Mobile Usage, Shopping Behaviour and Study Habit as Contributing Factor to Depression, Anxiety and Stress: A Review

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Abstract
Many studies have been carried out relating to certain behavioral aspects with mental health issues but only a few clustered depression, anxiety and stress together. Therefore, the aim of this study was to review and summarize findings obtained relating to previous studies that have been carried out concerning how mobile usage, shopping behavior and study habit act as predictor to depression, anxiety and stress. Most of the studies outside Malaysia employed survey method and some too carried out experiment in their research. Tracing back previous research and identifying their method, multiple analyses such as correlation, multiple regression and sequential equation modeling provided researcher with information beneficial for future research. Numerous similar and contradictory results also obtained relating to this topic. This review will extend the current literature on depression, anxiety and stress by examining the underlying contributing factors to those negative emotional states. Other than that, it can provide better understanding regarding those emotional states which can lead to better academic and social life. As studies highlighting these variables are limited, a new platform for future research could be conducted particularly among university students in Malaysia.
Keywords: Mobile Usage, Shopping Behavior, Study Habit, Mental Health.

Introduction
Some students may find transition to university life to be overwhelmed. Though they might have been prepared for the reality of university life which involve workload, evaluation and independent learning (Blair, 2016), the emotional process and the students' adjustment may differ from one to another. Juggling multiple things at once is common as during this period, student's life will involve studying, attending lectures and group discussion, completing assignments, engaging in club activities and programs, hanging out with friends and many

more. Other than that, in university, students are taught to be more independent and responsible in their action as there are no teachers or parents to monitor their behaviour. A student will physically getting mature and becoming psychologically unstable during this stage. However as being detached and away from family members and friends, university students might replace those changes with various coping strategies.

Some might find ease in mingling with supporting new friends, some might choose to focus in studying, and others might spend time shopping and doing all sorts of activities. The important of adjustment is evident in meta-analysis finding by Crede and Niehorster (2012) as it enables a student to perform well in academic, to obtain a degree and to view the university experience as positive. Not only these is experienced by freshman, sophomore and senior students are not exceptional. Inability to deal with the emotional changes could be one of the factors that lead to students' psychological breakdown. Other than that, mental health issues among students can also be related to other outer factors. It is revealed in a study by Mas Abdul Rashid, Othman & Ibrahim (2017) whom stated that financial difficulty is one of the major factors that lead to mental health problems among students, other than workload deadlines, requirement to maintain academic grades and personal problems.

Not only mental health issue applies to first-year university students, sophomore and even senior students also susceptible to the issue. Thus, it leads to research questions which are:

1. Which factors are associated to depression?
2. Which factors are associated to anxiety?
3. Which factors are associated to stress?

Since the area of mental health is wide and varied, most of the problems are easily recognizable. But unfortunately, some are them have very subtle symptoms thus making them hard to be detected. Since that is the case, when it is subtle, people tend to look away the significance of each symptom. A lot of people are unable to identify specific disorders or different types of psychological distress (Jorm, 2000). Some that has been identified are on biological factors but mostly are on social factors which are very much indeed very direct towards individuals' way of life. Thus here, this research gap would be the behavioural factors of individuals specifically students which can affect their psychological states.

Since there are a lot of behavioural aspects that can be taken into account, this study would only focus towards three main behaviours that most of research are looking into. Hence, the aim of this study was to review and summarize findings obtained relating to previous studies that have been carried out concerning how mobile usage, shopping behavior and study habit act as predictor to depression, anxiety and stress. In particular, the objective is to highlight, rationalize and interpret the similarities and differences among the studies in term of content, methodology and their findings.

As to authors' knowledge, the combination literature involving mobile usage, shopping behaviour and study habit has not been conducted previously, thus this would be a valuable contribution to the field. Combination of predictors may lead to certain emotional and psychological reaction in an individual and not much studies have conducted such blend which could definitely give us more input regarding each factor. Here, a review of studies may give an insight of how each factor, combination of two factors and even three factors would either summing up to same conclusion or not. Such result would reveal and give more prominent evidence of how much each result may differ from each year even from different type of

population. On top of that, this paper contributes to suggestions that can be considered and used in future study.

Methodology

The studies in this review are found through database Google Scholar and Ebscohost. A number of 26 studies are found relating to mobile usage, 15 studies relating to shopping behavior and 9 studies relating to study habit. They were screened from April 2018 to January 2019. The tables in this review would be emphasizing it's so-called independent variables which are mobile usage, shopping behaviour and study habit. There are a few inclusion criteria of the studies included in this review. Since there are three independent variables, the tables to be constructed will be three as well. Besides that, though this review focus on three dependent variables which are depression, anxiety and stress, some studies might focus only single variable such as solely on either depression, anxiety or stress. Some might be combining any two of them, such as depression and anxiety, or depression and stress or anxiety and stress. Nevertheless, all of them are included in this review to maximize the findings of the study.

Besides that, a few studies might not be using the same term stated in this review. An example that can be referred to is instead of mobile usage, some studies might be using the term smartphone addiction, cellphone use and mobile phones usage. However, since they convey the same meaning, they are all included in the review. Similar processes were undergone by the term shopping behaviour since most studies preferred to use the term compulsive buying and impulsive buying when it involved shopping behaviour. The table will be organized chronologically starting from the earliest to latest study carried out relating to the variables mentioned in order to trace the development of the studies over time. It will be made up of independent variables as its focus, and other section would be stating its authors, and its results. Not all studies will be explained in detail, as only a few will be pinpointed due to its importance.

In short, the table will be constructed and divided into the key elements of the studies namely name of the author of the article together with year of publication, method, sampling and lastly the findings of the study. Since there are three independent variables being studied, thus, three independent tables are laid.

Results

A breakdown of the results by study can be seen in Table 1. Another inclusion criterion for the studies in this review is all of them are from year 2010 to 2019. For mobile usage, the study begins with one conducted by Thomee, Harenstam and Hagberg (2011). This publication creates a stream of papers up to 2019 ranging from all different types of samples such as youths, teenagers and even households. From the Table, it is shown that most of the studies are focusing on students. Most of the studies found out that the use of mobile phone is either significantly correlated with depression, anxiety of stress. However, Harwood, Dooley, Scott & Joiner (2014) revealed that the nature of the relationship a person has with their smart-device that is predictive of depression and stress, rather than the extent of use. On top of that Tamura, Nishida, Tsuji & Sakakibara (2017) discovered that other than duration of mobile phone usage, how it is used also lead to mental health issue. The use of social network services

and online chats respectively, was associated with a higher risk of depression than the use for internet searching, playing games or viewing videos.

A group of psychiatric researchers in Brazil have defined a new disorder called Nomophobia, which describes people's dependencies on mobile devices (King et al., 2013), characterized by feeling of anxiety or discomfort caused by being out of contact with a wireless mobile devices or computer, or a fear of remaining out of touch with technology, especially among those who exhibit social phobias. A few studies suggested that there is positive correlation exists between smartphone use and stress (Vahedi & Saiphoo, 2018; Vasanthakumaran, 2018). The effect could be direct and also non-direct. This is because there is an association of mobile phone usage with sleep quality and academic performance (Sowmiya, Vidya, Lakshmi & William, 2017; Thomee, 2018). This indicates that the use of mobile usage may disrupt sleep quality of an individual. Without good sleep quality, academic performance will decline and lastly causing one to have stress. There are also studies that reveal the excessive use of mobile usage which will then results to mobile addiction have significant correlation with academic stress (Thomas, 2016). Students particularly, will have reduced sleep duration or sleep quality, lower down the productivity and lastly causing stress. Not only that this happen among human being, a clinical study using rats as revealed that long term exposure to cell phone radiation enhances serum cortisol level which may indicate the existing of stress in animals (Ahmadi Tameh, Ahmadi & Gohari, 2014). Though the usage of mobile phone is also proven in association with reduced stress (Toda, Ezoe & Takeshita, 2014), this may be due to how one's perceive the role of mobile usage in one's life.

In term of shopping behavior, only 15 studies were found that relate it to depression, anxiety and stress. Inclusion of impulsive and compulsive buying discussion will be able to generate wider scope of literature. Compulsive buyers are obsessed with buying, and they display repetitive, irresistible, and overpowering urges to purchase goods that are frequently useless and/or unused items (Weinstein, Maraz, Griffiths, Lejoyeux & Demetrovics, 2016). The onset for this disorder is in late adolescence to early adulthood, and female-to-male ratio may be 9:1 (Sharma, Narang, Rajender & Bhatia, 2009). Most authors chose to conduct survey relating to this topic, except for two which conducted experiment in their study, which was by Kyrios, McQueen and Moulding (2013); Durante & Laran (2016). Another one which was by Muller, Mitchell, Crosby, Cao, Johnson, Claes and de Zwaan (2012) took it to another level which combine survey and experiment in their study.

Most of studies found there is significant correlation between shopping behavior with depression, anxiety and stress, and the relationship is bi-directional. Hama (2001) suggested that a certain amount of expenditure was needed for stress release, but a high one did not relieve stress, and the finding was later supported by Durante and Laran (2016) which stated that the effect of stress does not solely lead to saving and decreased in spending. It might also result in increased in spending depending on how an individual perceive the stress. Even that so, Albrecht, Hattula & Lehmann (2017) suggesting that shopping is sometimes a source of stress, leading to avoidance coping behaviour by consumers. In term of impulsiveness, it is shown that people who faced high interpersonal influence depicted more impulsive buying due to the stress generated by the psychosocial stressor, but consumers with high emotional intelligence were less prone to stress which, in turn, led to low impulsive buying (Zia & Shahzad, 2017). On top of that, findings indicated that compulsive buyers have been reported as having more depressive symptoms (Otero-López & Villardefrancos, 2014; Bani-Rshaid &

Alghraibeh; 2017), and vice versa too where depression and materialism are having a significant impact to compulsive buying behaviour (Omar, Wel, Alam, Nazri, 2015).

Studies Relating to Mobile Usage from 2010-2019

Author (Year)	Sample	Method	Result
Thomee, Harenstam & Hagberg (2011)	4156 young adults	Survey	Other than depression, excessive mobile phone usage was linked to the experience of stress and sleep disturbances for women.
Augner & Hacker (2012)	196 young adults	Survey	Low emotional stability, chronic stress, and depression have a correlation with phone usage.
Hong, Chiu & Huang (2012)	269 Taiwanese female university students	Survey	Social extraversion and anxiety have positive effects on mobile phone addiction and self-esteem has negative effects on mobile phone addiction.
Lepp, Barkley& Karpinski (2013)	536 undergraduate students	Survey	Cell phone use/texting was negatively related to GPA and positively related to anxiety.
Harwood, Dooley, Scott & Joiner (2014)	274 people in which 186 were students, and others are either employed, unemployed or retired	Survey	Smart-device use was not significantly associated with depression, anxiety or stress, indicating that the nature of the relationship a person has with their smart-device that is predictive of depression and stress, rather than the extent of use.
Smetaniuk (2014)	Study 1 (301 students), Study 2 (362 non-students)	Survey	The results from Study 1 and Study 2 indicate that 10 to 25% of the participants tested exhibited problematic cell phone usage. Additionally, age, depression, extraversion, and low impulse control are

			the most suitable predictors for problem use.
Toda, Ezoe & Takeshita (2014)	139 medical university students	Survey	The intensity and type of mobile phone use may be associated with stress coping, particularly planful problem solving strategy.
Demirci, Akgonul & Akpinar (2015)	319 university students	Survey	Depression, anxiety and sleep quality may be associated with smartphone overuse.
Kim, Lee & Choi (2015)	351 Grade 6 elementary school students	Survey	Mobile phone use was positively correlated with anxiety, and it was negatively correlated with parental child-raising attitudes.
Kim, Seo & David (2015)	395 adults recruited through the Amazon Mechanical Turk, a crowdsourcing Internet marketplace used for posting work for pay.	Survey	Depressed people may rely on mobile phone to alleviate their negative feelings and spend more time on communication activities via mobile phone, which in turn can deteriorate into problematic use of mobile phone (PUMP).
Lemola, Perkinson-Gloor, Brand, Dewald, Kaufmann & Grob (2015)	362 adolescents	Survey	Sleep disturbance partially mediated the relationship between electronic media use at night and depressive symptoms, indicating that using electronic media at night might influence sleeping process and lastly causing the emergence of depressive symptoms.
Poorakbaran (2015)	209 young adults	Survey	The anxiety scores were higher in use of cell phone and the anxiety and stress scores were higher in use of internet, and

Schoeni, Roser & Roosli (2015)	439 adolescents	Survey	the depression and stress scores were higher in use of satellite significantly. Mobile phone overuse for social network services and online chats may contribute to depression than the use for internet searching, playing games or viewing videos.
Van Deursen, Bolle, Hegner & Kommers (2015)	386 randomly selected individuals	Survey	Habitual phone use is a significant factor that lead to addictive smartphone behaviour. Besides that, social stress and failure of self-regulation positively affecting addictive smartphone behaviour but emotional intelligence did not.
Wang, Wang, Gaskin & Wang (2015)	Using a sample of 600 typical smartphone users (Chinese college students)	Survey	Perceived stress moderates the relationship between entertainment motivation and problematic smartphone use, perceived stress moderated the relationship between entertainment motivation and problematic use also among users scoring low on problematic smartphone use.
Jeong, Kim, Yum, Hwang (2016)	944 respondents were recruited from 20 elementary schools in South Korea	Survey	Self-control was a negative predictor, whereas stress was a positive predictor of smartphone addiction.
Samaha & Hawi (2016)	300 university students	Survey	Smartphone addiction risk was positively related to perceived stress.

Boumosleh & Jaalouk (2017)	688 undergraduate university students	Survey	Depression and anxiety were found to be independent factor to smartphone addiction, after adjustment for confounders
Hawi & Samaha (2017)	381 university students	Survey	Undergraduate students who had smartphone addiction demonstrated greater odds of having high anxiety compared to those who were not addicted, and students who had high anxiety exhibited greater odds of having clinically significant problems in their family relations. Nevertheless, path analysis showed that anxiety mediated a positive relationship between smartphone addiction and problematic family relations.
Kuang-Tsan & Fu-Yuan (2017)	332 university students in northern Taiwan	Survey	University students' love-affair stress and academic stress positively influence smart phone addiction, and their stress of interpersonal relationship, stress of self-career, family life stress, and time management and issues significantly influence their life satisfaction.
Pearson, Mack & Namanya (2017)	92 households selected by simple random sampling from village rosters	Survey	Households which own mobile phone had higher levels of wealth on average but it did not become the sole cause of mobile phone ownership and mental well-being.

Reinecke et al. (2017)	1,557 German households	Survey	Communication load was positively related to perceived stress and had an indirect impact on depression and anxiety.
Tamura, Nishida, Tsuji & Sakakibara (2017)	295 students from 1st to 3rd grades of high school in Japan	Survey	Mobile phone use of 2 h or more per day for social network services and online chats respectively, was associated with a higher risk of depression. Moreover, mobile phone overuse for social network services and online chats may contribute more to depression than the use for internet searching, playing games or viewing videos.
Gao et al. (2018)	1105 college students	Survey	The level of alexithymia was significantly correlated with depression, anxiety, stress and mobile phone addiction. It also acted as a predictor on mobile phone addiction. Depression, anxiety or stress on the other hand had partially mediating effects between alexithymia and mobile phone addiction. Alexithymia not only directly had a positively impact on mobile phone addiction, but both also had an indirect effect on mobile phone addiction through depression, anxiety or stress.
Visnjic et al. (2018)	785 students at two distinguished universities in Serbia and Italy	Survey	Mental health problems are dependent on the way and the intensity of using the mobile phones. For instance, anxiety symptoms are somewhat more present in

			younger students in those who send more text messages and browse the internet less frequently. Stress in contrast is being experienced more by students who make fewer calls a day as well in those who spend more time talking on the mobile phone per day.
Vasanthakumaran, T. (2018).	120 participants both studying and working in the medical profession	Survey	Statistically significant correlation is seen between mobile phone usage and stress, sleep disturbance and symptoms of depression.
Tangmunkongvorakul et al. (2019)	800 university students	Survey	Students with excessive use of smartphones had lower scores the psychological well-being than those who did not use smartphone excessively.

Studies Relating to Shopping Behaviour from 2010-2019

Author (Year	Sample	Method	Result
Ergin (2010)	314 respondents, who are visitors of shopping malls in Ankara	Survey	Shopping was found as an en route to escapism which provides an outlet for psychological compensation where it aids to reduce the anxiety and stress in their everyday lives.
Davenport, Houston, & Griffiths (2012)	134 women	Survey	Reward sensitivity and cognitive anxiety were positively related to excessive eating and compulsive buying, as was impulsivity to compulsive buying. Somatic anxiety and

			social desirability were negatively related to compulsive buying.
Muller, Mitchell, Crosby, Cao, Johnson, Claes & de Zwaan (2012)	25 participants having diagnostic criteria of CB	Survey and experiment	The comparison of mood and the impact of daily stress on days on which compulsive buying occurred to those days on which compulsive buying episodes did not occur did not reveal any significant differences.
Roberts & Roberts (2012)	82 seventh graders ranging in age from 12 to 13 years of age.	Survey	Higher levels of stress led to higher levels of compulsive buying.
Kyrios, McQueen & Moulding (2013)	18 compulsive buyers and 17 non-clinical controls	Experiment	In study 1 the memory-facilitating effect of depressed mood was evident among control participants and absent among compulsive buyers. In study 2, compulsive buyers showed a lesser association of undesirable objects with positive emotional concepts than did non-clinical controls, and compulsive buyers were found to more strongly associate all consumer items with emotional concepts than with concepts of function.
Otero-López & Villardefrancos (2014)	2159 inhabitants in Galicia	Survey	Compulsive buyers have been reported as having more depressive symptoms.
Omar, Wel, Alam & Nazri (2015)	177 university students located at Klang Valley	Survey	Depression and materialism are having a significant impact to compulsive buying behaviour.

Singh & Nayak (2015)	246 adolescents aged from 15 to 18 years old	Survey	Adolescents practicing compulsive buying behaviour as a way to cope with heightened levels of stress due to familial and non-familial factors.
Weinstein, Mezig, Mizrachi & Lejoyeux, (2015)	120 partcipants who shopped regularly on the internet for at least twice a week.	Survey	The results of this study support existing evidence for an association between compulsive buying and anxiety.
Yuksel & Eroglu (2015)	892 consumers in three cities in the West side of Turkey	Survey	Personal factors namely materialism, self-esteem and mental disorders, and relating them to advertising and compulsive buying tendency (CBT) in the context of consumer culture. The authors have listed three types of mental disorders in the study which are depression, anxiety and stress
Darrat, Darrat & Amyx (2016)	143 undergraduate students	Survey	Impulse buying is related positively to consumer anxiety whereas escapism is related negatively to compulsive buying. On top of that, consumer anxiety is related positively to compulsive buying and consumer escapism. Thus, this underlines that not only shopping behaviour affects anxiety but anxiety also affects shopping behaviour as well.
Durante & Laran (2016)	Experiment 1 (230 students), Experiment 2 (70 participants)	Experiment	Stress led consumers to save rather than spend money. However, when there is a need to spend money, they chose to use

Author (Year)	Sample	Method	Result
			on necessities rather than nonnecessities, and this effect was mediated by a willingness to restore control.
Iqbal & Aslam (2016)	430 university students within the age range of 18 to 24 years from five universities of Islamabad and Rawalpindi.	Survey	There is no significant relationship between depression and compulsive buying.
Bani-Rshaid & Alghraibeh (2017)	744 citizens who visited the city's shopping centers	Survey	There is significant positive relationship between compulsive buying disorder and depression symptoms.
Moon & Attiq (2018)	895 fashion clothing consumers from shopping malls of different cities in Pakistan	Survey	Not only the authors found out that anxiety positively influenced compulsive buying, depression and stress also works the same way. Self-esteem had a significant negative influence whereas materialism had a significant positive influence on compulsive buying. The result of the study indicated that stress is the strongest antecedent of compulsive buying and compulsive buying provides consumers with huge positive feelings because of shopping in a mall.

Studies Relating to Study Habit from 2011-2019

Author (Year)	Sample	Method	Result

Bahrami, Rajaeepour, Rizi, Zahmatkesh & Nematolahi (2011)	100 students of MSc and PhD students in the second semester (2008 – 2009) of Isfahan University of Medical Sciences	Survey	There is a significant and negative relationship between studying and depression, and happiness and depression
Udeani (2012)	124 fifth year science students in one co-educational secondary school in Akoka, Lagos State of Nigeria	Survey	The relationship among study habits, facilitating anxiety and debilitating anxiety was not significant.
Lawrence (2014)	300 students from 10 higher secondary schools	Survey	There was no significant relationship between study habits and test anxiety of higher secondary students.
Kumaravelan & Selvaraju (2015)	1010 higher secondary students	Survey	The findings revealed that the study habits and mental health in relation to their examination stress of Vellore higher secondary students were significantly correlated.
Rao & Reddy (2015)	400 teacher trainees	Survey	It was shown that teacher trainees with low academic stress, good mental health and good study habits are better in their academic achievement and vice versa.
Kaur & Kaur (2016)	100 rural adolescents and 100 were urban adolescents from Ludhiana district	Survey	There is a significant relationship between the two variables of the study implying that academic stress might affect study habits and vice versa

Numan & Hasan (2017)	180 undergraduate students	Survey	Not only study habits have a significant effect on general anxiety, it also affected test anxiety and academic achievement.
AlFaris et al. (2018)	372 students attending the College of Medicine, King Saud University, Riyadh, Kingdom of Saudi Arabia	Survey	Poor study skills were found to correlate with higher depressive symptoms.
Gilavand (2018)	170 general medical students from Ahvaz Jundishapur University of Medical Sciences	Survey	There was a significant inverse correlation between the level of test anxiety and the study habits by medical students.

Fewer studies are found relating to study habit. However, most studies found similar findings in which study habit affect depression, anxiety and stress. The term study habit is most commonly associated to students, and in fact all of the studies use students as their samples except for one study by Rao & Reddy (2015) which use teacher trainees as their samples. There is bi-directional relationship between these variables too, in which Kaur & Kaur (2016) stated that there is a significant relationship between academic stress and study habit implying that academic stress might affect study habits and vice versa. Academic stress is not an unfamiliar experience among students. It is described as a student's interpretation of the present demands, challenges and treats in the academic environment in relation to available personal resources for coping (Siegel, 2008). Rather than general stress, academic stress is also included in this discussion as it is more specific and more relatable to students.

Level of stress also affects study habit, as Sohail (2013) stated that an optimal level of stress enhances learning while excess of stress can cause health problems. Prior studies also shown the reverse relationship between study habit and anxiety, where anxiety can have a debilitating effect on academic performance which is related to study habit as well (Macher, Paechter, Papousek, & Ruggeri, 2012). Some studies also discover the relationship between academic anxiety with study habits, reflecting in a study by Desiderato and Koskinen (1969), where the authors stated that differences in level of academic anxiety were also related to differences in study habits, and these were, in turn, related to GPA. To author's knowledge there are not much studies carried out on how study habits affect anxiety. Most found were either on stress or depression.

Conclusion

Compared to shopping behavior and study habit, more studies were found relating to mobile usage. This may be because of how time flies so fast that new era has acknowledging how importance the technology and devices are as they connect one to another. Mobile usage has caused sleep disturbance and also mobile phone addiction, and last but not least leading to depression, anxiety and stress. Though some of them ends up to different findings, most of them revealed that there is significant relation between mobile usage, shopping behavior and study habit with depression, anxiety and stress. The relationship is vice versa. Most of the studies also used survey in the studies, and a combination of method might be better as it reduces the disadvantages of self-report responses in survey. Since in Malaysia, only a few studies were found relating to this issue, more studies are needed in order to found out how it is generalizable to other population. On top of that, a combination of method involving qualitative and quantitative research method may uncover new findings relating to mobile usage, shopping behaviour and study habit which would definitely benefits everyone.

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