149) = 288.68, p < .001, CFI = .96, and RMSEA = .06. Next, I examined standardized structural parameters in the model and found that all were statistically significant, except for eight paths as reported in Table 15. Eight of the non- significant parameters represent structural regression paths including life events on

Table 15

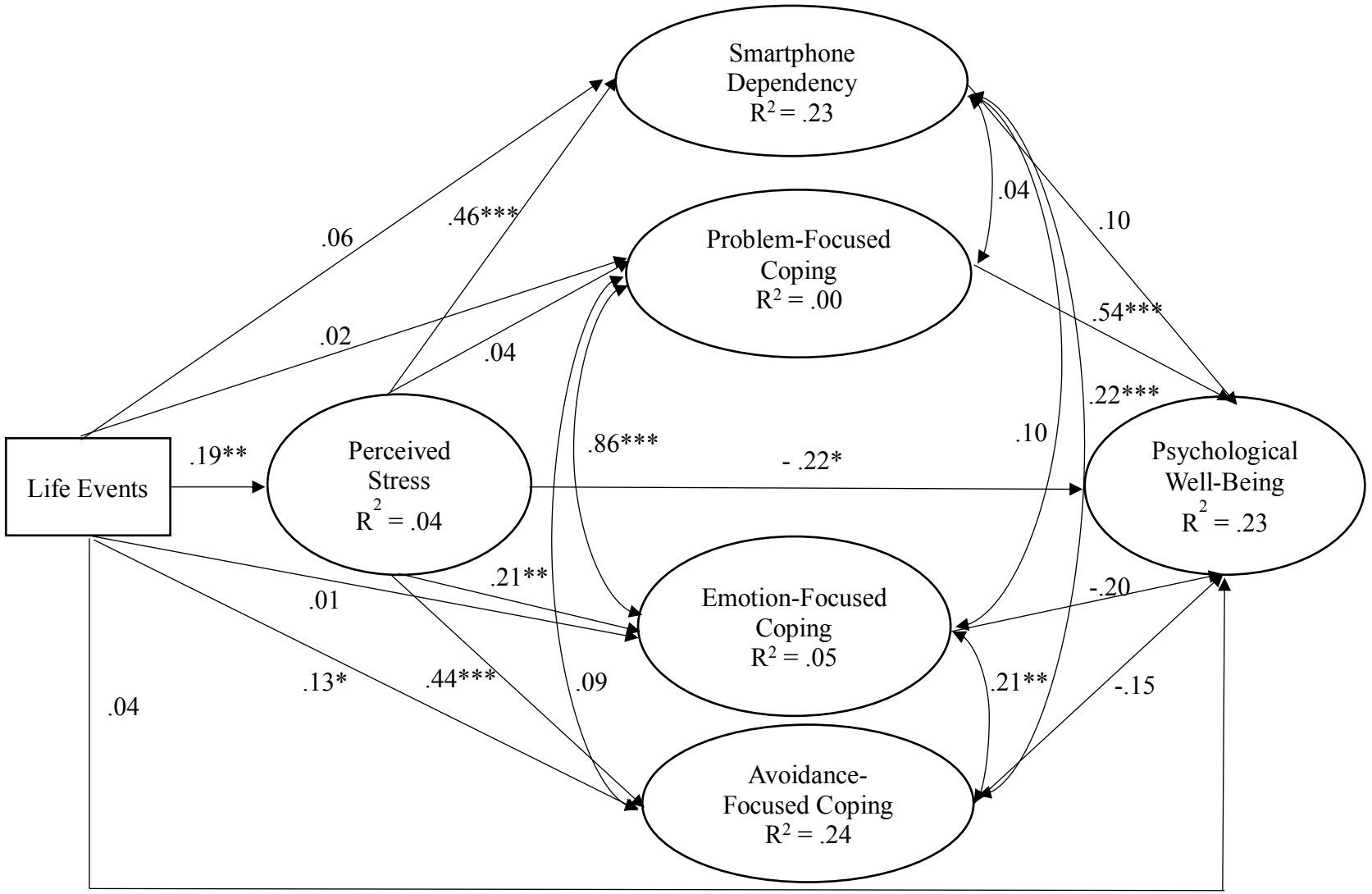
Direct Effects of Study Variables from the Structural Model

Direct Effect Paths	*B*	*SE*	β
LE → PS	0.85	0.28	0.19**
LE → SD	0.31	0.26	0.06
LE → PFC	0.08	0.23	0.02
LE → EFC	0.03	0.25	0.01
LE → AFC	0.42	0.19	0.13*
LE → PW	0.28	0.47	0.04
PS → PW	-0.39	0.14	-0.22**
PS → SD	0.49	0.07	0.46***
PS → PFC	0.03	0.06	0.04
PS → EFC	0.19	0.06	0.21**
PS → AFC	0.31	0.05	0.44***
SD → PW	0.17	0.12	0.10
PFC → PW	1.14	0.37	0.54***
EFC → PW	-0.41	0.38	-0.20
AFC → PW	-0.38	0.20	-0.15

Note. *$p < .05$. **$p < .01$. ***$p < .001$. PS = Perceived Stress; SD = Smartphone Dependency; LES = Life Event; PFC = Problem-Focused Coping; EFC = Emotion-Focused Coping; AFC = Avoidance-Focused Coping; PW = Psychological Well-Being.

smartphone dependency, life events on problem-focused coping, life events on emotion-focused coping, life events on psychological well-being, perceived stress on problem-focused coping, smartphone dependency on psychological well-being, emotion-focused coping on psychological well-being, and avoidance-focused coping on psychological well-being.

Next, as displayed in Figure 5: 1) Life events had a positive direct effect on perceived stress (β = .19, $p < .01$). In other words, more stressful life events were associated with higher perceived stress. Four percent of the variance in perceived stress was explained by life events. When examining the direct effect of life events on psychological well-being, the results yielded no significant direct effect (β = .04, $p > .05$). Also, the direct effect of life events on smartphone dependency (β = .06, $p > .05$), problem-focused coping (β = .02, $p > .05$), and emotion-focused coping (β = .01, $p > .05$), were not significant. However, the direct effect of life events on avoidance-focused coping was significant (β = .13, $p < .05$); 2). Perceived stress had a negative direct effect on psychological well-being (β = -.22, $p < .05$) and this indicated that higher levels of perceived stress were associated with lower levels of psychological well-being; 3) Perceived stress had a positive direct effect on smartphone dependency (β = .46, $p < .001$), emotion-focused coping (β = .21, $p < .01$), and avoidance-focused coping (β = .44, $p <.001$); and 4) problem-focused coping (β = .54, $p < .001$) had a moderate positive direct effect on psychological well-being. About, twenty-three percent of the variance in psychological well-being was explained by all predictors. In summary, hypothesis 1, 2, 4, 5b, 5c, and 7a were confirmed. Thus, this modified structural model was used to test the indirect effects of perceived stress on psychological well-being through four mediators. Also, this structural model was used to test the indirect effects of life events on psychological well-being, smartphone dependency, and three types of coping behaviors through perceived stress.



*$p < .05$. **$p < .01$. ***$p < .001$.

Figure 5. Structural model of psychological well-being.

Table 16 displays the result of correlation matrix among latent variables in this study. In summary, perceived stress correlated significantly with life events, smartphone dependency, emotion-focused coping, avoidance-focused coping, and psychological well-being. Second, life events correlated with smartphone dependency and avoidance-focused coping. Third, smartphone dependency correlated with emotion-focused and avoidance-focused coping. Fourth, problem-focused coping correlated with emotion-focused coping and psychological well-being. Fifth, emotion-focused coping correlated with avoidance-focused coping and psychological well-being. Finally, avoidance-focused coping correlated with psychological well-being.

Table 16

Correlations Matrix among Latent Variables

	Variables	1	2	3	4	5	6	7
1	PS	1						
2	LE	.19**	1					
3	SD	.47***	.15**	1				
4	PFC	.04	.03	.05	1			
5	EFC	.22***	.04	.19**	.85***	1		
6	AFC	.47***	.22***	.40***	.10	.28***	1	
7	PW	-.26**	-.02	-.07	.35***	.18**	-.21***	1

Note. ** $p < .01$. *** $p < .001$. PS = Perceived Stress; LE = Life Events; SD = Smartphone Dependency; PFC = Problem-Focused Coping; EFC = Emotion-Focused Coping; AFC = Avoidance-Focused Coping; PW = Psychological Well-Being.

Mediation

I used 1,000 bootstrap sampling to examine the significant indirect effect of perceived stress on psychological well-being. First, I tested the indirect effect of life events on psychological well-being though perceived stress. Second, I computed indirect effects of life events on smartphone dependency, problem-focused, emotion-focused, and

avoidance-focused coping through perceived stress. Then, I computed the indirect effect of perceived stress on psychological well-being through smartphone dependency, problem-focused, emotion-focused, and avoidance-focused coping. As reported in Table 17, the results indicate that the 95% CI for the standardized indirect effect between life events and psychological well-being through perceived stress did not included absolute zero (-0.09 to -0.01), indicating that perceived stress fully mediated the association between life events and psychological well-being (i.e., hypothesis 8a was confirmed). Therefore, an increase of one standard deviation on life events produced a small decrease of .04 standard deviations on psychological well-being through perceived stress.

Table 17

Bootstrap Tests for Statistical Significance of Indirect Effects

Indirect effects paths	(a X b) = β	*B*	95% CI
LE → PS → PW	(0.19) X (-0.22) = -0.04	-0.33	(-0.09, -0.01)
LE → PS→ SD	(0.19) X (0.46) = 0.09	0.42	(0.04, 0.14)
LE → PS → PFC	(0.19) X (0.04) = 0.01	0.03	(-0.01, 0.03)
LE → PS→ EFC	(0.19) X (0.21) = 0.04	0.16	(0.01, 0.08)
LE → PS → AFC	(0.19) X (0.44) = 0.08	0.27	(0.03, 0.14)
PS → SD → PW	(0.46) X (0.10) = 0.05	0.08	(-0.02, 0.11)
PS → PFC → PW	(0.04) X (0.54) = 0.02	0.03	(-0.03, 0.12)
PS → EFC → PW	(0.21) X (-0.20) = -0.04	-0.08	(-0.18, 0.03)
PS → AFC → PW	(0.44) X (-0.15) = -0.07	-0.12	(-0.15, 0.01)

Note. *a* = Direct effect of perceived stress on mediators; *b* = Direct effect of mediators on psychological well-being. PS = Perceived Stress; LE = Life Events; SD = Smartphone Dependency; PFC = Problem-Focused Coping; EFC = Emotion-Focused Coping; AFC = Avoidance-Focused Coping; PW = Psychological Well-Being.

In addition, hypothesis 8e was confirmed. The standardized indirect effects between life events and avoidance-focused coping through perceived stress did not included absolute zero (0.03, 0.14), suggesting that the indirect effect was significant. As such, perceived stress partially mediated the relationship between life events and avoidance-focused coping. Therefore, an increase of one standard deviation on life events produced a small increased of .08 standard deviations on avoidance-focused coping through the indirect effect of perceived stress. In contrast, hypothesis 8b, 8c, and 8d were not confirmed. In other words, perceived stress did not mediate the association between life events with smartphone dependency, problem-focused coping, and emotion-focused coping. Finally, the 95% CI for all indirect effects explaining the indirect effect of perceived stress on well-being via smartphone dependency and coping included zero. It can be concluded that the results did not confirm hypothesis 9, 10a, 10b, and 10c, the mediation effects (Baron & Kenny, 1986).

Moderation

To test moderation effects, I created four interaction terms (i.e., perceived stress X smartphone dependency, perceived stress X problem-focused coping, perceived stress X emotion-focused coping, and perceived stress X avoidance-focused coping) and included them separately in the psychological well-being model. As reported in Table 18, there were no significant interaction effects between perceived stress and smartphone dependency, between perceived stress and problem-focused coping, between perceived stress and emotion-focused coping, and between perceived stress and avoidance-focused coping on psychological well-being. Therefore, hypothesis 11, 12a, 12b, and 12c were not confirmed. In other words, problem-focused coping, smartphone dependency,

emotion-focused coping, and avoidance-focused coping did not moderate the effect of perceived stress on psychological well-being.

Table 18

Effect of Interaction Terms on Psychological Well-Being

Variables	Psychological Well-Being Model			
	B	*SE*	β	*t*
PS	-0.37	0.17	-0.21	-2.11*
SD	0.14	0.13	0.09	1.08
PFC	1.14	0.47	0.54	2.41**
EFC	-0.41	0.48	-0.20	-0.85
AFC	-0.39	0.23	-0.16	-1.70
PS*SD	0.03	0.24	0.01	0.12
PS*PFC	0.46	0. 27	0.13	1.73
PS*EFC	0.19	0.32	0.06	0.60
PS*AFC	-0.30	0.38	-0.07	-0.79

Note. *$p < .01$. **$p < .001$. PS = Perceived Stress; SD = Smartphone Dependency; PFC = Problem-Focused Coping; EFC = Emotion-Focused Coping; AFC = Avoidance-Focused Coping; PW = Psychological Well-Being. Latent interaction terms were included separately in the model.

CHAPTER 5. DISCUSSION

The purpose of this study was to understand the association between perceived stress, smartphone dependency, coping behaviors, and psychological well-being among undergraduate students in Malaysia. This chapter begins with a summary of life events, perceived stress, smartphone dependency, coping behaviors, and psychological well-being drawn from the descriptive statistics and mean differences. Second, I review and interpret findings based on the hypothesis in the present study. I finally discuss the limitations and future directions.

Life Events, Perceived Stress, Smartphone Dependency, Coping Behaviors, and Psychological Well-Being

First, the present study provides information about life events among undergraduate students in Malaysia. Based on the results, the most common life events were "family get-together," "getting an unjustified low grade on a test," "vacation with parents," "minor financial problems," and "vacation alone/with friends." The "family get-together" was the most common life event among participants. In Southeast Asia culture, such as Malaysia, it is a tradition for family members to host family get-togethers to strengthen family bonds (Ishak, 2010). Thus, get-together can be a challenge of time and social pressure which require intensive adjustment at this period. Also, I identified significant interaction terms between gender and ethnicity on life events. Specifically, Non-Malay men experienced fewer life events than Malay women, Malay men, and Non-Malay women. The results are consistent with existing literature which provide support that there was a significant interaction between gender and ethnicity in stressful life events (Assari, 2018). In Assari's (2018) study, this interaction effect indicates that White men experienced the highest levels of exposure to implicit bias when compared to White

women, Black men, and Black women. White men in the United States are considered a majority much like Malay men are seen as a majority group in Malaysia.

The present study provides support of past research (Chen, Ran, Wong, & Gilson, 2009) for year of study differences in the level of perceived stress. Specifically, perceived stress was significantly lower for first-year students than second- and third-year students in this sample. Low levels of perceived stress among first-year students might be due to these students having undergone matriculation before enrolling in a degree program which assists them in adapting to independent life at a college environment. In addition, fourth-year students experienced more stress than first-year students because they need to adjust to new requirements, such as a final year project and industrial training.

Third, the present results are consistent with past studies (Crocker, Luhtanen, Blaine, & Broadnax, 1994; Hardeman et al., 2015) indicating that there was a significant main effect for ethnicity on psychological well-being. In this sample, the psychological well-being was significantly lower for Malay than Non-Malay students. This finding indicated that Non-Malay students feel more satisfied than Malay students with their life achievements. According to Shamsuddin et al. (2013), a cultural factor emphasizing recognition greatly influences Malay students' well-being and this places a high pressure for them to meet life demands.

Ethnicity had significant effects on the smartphone dependency dimension "daily life-disturbance." Specifically, I found that daily life disturbance was higher in Malay than Non-Malay students. This might be because Malay students utilized more social networking than Non-Malay students and brings a high level of disturbance in their daily life. In addition, there was a significant interaction between gender and ethnicity in

problem-focused coping. This effect indicates that women and men were affected differently depending on ethnicity. Specifically, problem-focused coping was similar in Malay and Non-Malay women. However, for men, problem-focused coping by Non-Malay participant was significantly lower than Malay participants. Non-Malay men utilized less problem-focused coping due to cultural expectations that makes them accept their cultural norms. Similarly, Borrill, Fox, and Roger (2011) found significant differences in coping behaviors by ethnicity. Specifically, the researchers found rational coping was higher among Black students compare to White and Asian students. Rational coping in the study refers to how they manage their problems or solve problems as measured by the Coping Styles Questionnaire. In summary, although I found that it is difficult to compare with previous literature due to sample and methods differences, all the results above were consistent with other previous studies and can be a guideline for intervention programs. Also, it was appropriate to address the effect of covariates such as gender and ethnicity.

Evaluation of the Full Structural Model

The measurement model yielded an acceptable fit to the data. All the factor loadings of the item parcels on latent variables were statistically significant. Therefore, all the latent variables including perceived stress, smartphone dependency, problem-focused coping, emotion-focused coping, avoidance-focused coping, and psychological well-being had been adequately measured by their respective indicators. Also, it is important to highlight that the overall fit indices were achieved after allowing for a correlated error between two indicators in the measurement model. Sample size in this present study may have affected the fit indices. Also, in the structural model I included correlated error between emotion-focused and problem-focused coping which improved

the fit indices. Thus, the full structural model adequately fit with the data and was used to test the indirect effects of perceived stress on psychological well-being through smartphone dependency and coping behaviors.

In the present study, I found that most of the direct effects supported the model introduced by Lazarus and Folkman (1984). First, I had predicted that life events would be positively associated with perceived stress among undergraduate students in Malaysia. The path coefficient from life events to perceived stress was significant and in the direction as predicted. This result indicates that with increased life events, undergraduate students in this present study were more likely to experience higher perceived stress. This result is supported by previous literature suggesting that life events were associated with stress among undergraduate students at a public university in the Midwestern United States (Dusselier et al., 2005). Therefore, this finding further underlines the importance of primary appraisal explaining that students in this sample appraised their life events as stressful (Lazarus & Folkman, 1984).

Second, I had hypothesized that perceived stress and life events would be negatively associated with psychological well-being among undergraduate students in Malaysia. The results of the structural model indicated that the path coefficient from perceived stress to psychological well-being was significant and in the direction as predicted. In other words, an increase in perceived stress resulted in lower psychological well-being. This finding is consistent with previous literature that indicated high levels of perceived stress were associated with low levels of psychological well-being (Bovier et al., 2004; Chao, 2011; Diong & Bishop, 1999; Hamarat et al., 2001; Smith & Yang, 2017; Yang, Xia, Han, & Liang, 2018). Results support Lazarus and Folkman's (1984)

theoretical concept of the association between high levels of stress and adverse outcomes. However, the path coefficient from life events to psychological well-being was not significant.

Third, I predicted that perceived stress would be positively associated with smartphone dependency among undergraduate students in Malaysia. Results of the structural model demonstrated that the path coefficient was significant and in the direction as I had predicted. Thus, as an increase in perceived stress resulted in high smartphone dependency in this sample. This finding is consistent with past studies showing that perceived stress is related to smartphone dependency (Chiu, 2014; Kim et al., 2017; Samaha & Hawi, 2016; Younes et al., 2016).

Hypothesis 5a stated that perceived stress would be positively associated with problem-focused coping among undergraduate students in Malaysia. Previous literature has documented the importance of problem-focused coping in reducing stress (Alsaqri, 2017; Chai & Low, 2015). However, in the present study, the path coefficient from perceived stress to problem-focused coping was not significant. This finding does not suggest that problem-focused coping does not play an essential role among students in this sample. Problem-focused coping was correlated with psychological well-being.

Hypothesis 5b predicted that perceived stress would be positively associated with emotion-focused coping among undergraduate students in Malaysia. As expected, the path coefficient from perceived stress to emotion-focused coping was significant and in the direction as predicted. Thus, an increase in perceived stress predicted high emotion-focused coping among the participants or vice versa. This finding is supported by past studies (Chai & Low, 2015; Gautam & Madnawat, 2017) and furthers our understanding

of the maladaptive concept of emotion-focused coping suggested by Lazarus and Folkman (1984) emphasizing that under specific circumstances some forms of emotion-focused coping are maladaptive. For example, self-blame and blaming others were less adaptive in dealing with stress because the dimensions are associated with poor well-being (Garnefski, Kraaij, & Spinhoven, 2001).

Hypothesis 5c predicted that perceived stress would be positively associated with avoidance-focused coping among undergraduate students in Malaysia. The results of the structural model confirmed this hypothesis. In other words, a significant increase in perceived stress is leading the participants to utilize avoidance-focused coping such as self-distraction, denial, behavioral disengagement, and self-blame. Therefore this finding supports other past literature (Chao, 2011; Diong & Bishop, 1999).

The sixth hypothesis predicted that smartphone dependency would be negatively associated with psychological well-being among undergraduate students in Malaysia. Previous literature had reported that high smartphone usage led to adverse outcomes (Elhai, Levine, Dvorak, & Hall, 2017; Hong et al., 2012; Li, Lepp, & Barkley, 2015; Thomée et al., 2011; Younes et al., 2016). In contrast, the present finding was not consistent with this literature because the path coefficient from smartphone dependency to psychological well-being was not significant. However, when examining specific smartphone dependency dimensions, correlational results indicated that high levels of cyber-oriented relationship and withdrawal were associated with low levels of psychological well-being. In contrast, high levels of positive anticipation correlated with high levels of psychological well-being. Positive anticipation might give a feeling of leisure/relaxation and comfort when using a smartphone thus increasing well-being.

Having social interactions with online friends and not being able to be without a smartphone can create worry or anxiety among young adults. Therefore, the use of social media can be positive or negative: cyber-oriented relationship and withdrawal were maladaptive and positive anticipation was adaptive in dealing with psychological well-being. The other three smartphone dependency subscales which were daily life disturbance, primacy, and overuse did not significantly correlate with psychological well-being. Therefore, this indicated that missing something such as missing planned work due to smartphone overuse and frequently checking one's smartphone did not significantly influence well-being. In summary, multidimensional smartphone dependency expands the understanding of how smartphone dependency influences psychological well-being.

Hypothesis 7a predicted that problem-focused coping would be positively associated with psychological well-being among undergraduate students in Malaysia. Results found that the path coefficient was significant and in the expected direction. Thus, higher levels of problem-focused coping were associated with higher levels of psychological well-being. In other words, utilizing active coping, planning, instrumental support, and religion approaches contributed to a higher level of psychological well-being in this sample. This finding supports previous studies (Chao, 2011; Diong & Bishop, 1999; Giancola et al., 2009; Julal, 2013). Also, the findings support our understanding of adaptive coping by Lazarus and Folkman (1984) that explains adaptive coping is associated with fewer adjustment problems. Thus, I can conclude that problem-focused coping is important for increases in positive well-being in this sample.

Hypothesis 7b stated that emotion-focused coping would be negatively associated with psychological well-being among undergraduate students in Malaysia. The results

indicate that the path coefficient from emotion-focused coping to psychological well-being was not significant. This finding is inconsistent with previous literature indicating that high levels of emotion-focused coping is linked with low levels of psychological well-being (Giancola et al., 2009; Sapranaviciute et al., 2013) and the theoretical concept by Lazarus and Folkman (1984). Even though I used the same measurement as Giancola et al. (2009) to measure coping and psychological well-being, the inconsistent finding might be due to the age of participants who were somewhat older in the Giancola's study. Furthermore, the researchers examined sub-dimensions of emotion-focused coping separately. Sapranaviciute et al. (2013) used the Zung Self-Rating Depression Scale to measure psychological outcome, and the sample included international students. However, when examining the correlations of the five dimensions of emotion-focused coping (i.e., emotional support, venting, positive reframing, humor, and acceptance) with psychological well-being, two dimensions were significant. Emotional support and positive reframing were positively correlated with participants' psychological well-being. In contrast, venting was positively correlated with perceived stress. This further highlights the importance of expanding the results of some emotion-focused coping efforts that are adaptive, and some of them that were maladaptive.

Hypothesis 7c predicted that avoidance-focused coping would be negatively associated with psychological well-being among undergraduate students in Malaysia. I found that the path coefficient from avoidance-focused coping to psychological well-being was not significant. Therefore, this finding is inconsistent with previous empirical studies (Chao, 2011; Giancola et al., 2009; Sapranaviciute et al., 2013).

In conclusion, Lazarus and Folkman's model worked well in this present study. As described by Lazarus and Folkman (1984), this study found life events predicted perceived stress, perceived stress predicted psychological well-being and emotion-focused coping, and problem-focused coping predicted psychological well-being. However, the model did not work for the two associations: the association between perceived stress and problem-focused coping, as well as emotion-focused coping with psychological well-being. These results may perhaps be explained by the sample of this study including college students, whereas Lazarus and Folkman's work focused more on midlife and later life adults. Also, because I extended the model by including smartphone dependency, it is possible that rather than utilizing problem-focused and emotion-focused coping, the students used the smartphone in dealing with stress.

Mediation and Moderation Model

In terms of the mediation model, I expected that smartphone dependency, problem-focused coping, emotion-focused coping, and avoidant-focused coping mediated the association between perceived stress and psychological well-being. However, the present findings did not support the proposed mediation model, and hypothesis 9, 10a, 10b, and 10c were not confirmed. Therefore, these findings were not consistent with Lazarus and Folkman's theory that assumed problem-focused and emotion-focused coping mediate the association between perceived stress and psychological well-being. The present results were inconsistent with previous studies. For example, previous studies have examined that online social support (Xavier & Wesley, 2018) and coping behaviors (Amjad & Bokharey, 2014) mediated the association between stress and well-being. The inconsistent results may be due to these researchers using a different measurement to measure well-being such as the Warwick-Edinburgh Mental Wellbeing

scale and the Spiritual Wellness Inventory. However, hypothesis 8a was confirmed: perceived stress mediated the association between life events and psychological well-being. As such, perceiving a high level of stress in response to life events, such as getting an unjustified mark, death of parents, and experienced financial problems, would decrease participants' psychological well-being. This finding was consistent with a previous study indicating that perceived stress fully mediated the association between stressful life events and depressive symptoms (Seib et al., 2018). However, the participants in Seib's (2018) study were women treated with cancer with an average age of 53 years. Furthermore, hypothesis 8e was confirmed, suggesting that perceived stress mediated the association between life events and avoidance-focused coping. Thus, perceiving a high level of stress in response to life events increases the likelihood of utilizing avoidance-focused coping.

For the moderation model, interaction terms of perceived stress with smartphone dependency, problem-focused, emotion-focused, and avoidant-focused coping were not significant. These findings are also inconsistent with previous studies. For example, a previous study found that problem-focused coping buffered the effects of stress on psychological outcomes (Chao, 2011; Crockett et al., 2007; Yang & Clum, 1994). Second, a low level of avoidant-focused coping buffered the effect of family stress on depression (Gonzales, Tein, Sandler, & Friedman, 2001). Third, although, there is lack of previous studies focusing on interaction effects of stress with smartphone dependency on psychological well-being, a high number of daily texts was found to moderate the association between stress and psychological outcome (Murdock, 2013). However, the present finding is consistent with previous literature indicating no moderation effect of

stress with emotion-focused coping (i.e., seeking social support and anger coping) on the psychological outcome (Galaif, Sussman, Chou, & Wills, 2003). In addition, it is important to note that the previous studies used different measurements to assess perceived stress such as the Social, Attitudinal, Familial and Environmental Acculturative Stress Scale, three binary items of Cohen et al. (1983), the Multicultural Events Scale for Adolescents, and the Bergen Social Relationships Scale (Crockett et al., 2007; Galaif et al., 2003; Gonzales et al., 2001; Murdock, 2013). Coping behaviors were measured by four items coping scale, the Children's Coping Strategies Checklist, and the Modified Means-End Problem-Solving Procedure (Galaif et al., 2003; Gonzales et al., 2001; Yang & Clum, 1994). Finally, psychological outcomes were measured by the 21-item Beck Anxiety Inventory, the Center for Epidemiologic Studies Depression Scale, the Children's Depression Inventory, and the Maslach Burnout Inventory (Crockett et al., 2007; Galaif et al., 2003; Gonzales et al., 2001; Murdock, 2013).

Future Directions, Limitations, and Implications

This study highlighted significant and nonsignificant associations among variables of the hypothesized psychological well-being model. Although there were nonsignificant findings among study variables and not all contributed to the psychological well-being model, the findings give insights for future researchers, counselors, educators, and policy makers.

First, it is essential to identify several limitations in this study. This present study may be lacking generalizability to a larger undergraduate population in Malaysia. This study was only conducted among engineering students in a public technical university in Malaysia. Therefore, caution must be taken in generalizing these findings to another student population. Future researchers can consider testing this model by including a

representative sample of the whole undergraduate population in Malaysia. Specifically, future researchers may consider recruiting undergraduate students that represent a variety of majors in a Malaysian university such as recruiting a sample from the humanities and social sciences, sciences, and technical/vocational studies. Therefore, future researchers should include participants representing the entire spectrum of the undergraduate population in Malaysia. However, the sample in this study is unique because it represented various ethnic groups in Malaysia, including Malay, Chinese, Indian, and other ethnic groups.

Second, this study used data collected only at one point in time. Hence, future researchers may consider incorporating longitudinal research so that a stronger conclusion of causality between study variables can be drawn. Third, self-report measures were the only assessment in this study. Thus, future researchers may consider other methods of data collection such as interviews. An in-depth interview would be beneficial for future researchers to gather valuable information which can be derived from students' stories and experiences. Therefore, a comprehensive understanding of stressful life events, perceived stress, smartphone dependency, coping behaviors, and psychological well-being can be the focus of future studies.

Fourth, the present model focused on a summary of life events. In the future, it would be informative to identify life event domains and their association with perceived stress. Testing the multidimensionality of life events enables more detailed results of its association with perceived stress. For example, future researchers can classify life events into academic stress, financial problems, and family conflicts. Finally, future researchers may consider extending this model to include other psychological outcomes. In this

study, the Satisfaction with Life Scale was the only measurement to assess the participants' psychological well-being. Future research should include other measurements such as loneliness and depression, so that students' well-being can be examined in a broader perspective. In addition, future researchers may also consider an alternative well-being model. For example, it could also be possible to examine a model which assumed that psychological well-being predicts coping behaviors and smartphone dependency, and coping behaviors and smartphone dependency predict stress.

Despite the limitations outlined above, I found important theoretical and practical implications from this present study. Significant hypotheses offer new insights into student's well-being, specifically for the Ministry of Higher Education in Malaysia, UMP's counseling center/student services, educators, and students. First, awareness regarding the negative consequences of high smartphone dependency in an educational setting should be highlighted through a variety of university channels such as classrooms, Facebook, and websites. Although there was no direct effect of smartphone dependency on psychological well-being in the present study, the results show that higher levels of perceived stress are linked to higher smartphone dependency and vice versa. There is growing evidence of studies indicating high smartphone dependency had been accompanied by increasing negative consequences such as poor academic achievement (Dzamesi, Akyina, Manu, & Danso, 2019), psychological disorder (Contractor, Weiss, Tull, & Elhai, 2017; Demirci, Akgönül, & Akpinar, 2015), and adverse health effects (Toda, Monden, Kubo, & Morimoto, 2006). Therefore, a guideline to use smartphones should be designed, so that negative consequences can be minimized. For example,

students should be educated to monitor their time and activity while using a smartphone and reflect on their responsibility as a student.

Second, coping behaviors appeared to be related to the students' well-being. Interventions directed at promoting effective coping skills would be beneficial in this sample. For example, applying stress management programs, can help educate students to utilize problem-focused coping such as taking action or trying to make the situation better can promote their well-being. Also, awareness of the negative consequences of maladaptive coping such as emotion-focused and avoidant-focused coping on well-being should also be highlighted in stress management programs. Third, interventions may target students at risk by considering group differences, for example, focusing more on the Malay and women group because they are prone to exhibit high levels of stress and low psychological well-being than other groups. However, future researchers may consider including larger samples of other ethnic groups, gender, and year of study, as it was challenging to include a representative population in this study. Thus, caution must be taken in generalizing the findings of mean differences.

In conclusion, it is hoped that these findings will provide useful information in the understanding of students' well-being. Furthermore, it is expected that these findings contribute to intervention designs and stress management programs. As explained above, this study provides valuable information to researchers, counselors, educators, and policymakers in this field. Also, the present study contributes to the literature of well-being concepts among young adults from a cross-cultural perspective.

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APPENDIX A. IRB APPROVAL

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
2420 Lincoln Way, Suite 202
Ames, Iowa 50014
515 294-4566

Date: 10/29/2018

To: Noradilah Md-Nordin Peter Martin

From: Office for Responsible Research

Title: **Perceived stress, smartphone dependency, coping behaviors, and psychological well-being among undergraduate students in Malaysia**

IRB ID: 18-441

Submission Type: Initial Submission **Exemption Date:** 10/29/2018

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

2: Research involving use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observations of public behavior, unless (i) Information obtained is recorded in such a manner that human subjects can be identified, and (ii) Any disclosure of the human subjects' responses outside the research could reasonably place the subject at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

The determination of exemption means that:

- **You do not need to submit an application for annual continuing review.**
- **You must carry out the research as described in the IRB application.** Review by IRB staff is required prior to implementing modifications that may change the exempt status of the research. In general, review is required for any *modifications to the research procedures* (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the *inclusion of participants from vulnerable populations*, and/or any *change that may increase the risk or discomfort to participants*. The purpose of review is to determine if the project still meets the federal criteria for exemption.

  In addition, ***changes to key personnel*** must receive prior approval.

  Detailed information about requirements for submission of modifications can be found on our website. For modifications that require prior approval, an amendment to the most recent IRB application must be submitted in IRBManager. A determination of exemption or approval from the IRB must be granted before implementing the proposed changes.

  Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may

constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

Please note that you must submit all research involving human participants for review. **Only the IRB or its designees may make the determination of exemption**, even if you conduct a study in the future that is exactly like this study.

Please be aware that **approval from other entities may also be needed**. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution(s) as required by their policies. **An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.**

Please be advised that your research study may be subject to post-approval monitoring **by Iowa State University's Office for Responsible Research**. In some cases, it may also be subject to formal audit or inspection by federal agencies and study sponsors.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or IRB@iastate.edu.

APPENDIX B. DEMOGRAPHIC CHARACTERISTICS

Arahan: Sila bulatkan jawapan yang berkenaan /

Directions: Please specify your response by circling the appropriate choices given.

1. Umur / Age:
2. Jantina / Gender:
    a. Perempuan/ Female
    b. Lelaki / Male
3. Etnik / Ethnicity:
    a. Melayu / Malay
    b. Cina / Chinese
    c. India / Indian
    d. Lain-lain / Other:
4. Tahun Pengajian / Year of Study:
    a. Tahun satu / First Year
    b. Tahun dua / Second Year
    c. Tahun tiga / Third Year
    d. Tahun empat / Fourth Year
5. Sekolah Pengajian/ School:
    a. Chemical and Natural Resources Engineering
    b. Civil Engineering and Earth Resources
    c. Computer Systems and Software Engineering
    d. Industrial Sciences & Technology
    e. Engineering Technology

f. Industrial Management

g. Electrical and Electronics Engineering

h. Manufacturing Engineering

i. Mechanical Engineering

6. Adakah anda mempunyai akaun perkhidmatan jaringan sosial /Do you have a social networking account?

   a. Ya / Yes

   b. Tidak / No

7. Jika ya, apakah jenis akaun perkhidmatan jaringan sosial anda gunakan? (bulatkan lebih daripada satu)/ If yes, what types of social networking accounts do you use? (circle more than one)

   a. Facebook

   b. Twitter

   c. Instagram

   d. Snapchat

   e. Lain-lain/ Other: _____

8. Sebab utama menggunakan telefon pintar (bulatkan lebih daripada satu)/ What is your main reason to use smartphone (circle more than one):

   a. Internet / Internet

   b. PJS / SNS

   c. Permainan/ Games

   d. Panggilan / Calling

   e. Pembelajaran / Learnig

APPENDIX C. LIFE EVENTS SCALE

Listed on the following tables are number of life events which may occur daily. Please circle the appropriate answer to indicate whether each event occurs within the previous six months. / Senarai dibawah adalah peristiwa yang mungkin berlaku dalam kehidupan seharian anda. Sila bulatkan pada ruangan yang bersesuaian jika peristiwa tersebut pernah berlaku dalam jangka waktu enam bulan yang lepas.

	Butiran/Items	Yes/Ya	No/Tidak
1	Kematian Ibu atau bapa (Death of parent)	1	2
2	Kematian kawan karib atau kawan baik anda (Death of your best or good friend)	1	2
3	Ibu bapa telah bercerai (Break up of parent's marriage/divorce)	1	2
4	Ditendang keluar daripada sekolah (Getting kicked out of school)	1	2
5	Terlibat dalam kemalangan kereta (mengalami kecederaan dan kereta telah rosak) [Major car accident (car wrecked, people injured)]	1	2
6	Gagal dalam beberapa subjek (Failing a number of courses)	1	2
7	Ibu atau bapa kehilangan pekerjaan (Parent losing a job)	1	2
8	Mengalami kecederaan dan kesakitan yang serius (Major personal injury or illness)	1	2
9	Kehilangan rakan baik. (Losing a good friend)	1	2
10	Perubahan kesihatan yang serius dalam ahli keluarga anda. (Major change of health in close family member)	1	2
11	Putus dengan teman wanita/teman lelaki (Breakup with boy/girlfriend)	1	2
12	Masalah kewangan yang kronik/serius (Major and/or chronic financial problems)	1	2
13	Berpindah ke bandar bersama keluarga (Moving out to town with parents)	1	2
14	Berfikir dengan mendalam ingin berhenti belajar (Seriously thinking about dropping school)	1	2

(Appendix continues)

Appendix C continued

	Butiran/Items	Yes/Ya	No/Tidak
15	Mendapat markah yang rendah dalam peperiksaan (Getting an unjustified low mark on a test)	1	2
16	Berpindah keluar daripada rumah (Moving out from home)	1	2
17	Gagal dalam satu subjek (Failing a course)	1	2
18	Baru memulakan pengajian sarjana muda di universiti (Beginning an undergraduate or graduate program in university)	1	2
19	Pertenglingkahan yang serius dengan ibu bapa (Major argument with parents)	1	2
20	Pertenglingkahan yang serius dengan teman wanita/teman lelaki. (Major argument with boy/girlfriend)	1	2
21	Baru membentuk hubungan yang stabil dengan pasangan anda (Establishing new steady relationship with partner)	1	2
22	Mengalami kemalangan yang kecil/minor (Minor car accident)	1	2
23	Mengalami masalah kewangan yang tidak serius/minor (Minor financial problems)	1	2
24	Kehilangan kerja separuh masa. (Losing a part-time job)	1	2
25	Mencari kerja separuh masa (Finding a part-time job)	1	2
26	Bertukar kerja (Change job)	1	2
27	Melanggar undang-undang yang kecil (iaitu melebihi had laju) [Minor violation of the law (i.e., speeding ticket)]	1	2
28	Bertukar program pengajian samaada di fakulti atau universiti yang sama. (Switch in program within same college or university)	1	2
29	Perjumpaan dengan ahli keluarga (Family get-togethers)	1	2
30	Percutian dengan ibu dan bapa (Vacation with parents)	1	2
31	Percutian dengan rakan/pergi bersendirian Vacation alone/with friends	1	2

APPENDIX D. PERCEIVED STRESS SCALE

	Butiran/Items	Tidak pernah/ Never	Hampir tidak pernah/ Rarely	Kadang-kadang/ Sometimes	Agak Kerap/ Often	Sangat Kerap/ Very Often
1	Pada bulan lalu, berapa kerapkah anda merasa kecewa kerana sesuatu yang terjadi di luar jangkaan anda?	0	1	2	3	4
	(In the last month, how often have you been upset because of something that happened unexpectedly?)	0	1	2	3	4
2	Pada bulan lalu, berapa kerapkah anda merasa bahawa anda tidak mampu mengawal isu-isu penting dalam hidup anda?	0	1	2	3	4
	(In the last month, how often have you felt that you were unable to control the important things in your life?)	0	1	2	3	4
3	Pada bulan lalu, berapa kerapkah anda merasa gugup dan tertekan ("stress")?	0	1	2	3	4
	(In the last month, how often have you felt nervous and "stressed"?)	0	1	2	3	4
4	Pada bulan lalu, berapa kerapkah anda merasa yakin tentang kemampuan anda untuk menangani masalah-masalah peribadi anda?	0	1	2	3	4
	(In the last month, how often have you felt confident about your ability to handle your personal problems?)	0	1	2	3	4

(Appendix continues)

Appendix D *continued*

	Butiran/Items	Tidak pernah/ Never	Hampir tidak pernah/ Rarely	Kadang-kadang/ Sometimes	Agak Kerap/Often	Sangat Kerap/Very Often
5	Pada bulan lalu, berapa kerapkah anda merasa bahawa semuanya berjalan mengikut rancangan anda?	0	1	2	3	4
	(In the last month, how often have you felt that things were going your way?)	0	1	2	3	4
6	Pada bulan lalu, berapa kerapkah anda mendapati bahawa anda tidak mampu mengatasi semua perkara yang anda perlu lakukan?	0	1	2	3	4
	(In the last month, how often have you found that you could not cope with all the things that you had to do?)	0	1	2	3	4
7	Pada bulan lalu, berapa kerapkah anda mampu mengawal perasaan marah dalam hidup anda?	0	1	2	3	4
	(In the last month, how often have you been able to control irritations in your life?)	0	1	2	3	4
8	Pada bulan lalu, berapa kerapkah anda berjaya di atas segala sesuatu?	0	1	2	3	4
	(In the last month, how often have you felt that you were on top of things?)	0	1	2	3	4
9	Pada bulan lalu, berapa kerapkah anda menjadi marah kerana hal-hal yang berada di luar kawalan anda?	0	1	2	3	4
	(In the last month, how often have you been angered because of things that were outside of your control?)	0	1	2	3	4
10	Pada bulan lalu, berapa kerapkah anda merasa kesulitan yang menimbun begitu tinggi sehingga anda tidak mampu menanganinya?	0	1	2	3	4
	(In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?)	0	1	2	3	4

APPENDIX E. SMARTPHONE DEPENDENCY SCALE

	Butiran/Items	Sangat tidak setuju /Strongly disagree	Tidak setuju/ Disagree	Agak tidak setuju / Weakly disagree	Agak setuju/ Weakly agree	Setuju/ Agree	Sangat setuju/ Strongly agree
1	Kerja yang dirancang tidak dapat dilakukan akibat penggunaan telefon pintar.	1	2	3	4	5	6
	(Missing planned works due to smartphone usage.)	1	2	3	4	5	6
2	Sukar memberi tumpuan dalam kelas, semasa membuat tugasan, atau semasa bekerja akibat penggunaan telefon pintar.	1	2	3	4	5	6
	(Having a hard time concentrating in class, while doing assignments, or while working due to smartphone use.)	1	2	3	4	5	6
3	Mengalami pening kepala atau penglihatan kabur akibat penggunaan telefon pintar yang berlebihan.	1	2	3	4	5	6
	(Experiencing lightheadedness or blurred vision due to excessive smartphone use.)	1	2	3	4	5	6
4	Rasa sakit di pergelangan tangan atau di tengkuk semasa menggunakan telefon pintar.	1	2	3	4	5	6
	(Feeling pain in the wrists or at the back of the neck while using a smartphone.)	1	2	3	4	5	6
5	Berasa letih dan kurang tidur akibat penggunaan telefon pintar yang berlebihan.	1	2	3	4	5	6
	(Feeling tired and lacking adequate sleep due to excessive smartphone use.)	1	2	3	4	5	6

(Appendix continues)

Appendix E *continued*

	Butiran/Items	Sangat tidak setuju /Strongly disagree	Tidak setuju/ Disagree	Agak tidak setuju / Weakly disagree	Agak setuju/ Weakly agree	Setuju/ Agree	Sangat setuju/ Strongly agree
6	Berasa tenang dan selesa semasa menggunakan telefon pintar.	1	2	3	4	5	6
	(Feeling calm or cozy while using a smartphone.)	1	2	3	4	5	6
7	Berasa seronok dan teruja semasa menggunakan telefon pintar.	1	2	3	4	5	6
	(Feeling pleasant or excited while using a smartphone.)	1	2	3	4	5	6
8	Berasa yakin semasa menggunakan telefon pintar.	1	2	3	4	5	6
	(Feeling confident while using a smartphone.)	1	2	3	4	5	6
9	Mampu menghilangkan stres dengan telefon pintar.	1	2	3	4	5	6
	(Being able to get rid of stress with smartphone use.)	1	2	3	4	5	6
10	Tidak ada perkara yang lain yang lebih menyeronokkan daripada menggunakan telefon pintar.	1	2	3	4	5	6
	(There is nothing other than smartphone use that is fun to do in my life.)	1	2	3	4	5	6
11	Hidup saya kosong tanpa telefon pintar.	1	2	3	4	5	6
	(My life would be empty without my smartphone.)	1	2	3	4	5	6
12	Berasa sangat bebas semasa menggunakan telefon pintar.	1	2	3	4	5	6
	(Feeling most liberal while using a smartphone.)	1	2	3	4	5	6
13	Menggunakan telefon pintar adalah perkara yang paling menyeronokkan.	1	2	3	4	5	6
	(Smartphone use is the most fun thing to do.)	1	2	3	4	5	6

(Appendix continues)

Appendix E *continued*

	Butiran/Items	Sangat tidak setuju /Strongly disagree	Tidak setuju/ Disagree	Agak tidak setuju / Weakly disagree	Agak setuju/ Weakly agree	Setuju/ Agree	Sangat setuju/ Strongly agree
14	Tidak mampu bertahan tanpa telefon pintar.	1	2	3	4	5	6
	(Won't be able to stand not having a smartphone.)	1	2	3	4	5	6
15	Berasa tidak sabar dan gelisah apabila saya tidak memegang telefon pintar.	1	2	3	4	5	6
	(Feeling impatient and fretful when I am not holding my smartphone.)	1	2	3	4	5	6
16	Sentiasa terfikir tentang telefon pintar saya walaupun semasa saya tidak menggunakannya.	1	2	3	4	5	6
	(Having my smartphone in my mind even when I'm not using it.)	1	2	3	4	5	6
17	Saya tidak akan berhenti daripada menggunakan telefon pintar walaupun kehidupan harian saya sangat terganggu olehnya.	1	2	3	4	5	6
	(I will never give up using my smartphone even when my daily life is already greatly affected by it.)	1	2	3	4	5	6
18	Berasa geram apabila saya diganggu semasa menggunakan telefon pintar saya	1	2	3	4	5	6
	(Getting irritated when bothered while using my smartphone.)	1	2	3	4	5	6
19	Membawa telefon ke tandas walaupun saya dalam keadaan tergesa-gesa untuk ke situ.	1	2	3	4	5	6
	(Bringing my smartphone to the toilet even when I am in a hurry to get there.)	1	2	3	4	5	6

(Appendix continues)

Appendix E *continued*

	Butiran/Items	Sangat tidak setuju /Strongly disagree	Tidak setuju/ Disagree	Agak tidak setuju / Weakly disagree	Agak setuju/ Weakly agree	Setuju/ Agree	Sangat setuju/ Strongly agree
20	Berasa hebat berjumpa lebih ramai orang melalui penggunaan telefon pintar.	1	2	3	4	5	6
	(Feeling great meeting more people via smartphone use.)	1	2	3	4	5	6
21	Berasa hubungan dengan rakan-rakan di telefon pintar lebih rapat daripada hubungan dengan kawan-kawan sebenar.	1	2	3	4	5	6
	(Feeling that my relationships with my smartphone buddies are more intimate than my relationships with my real-life friends.)	1	2	3	4	5	6
22	Terasa perit seperti kehilangan rakan jika tidak dapat meggunakan telefon pintar.	1	2	3	4	5	6
	(Not being able to use my smartphone would be as painful as losing a friend.)	1	2	3	4	5	6
23	Berasa rakan di telefon pintar lebih memahami saya berbanding rakan sebenar.	1	2	3	4	5	6
	(Feeling that my smartphone buddies understand me better than my reallife friends.)	1	2	3	4	5	6
24	Sentiasa memeriksa telefon pintar supaya tidak terlepas perbualan di kalangan orang-orang lain di Twitter atau Facebook.	1	2	3	4	5	6
	(Constantly checking my smartphone so as not to miss conversations between other people on Twitter or Facebook.)	1	2	3	4	5	6

(Appendix continues)

Appendix E *continued*

	Butiran/Items	Sangat tidak setuju /Strongly disagree	Tidak setuju/ Disagree	Agak tidak setuju / Weakly disagree	Agak setuju/ Weakly agree	Setuju/ Agree	Sangat setuju/ Strongly agree
25	Memeriksa PJS (Perkhidmatan Jaringan Sosial) seperti Twitter atau Facebook sebaik saja bangun daripada tidur.	1	2	3	4	5	6
	(Checking SNS (Social Networking Service) sites like Twitter or Facebook right after waking up.)	1	2	3	4	5	6
26	Memilih untuk bercakap dengan rakan-rakan di telefon pintar daripada secara bersemuka dengan rakan atau anggota keluarga yang lain.	1	2	3	4	5	6
	(Preferring to talk with my smartphone buddies to hanging out with my real-life friends or with the other members of my family.)	1	2	3	4	5	6
27	Lebih suka mencari informasi menggunakan telefon pintar daripada bertanya kepada orang lain.	1	2	3	4	5	6
	(Preferring searching from my smartphone to asking other people.)	1	2	3	4	5	6
28	Bateri telefon pintar yang telah dicaj penuh tidak dapat bertahan sehari.	1	2	3	4	5	6
	(My fully charged battery does not last for one whole day.)	1	2	3	4	5	6
29	Menggunakan telefon pintar lebih lama daripada yang saya jangkakan.	1	2	3	4	5	6
	(Using my smartphone longer than I had intended.)	1	2	3	4	5	6

(Appendix continues)

Appendix E *continued*

	Butiran/Items	Sangat tidak setuju /Strongly disagree	Tidak setuju/ Disagree	Agak tidak setuju / Weakly disagree	Agak setuju/ Weakly agree	Setuju/ Agree	Sangat setuju/ Strongly agree
30	Berasa ingin menggunakan telefon pintar sebaik saja saya berhenti menggunakannya.	1	2	3	4	5	6
	(Feeling the urge to use my smartphone again right after I stopped using it.)	1	2	3	4	5	6
31	Telah cuba beberapa kali untuk mengurangkan masa menggunakan telefon pintar, tetapi selalu gagal.	1	2	3	4	5	6
	(Having tried time and again to shorten my smartphone use time but failing all the time.)	1	2	3	4	5	6
32	Saya selalu berfikir untuk mengurangkan masa dalam penggunaan telefon pintar saya.	1	2	3	4	5	6
	(Always thinking that I should shorten my smartphone use time.)	1	2	3	4	5	6
33	Orang-orang di sekeliling mengatakan penggunaan telefon pintar saya adalah terlalu kerap.	1	2	3	4	5	6
	(The people around me tell me that I use my smartphone too much.)	1	2	3	4	5	6

APPENDIX F. COPING BEHAVIORS SCALE

	Butiran/Items	Saya tidak melakukan ini langsung/ I haven't been doing this at all	Saya melakukan ini kadang-kala sahaja/ I have been doing this for a little bit	Saya agak kerap melakukan ini/ I have been doing this a medium amount	Saya sangat kerap melakukan ini/ I have been doing this a lot
1	Saya beralih kepada aktiviti/tugasan lain supaya saya melupakan perkara tersebut.	1	2	3	4
	(I've been turning to work or other activities to take my mind off things.)	1	2	3	4
2	Saya membuat sesuatu untuk kurang memikirkan hal tersebut seperti pergi, menonton wayang, menonton televisyen, membaca, berkhayal, tidur atau membeli belah.	1	2	3	4
	(I've been doing something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping.)	1	2	3	4
3	Saya menumpukan usaha saya untuk melakukan sesuatu terhadap situasi yang saya sedang alami.	1	2	3	4
	(I've been concentrating my efforts on doing something about the situation I'm in.)	1	2	3	4
4	Saya mengambil tindakan untuk cuba menjadikan situasi itu lebih baik.	1	2	3	4
	(I've been taking action to try to make the situation better.)	1	2	3	4

(Appendix continues)

Appendix F continued

	Butiran/Items	Saya tidak melakukan ini langsung/ I haven't been doing this at all	Saya melakukan ini kadang-kala sahaja/ I have been doing this for a little bit	Saya agak kerap melakukan ini/ I have been doing this a medium amount	Saya sangat kerap melakukan ini/ I have been doing this a lot
5	Saya berkata pada diri sendiri, "ini bukan realiti".	1	2	3	4
	(I've been saying to myself "this isn't real".)	1	2	3	4
6	Saya enggan mempercayai bahawa perkara tersebut telah berlaku.	1	2	3	4
	(I've been refusing to believe that it happened.)	1	2	3	4
7	Saya menggunakan alkohol atau dadah untuk menjadikan saya berasa lega.	1	2	3	4
	(I've been using alcohol or other drugs to make myself feel better.)	1	2	3	4
8	Saya menggunakan alkohol atau dadah untuk membantu saya menghadapinya.	1	2	3	4
	(I've been using alcohol or other drugs to help me get through it.)	1	2	3	4
9	Saya mendapatkan sokongan emosi daripada orang lain.	1	2	3	4
	(I've been getting emotional support from others.)	1	2	3	4

(Appendix continues)

Appendix F continued

	Butiran/Items	Saya tidak melakukan ini langsung/ I haven't been doing this at all	Saya melakukan ini kadang-kala sahaja/ I have been doing this for a little bit	Saya agak kerap melakukan ini/ I have been doing this a medium amount	Saya sangat kerap melakukan ini/ I have been doing this a lot
10	Saya memperolehi pujukan dan timbangrasa daripada seseorang.	1	2	3	4
	(I've been getting comfort & understanding from someone)	1	2	3	4
11	Saya mendapatkan bantuan dan nasihat daripada orang lain.	1	2	3	4
	I've been getting help & advice from other people.	1	2	3	4
12	Saya cuba mendapatkan nasihat atau bantuan daripada orang lain tentang apa yang harus dilakukan.	1	2	3	4
	(I've been trying to get advice or help from other people about what to do.)	1	2	3	4
13	Saya berputus asa untuk menangani masalah tersebut.	1	2	3	4
	(I've been giving up trying to deal with it.)	1	2	3	4
14	Saya berputus asa untuk mencuba mengendalikannya.	1	2	3	4
	(I've been giving up to attempt to cope.)	1	2	3	4

(Appendix continues)

Appendix F continued

	Butiran/Items	Saya tidak melakukan ini langsung/I haven't been doing this at all	Saya melakukan ini kadang-kala sahaja/I have been doing this for a little bit	Saya agak kerap melakukan ini/I have been doing this a medium amount	Saya sangat kerap melakukan ini/I have been doing this a lot
15	Saya berkata sesuatu untuk membiarkan perasaan yang tidak menyenangkan itu berlalu.	1	2	3	4
	(I've been saying things to let my unpleasant feelings escape.)	1	2	3	4
16	Saya meluahkan perasaan-perasaan negatif saya	1	2	3	4
	(I've been expressing my negative feeling.)	1	2	3	4
17	Saya cuba melihat daripada sudut yang berbeza untuk menjadikan ia lebih positif.	1	2	3	4
	(I've been trying to see it in different light, to make it seem more positive.)	1	2	3	4
18	Saya mencuba mencari sesuatu yang baik daripada apa yang berlaku.	1	2	3	4
	(I've been looking for something good in what is happening.)	1	2	3	4
19	Saya cuba menyediakan strategi apa yang harus dilakukan.	1	2	3	4
	(I've been trying to come up with a strategy about what to do.)	1	2	3	4
20	Saya berfikir dengan mendalam tentang langkah-langkah yang perlu diambil.	1	2	3	4
	(I've been thinking hard about what steps to take.)	1	2	3	4

(Appendix continues)

Appendix F continued

	Butiran/Items	Saya tidak melakukan ini langsung/ I haven't been doing this at all	Saya melakukan ini kadang-kala sahaja/ I have been doing this for a little bit	Saya agak kerap melakukan ini/ I have been doing this a medium amount	Saya sangat kerap melakukan ini/ I have been doing this a lot
21	Saya berjenaka dengan perkara itu.	1	2	3	4
	(I've been making jokes about it.)	1	2	3	4
22	Saya mempersendakan situasi tersebut.	1	2	3	4
	(I've been making fun of the situation.)	1	2	3	4
23	Saya menerima hakikal bahawa ianya telah berlaku.	1	2	3	4
	(I've been accepting the reality of the fact that it has happened.)	1	2	3	4
24	Saya cuba belajar untuk hidup dengan masalah itu.	1	2	3	4
	(I've been learning to live with it.)	1	2	3	4
25	Saya cuba mencari ketenangan dalam kepercayaan agama atau rohani saya.	1	2	3	4
	(I've been trying to find comfort in my religion or spiritual belief.)	1	2	3	4
26	Saya berdoa atau bermeditasi.	1	2	3	4
	(I've been praying or meditating.)	1	2	3	4
27	Saya mengkritik diri saya sendiri.	1	2	3	4
	(I've been criticizing myself.)	1	2	3	4
28	Saya menyalahkan diri sendiri atas apa yang telah berlaku.	1	2	3	4
	(I've been blaming myself for things that happened.)	1	2	3	4

APPENDIX G. PSYCHOLOGICAL WELL-BEING SCALE

	Butiran/Items	Sangat tidak setuju/ Strongly Disagree	Tidak setuju/ Disagree	Sedikit Setuju/ Slightly disagree	Tidak pasti/ Neither agree nor disagree	Sedikit setuju/ Slightly Agree	Setuju/ Agree	Sangat setuju/ Strongly Agree
1	Di dalam kebanyakkan perkara, kehidupan saya menghampiri ke tahap sempurna. (In most ways my life is close to my ideal.)	1	2	3	4	5	6	7
2	Keadaan hidup saya adalah amat baik. (The conditions of my life are excellent.)	1	2	3	4	5	6	7
3	Saya berpuas hati dengan kehidupan saya. (I am satisfied with my life.)	1	2	3	4	5	6	7
4	Sehinggga kini, saya telah mencapai perkara-perkara penting yang saya mahukan di dalam hidup saya. (So far, I have gotten the important things I want in life.)	1	2	3	4	5	6	7
5	Sekiranya saya boleh menjalani kehidupan saya semula, saya tidak akan menukar apa-apa. (If I could live my life over, I would change almost nothing.)	1	2	3	4	5	6	7