

The Nexus of Stress, Anxiety Symptoms, and Smartphone Addiction among Expatriate Students

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Abstract

Smartphone addiction among students has been a topic of interest in recent years. While research in this area is ongoing, the current study aims to investigate the association between stress, anxiety symptoms, and smartphone addiction among expatriate students. The sample of the study, consisting of 84 participants (51 male and 33 female), was selected from a different educational stream. The study adopts three tools: a self-evaluation anxiety scale, a stress scale, and a smartphone addiction scale. The findings showed that the level of stress was the highest one, followed by the level of smartphone addiction. Moreover, anxiety symptoms were at their lowest level among the participants. Furthermore, a significant positive correlation between stress, anxiety symptoms, and smartphone addiction was found. Also, smartphone addiction correlated positively and significantly with anxiety symptoms. Finally, the findings failed to detect statistically significant differences based on the participant's gender.

Keywords: stress, anxiety symptoms, smartphone, addiction, students.

Introduction

The relationship between stress, anxiety symptoms, and smartphone addiction is complex and can vary from person to person (Panova & Carbonell, 2018). While smartphones have become an integral part of modern life and offer numerous benefits, excessive and compulsive smartphone use can contribute to stress and anxiety symptoms. Stress is a natural response to challenging or demanding situations (Lin, 2014). However, excessive stress can negatively impact mental and physical well-being. Smartphones, with their constant connectivity and access to social media, emails, news updates, and notifications, can create a sense of constant availability and pressure to stay connected (Panova & Lleras, 2016). This can contribute to increased stress levels as individuals feel the need to constantly be engaged with their devices, respond to messages, and stay updated on various online activities. Anxiety symptoms, such as restlessness, irritability, and difficulty concentrating, can also be influenced by smartphone use (Velthoven et al., 2018). The overuse of smartphones, especially when combined with the fear of missing out on social interactions or important information, can lead to heightened anxiety levels. Continuous exposure to social media, where people often present curated versions of their lives, can also contribute to social comparison and feelings of inadequacy, which can exacerbate anxiety symptoms (Domoff et al., 2020).

Stress

Stress is a physiological and psychological response to external pressures or demands, commonly referred to as stressors (Denovan and Macaskill, 2017). It is a natural reaction that occurs when an individual perceives a situation as challenging, threatening, or overwhelming. Stress can be caused by various factors, including work-related issues, financial problems, relationship difficulties, academic pressures, major life changes, or even everyday hassles. When a person experiences stress, their body undergoes a series of physiological changes as part of the "fight-or-flight" response. This response prepares the body to either confront or flee from the perceived threat (Lazarus, 1999). The release of stress hormones, such as cortisol and adrenaline, increases heart rate, blood pressure, and breathing rate, while redirecting blood flow to essential organs and muscles (Sohail, 2013).

While stress is a natural and adaptive response, prolonged or chronic stress can have negative effects on both physical and mental health (Hachintu and Kasisi, 2022). It can lead to a range of symptoms

and conditions, including anxiety, depression, insomnia, digestive problems, weakened immune system, headaches, muscle tension, and difficulty concentrating. Additionally, chronic stress has been linked to an increased risk of developing certain health issues, such as cardiovascular diseases, obesity, and diabetes. Managing stress is important for overall well-being. Strategies for stress management can include practicing relaxation techniques (such as deep breathing or meditation), engaging in physical exercise, maintaining a balanced and healthy lifestyle, seeking social support, setting realistic goals, managing time effectively, and adopting positive coping mechanisms. If stress becomes overwhelming and significantly impacts daily functioning, it may be helpful to seek support from a healthcare professional or therapist.

Anxiety symptoms

Anxiety is a normal and often temporary reaction to stress or a perceived threat. However, when anxiety becomes excessive, persistent, and interferes with daily life, it may be diagnosed as an anxiety disorder (Kushner et al., 2008). The symptoms of anxiety can vary from person to person, but here are some common symptoms: Excessive worry: Feeling restless or having a sense of impending doom and having difficulty controlling or stopping worrying thoughts (Kessler et al., 2005). Physical symptoms: Anxiety often manifests in physical ways, such as rapid heartbeat, shortness of breath, chest tightness, sweating, trembling, dizziness, headaches, or stomach-aches (Ge et al., 2022). Sleep disturbances: Difficulty falling asleep, staying asleep, or having restless, unsatisfying sleep. Nightmares or vivid dreams may also be present. Cognitive symptoms: Racing thoughts, difficulty concentrating, feeling easily distracted, or experiencing mental blankness. Irritability: Feeling on edge, becoming easily agitated, and having a lower threshold for frustration or irritability (Ayandele, Popoola, and Oladiji, 2020). Muscle tension: Feeling tense, having muscle aches or tension, or experiencing trembling or shakiness. Avoidance behaviors: Avoiding situations or places that trigger anxiety, such as crowded places or social gatherings. Social withdrawal: Withdrawing from social activities, isolating oneself, or avoiding interactions with others. Changes in appetite: Loss of appetite or overeating as a result of anxiety. Panic attacks: Intense episodes of fear or discomfort accompanied by physical symptoms such as a racing heart, sweating, trembling, shortness of breath, or a sense of impending doom (Ge et al., 2022).

Smartphone addiction

Smartphone addiction, also known as mobile phone addiction or problematic smartphone use, refers to the excessive and compulsive use of smartphones that interferes with daily life and causes negative consequences (Domoff et al., 2020). It is characterized by a strong and uncontrollable urge to constantly use or be connected to a smartphone, leading to an imbalance in personal and social activities. The symptoms of smartphone addiction may include Excessive use: Spending a significant amount of time on the smartphone, often neglecting other responsibilities and activities (Duke & Montag, 2017). Withdrawal symptoms: Feeling restless, anxious, or irritable when unable to access or use the smartphone. Neglecting personal relationships: Prioritizing smartphone use over spending time with family and friends, leading to social isolation (Lee et al., 2017).

In addition to impact on productivity: Decreased focus and performance in work or studies due to excessive smartphone use (Velthoven et al., 2018). Preoccupation: Constantly thinking about the smartphone, anticipating notifications, and feeling the need to check it frequently. Escapism: Using the smartphone as a means to escape from real-life problems, emotions, or stressors. Neglected self-care: Neglecting basic self-care activities such as sleep, eating, and exercise due to excessive smartphone use (Duke & Montag, 2017). Financial problems: overspending on apps, games, or other digital content through in-app purchases or subscriptions (Bi, 2022). Physical health issues: Prolonged and improper smartphone use may lead to issues such as eye strain, headaches, neck and back pain, and poor posture. Finally, disturbed sleep patterns: Using smartphones excessively before bed can disrupt sleep, leading to insomnia or poor sleep quality (Santander-Hernández et al., 2022).

Qiu et al. (2023) explored the effects of chronic stress on smartphone addiction via a moderated mediation model. The study used a questionnaire survey of 286 participants (13.64% female; Mage = 22.88; SD = 3.77; range = 17–39) on chronic stress, SPA, intolerance of uncertainty, and emotion differentiation. The study found that (1) intolerance of uncertainty, SPA, and chronic stress were positively correlated. Positive emotion differentiation was positively connected with intolerance of uncertainty and negative emotion differentiation. (2) Intolerance of ambiguity mediated the link between chronic stress and SPA. (3) Positive emotion differentiation considerably moderated the link between chronic stress and SPA. Under the condition of low positive emotion differentiation, chronic stress was more effective in predicting SPA. Ge, Liu, Cao, and Zhou (2022) discussed the relationship between anxiety, depression, and smartphone addiction among college students, employing the mediating effect of executive dysfunction. The study sample consisted of Chinese university students. In order to examine the relationships between anxiety, depression, impaired executive function, and smartphone addiction, the questionnaire's design was subjected to a confirmatory factor analysis. The study findings also showed that smartphone addiction positively and strongly correlated with executive dysfunction, sadness, and anxiety. Executive dysfunction mediated the link between anxiety and sadness in smartphone addiction. Executive dysfunction also mediated both the pathway of smartphone addiction and anxiety entirely and the channel of smartphone addiction and depression somewhat. Nonetheless, anxiety did not directly predict smartphone addiction.

In the study of perceived stress and smartphone addiction, Wang et al. (2021) examined the mediating function of negative emotions and the moderating impact of psychological capital in medical college students. In Heilongjiang Province, China, 769 medical college students responded to a questionnaire measuring perceived stress, smartphone addiction, negative emotions, and psychological capital. The relationships between the variables were examined using Pearson's correlation analysis and Hayes' Process MACRO. The findings revealed that psychological capital and perceived stress were inversely connected with smartphone addiction, whereas negative emotions and perceived stress were favorably correlated. Negative emotions were found to play a significant role in mediating the relationship between perceived stress and smartphone addiction (the mediation effect accounted for 33.3%), while psychological capital significantly moderated the first stage of the mediation process.

Ayandele, Popoola, and Oladiji (2020) looked at the incidence and connection between smartphone addiction and depressive and anxious symptoms among undergraduate female students. In an appropriate sample of 398 female students from two major universities in southwest Nigeria, standardized questionnaires were used to assess smartphone addiction, depression, and anxiety. The data showed that 17.34% of respondents were in danger, 1.01% of respondents were probably smartphone addicts, and 14.32% and 16.33% of respondents showed signs of anxiety and moderate-to-severe despair, respectively. Smartphone addiction is strongly associated with depression and anxiety. When it came to depressive symptoms, addictive or at-risk smartphone users performed noticeably worse than regular smartphone users. Additionally, addicts and at-risk users reported significantly higher levels of anxiety compared to other smartphone users.

Statement of Problem

Smartphone addiction can have negative effects on various aspects of life, including mental health, social relationships, academic achievement, professional performance, and physical well-being. It is important to maintain a healthy balance in smartphone use and seek professional help if addiction symptoms are present. The relationship between stress, anxiety symptoms, and smartphone addiction is complex and multifaceted. While research in this area is still evolving, several studies have indicated a correlation between these variables; (Lin, 2014; Panova & Lleras, 2016; Panova & Carbonell, 2018) suggests that stress and anxiety can contribute to smartphone addiction. Individuals experiencing high levels of stress and anxiety may be more likely to turn to their smartphones as a coping mechanism or a means of distraction. Smartphones offer easy access to social media, games, entertainment, and

other online activities that can provide temporary relief or diversion from stress and anxiety. However, this excessive reliance on smartphones can create a cycle where smartphone use leads to more stress and anxiety, thus, perpetuating the addiction.



It's important to note that the relationship between stress, anxiety, and smartphone addiction can vary among individuals, and not everyone who experiences stress or anxiety will develop smartphone addiction. Furthermore, more research is needed to better understand the underlying mechanisms and causal relationships between these factors. If the students experiencing significant stress, anxiety, or smartphone addiction, it's advisable to seek professional help from a mental health provider who can provide personalized guidance and support. The problem of this study lies on examining the association between stress and anxiety symptoms as predictors of smartphone addiction among expatriate students.

Significance of the study

Addressing this relationship involves adopting healthy smartphone use habits and implementing strategies to manage stress and anxiety. These can include setting boundaries and time limits for smartphone use, practicing mindfulness and relaxation techniques, engaging in offline activities, seeking social support, and, if necessary, seeking professional help from mental health experts who can provide guidance and support in managing stress, anxiety, and smartphone addiction.

Objectives of the study

The current study aims to investigate the levels of stress, anxiety symptoms, and smartphone addiction that expatriate students experience. In addition to examining the correlation between the three variables, the study also aims to explore the effects of students' gender on levels of stress, anxiety symptoms, and smartphone addiction. The study is designed to achieve its objectives by answering the following questions:

1. What are the levels of stress, anxiety symptoms and smartphone addiction among expatriate students?
2. What is the association between stress, anxiety symptoms and smartphone addiction among expatriate students?
3. To what extent can the variation in stress, anxiety symptoms, and smartphone addiction be explained through variation in the participants' gender?

Methodology

A mixed methods approach has been used to conducting research that combines qualitative and quantitative methods in a single study (questionnaires and interviews). It involves collecting, analysing, and integrating both qualitative and quantitative data to gain a more comprehensive understanding of the research topic. In this study the researcher aims to capitalize on the strengths of both qualitative and quantitative approaches, thereby enhancing the validity and reliability of the findings.

Participants

To collection the data (84) participants (51 male and 33 female) were select from a different educational stream. The participants homogenous in socioeconomic classes (low, middle, and high class) and age rating between 18 to 25 years. To gathering the qualitative data, 8 participants (4 male and 4 female) were selected for being available during the study data collection period. In addition to a nickname was also used to presents each participant responses.

Tools

To gather the data, the study adopts three tools: scale of (Abbasi and Ghosh, 2020) to self-evaluation anxiety consisting of 21-item self-report assessment device built to measure anxiety levels, based on: bodily symptoms, cognitive, emotional reaction, and behavioural reaction. Second, the participant's subjectively experienced stress was evaluated by stress scale (Fliege, et al., 2001) consisting of 20 items, the scale focuses on current subjectively perceived stress on a cognitive and affective level. The third scale was the smartphone addiction (Bradish, 2020) consisting of 27 items. To answering the items; a participant should indicate how much each item applies to him/her within two or three weeks prior to taking the test. Each item is scored on a five Likert-type scale of 1– 5: "never", "a little of the time", "some of the time", "good part of the time", "most of the time". Some items were negatively oriented to avoid the problem of set response. In term of reliability and validity, the tools were check and review by a group of experts in psychology. Moreover, the reliability was check using two Cronbach's Alpha and its values was ranging between (0.81 to 0.86).

Study Design

This study employed three questionnaires (stress, anxiety symptoms, and the smartphone addiction scale) as the main sources of data collection. Additionally, the researcher defined the study's objectives, identified the topics it sought to investigate, and developed a list of crucial inquiries to ask during interviews to gather information as a second source. Later, face-to-face interviews were scheduled to collect the required data. The researcher maintained the broad format of the questionnaire throughout the interviews but was also open to pursuing new lines of study based on the participants' replies. The results have been given and explained in the context of literature reviews and theories after the researcher has organized the data collected and the interviews for transcription and analysis.

Findings

Quantitative findings

To examine the levels of stress, anxiety symptoms and smartphone addiction among expatriate students. One-sample t-test was run, the findings presented that stress was the most effective level as reported by the participants ($M = 3.71$, $sig = 0.00$). The second effective level was smartphone addiction ($M = 3.59$, $sig = 0.03$). Moreover, anxiety symptoms were the lowest effective level among the participants ($M = 3.41$, $sig = 0.01$) as shown in Table (1).

Table 1: One-sample t-test for stress, anxiety symptoms and smartphone addiction levels.

Variables	Mean	St.dev	t	Sig
anxiety symptoms	3.41	0.85	43.18	0.01*
stress	3.71	0.71	57.58	0.00*
smartphone addiction	3.59	0.87	56.17	0.03*

* Sig at ($\alpha \leq 0.05$)

"Pearson Correlation Coefficient test" was calculated to explore the association between stress, anxiety symptoms and smartphone addiction among expatriate students. As shown in Table (2), findings showed a significant positive correlation between stress, anxiety symptoms, and smartphone addiction $r = 0.235, p \leq 0.01$ and $r = 0.573, p \leq 0.01$ respectively. smartphone addiction correlated positively and significantly with anxiety symptoms, $r = 0.461, p \leq 0.01$.

Table 2: Pearson Correlation Coefficient test for stress, anxiety symptoms and smartphone addiction.

Variables	anxiety symptoms	stress	smartphone addiction
Stress	0.235*	1	0.573*
smartphone addiction	0.461*	0.573*	1

* Sig at ($\alpha \leq 0.01$), ** Sig at ($\alpha \leq 0.05$)

"An independent sample t-test" was used to investigate the effect of participants gender on levels of stress, anxiety symptoms and smartphone addiction. As shown in Table (3), findings failed to detect statistically significant differences based on the participant's gender.

Table 3: t-tests for the effect of participants' gender on levels of stress, anxiety symptoms and smartphone addiction

Variable	Gender	N	Mean	St.dev	T	Sig
anxiety symptoms	Male	51	3.43	0.83	0.29	0.54
	Female	33	3.47	0.81		
Stress	Male	51	3.61	0.82	1.04	0.70
	Female	33	3.74	0.71		
smartphone addiction	Male	51	3.55	0.78	1.48	0.61
	Female	33	3.74	0.67		

* Sig at ($\alpha \leq 0.05$)

Qualitative findings

Samples from each case were interviewed individually, right after analyzing the descriptive data. Besides further explaining the factors that would affect the association between stress, anxiety symptoms, and smartphone addiction among expatriate students, the interviews examined how stress and anxiety symptoms are associated with smartphone addiction. The aim of the interviews was to validate the quantitative data, examine the details in depth, and explain the data. The interviews were conducted face-to-face on the university campus, videotaped, and each lasted approximately 40 minutes. The topics examined in the interviews consisted of factors that would lead to smartphone

addiction, the effect of stress and anxiety on the phenomenon of smartphone addiction, and the challenges that face the participants.

The participant (X male aged 22 years and studying in the science faculty) indicated that activities such as playing games, browsing social media, or watching videos can provide temporary distraction or relaxation. He said *"Sometimes I play video games for hours"*. The participant (A male aged 19 years and studying in the medical science faculty) believed that smartphones offer an escape from real-life stressors by providing a constant source of entertainment, information, and social interaction. He stated *"Surfing the internet or checking the social media platforms makes up for being away from my family and friends"*. In addition, *"the fear of missing out on social interactions or updates can drive me to constantly check my devices"*. The participant (G female aged 23 years studying in the arts faculty) noted that the social media platforms and constant connectivity through smartphones drive a fear of missing out on important events, updates, or social interactions. This fear induces stress and anxiety, leading me to spend excessive time on my smartphones to stay connected and up-to-date. She said *"I worry about my family and home country, so I stay online to always be updated"*. Furthermore, they use mobile games, videos, or other applications to distract themselves from negative emotions or mundane tasks. Furthermore, the participant (H female aged 19 years studying in the social sciences faculty) noted *"I feel stressed to respond to messages, emails, and notifications immediately"*. This increases stress levels and contributes to the feeling of being overwhelmed. While the participant (Y male aged 24 years studying in the engineering faculty) said that *"I use my smartphone to escape or avoid anxious thoughts or situations, and checking notifications, scrolling through social media feeds, or engaging in excessive gaming can provide temporary relief from anxiety symptoms"*. The participant (Z male aged 20 years and studying Islamic studies) believed that exposure to negative news, distressing social media content, or relentless work demands made him feel anxious; he said *"the fear of missing calls, messages, or updates creates a sense of attachment and dependency on smartphones"*. Moreover, the participant (N female aged 27 years and studying political sciences) reported that the social media platforms on smartphones lead to feelings of inadequacy and anxiety when individuals compare their lives to the curated and often idealized versions presented by others. He noted *"I hate when people show off on social media. This makes me feel less than others"*. Finally, the participants (V, aged 25 years and studying Arabic language) suggested that *smartphones can provide constant access to news, notifications, and information*. This constant influx of information is overwhelming, leading to increased anxiety levels. Also, the fear of missing out on important updates or the pressure to stay constantly connected contributes to anxiety.

Discussion

This study was designed to examine the association between stress, anxiety symptoms, and smartphone addiction among expatriate students. Using a mixed-methods approach, the findings of the study showed that the level of stress was the most effective level as reported by the participants. The second effective level was smartphone addiction. Moreover, anxiety symptoms were at the lowest effective level among the participants. A significant positive correlation between stress, anxiety symptoms, and smartphone addiction was found. Also, smartphone addiction correlated positively and significantly with anxiety symptoms. Finally, the findings failed to detect statistically significant differences based on the participant's gender.

The findings of the study found a positive correlation between stress, anxiety symptoms, and smartphone addiction. Excessive smartphone use can act as a coping mechanism for expatriate students experiencing stress and anxiety. The constant connectivity and distraction provided by smartphones may offer temporary relief from stressful situations or anxiety-inducing thoughts. On the other hand, prolonged and excessive smartphone use can contribute to increased stress and anxiety levels. Frequent use of social media platforms can expose expatriates' students to comparisons, cyberbullying, and the fear of missing out, which can heighten anxiety and stress levels. Several

mechanisms may explain the association between stress, anxiety symptoms, and smartphone addiction. Smartphone use may serve to escape or avoid stressors, providing temporary relief from anxious thoughts or uncomfortable emotions. Also, smartphones offer a means of social interaction and connection, which can be particularly appealing to expatriate students experiencing anxiety. Engaging with others online can provide a sense of security and reduce social stress. The rewarding nature of smartphone use, through notifications, likes, or gaming achievements, can reinforce the behavior and lead to increased smartphone use as a coping mechanism. Furthermore, excessive smartphone use may interfere with the development and utilization of healthy coping strategies for managing stress and anxiety, leading expatriate students to rely more on smartphone use as a maladaptive coping mechanism.

The findings of the study agree with those of Ge, Liu, Cao, and Zhou (2022), who showed that smartphone addiction was positively and strongly correlated with executive dysfunction, sadness, and anxiety. Along with the findings of Qiu et al. (2023), who hypothesized that ambiguity intolerance mediates the link between chronic stress and smartphone addiction, executive dysfunction mediates the link between anxiety and sadness in smartphone addiction. Also, a positive emotion differentiation considerably moderates the link between chronic stress and smartphone addiction. The findings also agree with findings of Wang et al. (2021) that revealed that psychological capital and felt stress were inversely connected with smartphone addiction, whereas the connection between perceived stress and smartphone addiction was shown to be largely mediated by negative emotions. Finally, it agrees with findings of Ayandele, Popoola, and Oladiji (2020) which indicated that the addictive usage of smartphones is significantly correlated with depression and anxiety.

Limitations and implications of the study

The results of this study should be interpreted with a few caveats in mind. First, the sample size was rather small, which would restrict how broadly the results could be applied. Furthermore, response bias may be introduced when stress and anxiety are measured using self-reported methods. Additionally, because this study only included expatriate students, it failed to consider the role of other confounding variables that may have an impact on stress, anxiety, or smartphone addiction, such as socioeconomic status or study adherence. The study conclusions have an impact on numerous clinical procedures and treatments. Medical professionals should, first and foremost, be aware of the stress and anxiety that students from abroad experience and should consider incorporating psychological testing and therapies into their treatment plans. The well-being and control of smartphone usage can be improved by addressing anxiety and perceived stress.

Conclusion

Findings of research that suggests a link between stress, anxiety symptoms, and smartphone addiction. While smartphones have undoubtedly revolutionized communication and provided numerous benefits, their excessive use can have negative consequences on mental health. Stress and anxiety symptoms often contribute to smartphone addiction, and in turn, smartphone addiction can exacerbate stress and anxiety. Furthermore, smartphones offer a convenient escape from stress and anxiety. Expatriates' students may turn to their devices as a coping mechanism, using apps, social media, or games to distract themselves from expatriates' negative emotions. However, excessive reliance on smartphones for escapism can lead to a vicious cycle, where stress and anxiety increase, and smartphone use intensifies. Smartphone use, particularly before bedtime, can disrupt sleep patterns. Exposure to the blue light emitted by screens, engaging with stimulating content, or responding to notifications can make it difficult to fall asleep or get quality rest. Sleep deprivation, in turn, can increase stress and anxiety levels. Moreover, the constant access to information, social media updates, and notifications can overstimulate the brain. This can lead to feelings of overwhelm, stress, and anxiety. The need to

constantly be connected and respond to notifications can create a sense of stress, further exacerbating these symptoms.

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