nomophobia cross national study

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Smartphone Use as a Mediator of Self-Control, and Emotion Dysregulation in Nomophobia: a Cross National Indonesia-Malaysia Study

Abstract

Purpose- This study aims to explore cross-cultural differences in nomophobia, emotional dysregulation, self-control, and smartphone use among a sample of university students in Yogyakarta, Indonesia, and Pahang, Malaysia. Additionally, it examines smartphone use as a mediator of the effects of emotional dysregulation and self-control on nomophobia. Currently, there is a limited amount of research specifically testing the nomophobia-mediated model across different countries.

Design/methodology/approach -The study used cross sectional design that involved a private university in Yogyakarta and a public university in Pahang. Participants in this research comprised 215 university students from Yogyakarta and 211 university students from Pahang, resulting in a total of 426 respondents. Among them, 110 (25.8%) were female, and 316 (74.2%) were male, with an average age of 18 years (SD=3.4). Manova and regression analyses were conducted to examine the hypothesis, with an initial assessment of data normality, multicolinierity and homogeneity assumptions performed before the analysis.

Findings-The results of this study indicate that students from Pahang exhibit higher levels of smartphone use and nomophobia compared to students from Yogyakarta. Emotional dysregulation and smartphone use consistently show a significant positive role in nomophobia across national contexts. Meanwhile, self-control does not demonstrate a significant direct influence on nomophobia across national contexts.

Practical implications- This research indicates the importance of the role of emotional dysregulation and smartphone use in cases of nomophobia. Practical recommendations from this study include enhancing adequate emotional regulation skills, and manage smartphone usage can help control the emergence of nomophobia in individuals. Further discussion is elaborated in the following manuscript.

Keywords: Nomophobia, emotional dysregulation, self-control, smartphone use
Paper type: Research paper

Introduction

Nomophobia is a recent issue recognized as anxiety and fear when unable to use a smartphone, being away from it, or not having it, which can impact an individual's psychological well-being (Dixit et al., 2010; King et al., 2010; King et al., 2013; Bragazzi & Del Puente, 2014; King et al., 2014; Lee et al.,

2014; Yildirim & Correia, 2015; Yildirim et al., 2016; Bekaroglu, & Yilmaz, 2020). Nomophobia, short for "no mobile phone phobia," is the "fear of being disconnected from one's smartphone" (SecurEnvoy, 2012). It was first identified in a study conducted in 2008 by the UK Post Office to investigate anxiety experienced by smartphone users (SecurEnvoy, 2012).

The prevalence of nomophobia in both developed and developing countries ranges from 77% to 99%, with the highest occurrence in the young adult population (Ozdemir et al., 2018). Nomophobia affects 18.5–73% of students (Dixit et al., 2010; Kaur & Sharma, 2015; Liu et al., 2022). Individuals experiencing nomophobia exhibit specific characteristics, such as using multiple phones and chargers, frequently checking their phone screens for notifications, and keeping their phones close while sleeping (Bhattacharya et al., 2019). Nomophobic individuals tend to avoid face-to-face interactions and prefer the virtual world of connections (Jahrami et al., 2023; Bhattacharya et al., 2019). Previous research has found clinical manifestations in individuals with nomophobia, including tachycardia (increased heart rate), excessive sweating, difficulty breathing, confusion, and anxiety (Kaur & Sharma, 2015; Bhattacharya et al., 2019).

Several previous studies have identified various variables correlated with nomophobia, including demographic factors such as age (Dasgupta et al., 2017; Musa et al., 2017; Darvishi et al., 2019), context (Dasgupta et al., 2017), the presence of Carpal Tunnel Syndrome (Lee et al., 2012), and gender (Yildirim et al., 2016; Argumosa-Villar et al., 2017; Arpaci et al., 2017; Darvishi et al., 2019; Arpaci et al., 2019). Other studies have found associations between various psychological variables and nomophobia, such as anxiety, self control, emotion regulation (King et al., 2013; Arpaci et al., 2017; Ayar et al., 2018; Darvishi et al., 2019), panic disorders (King et al., 2010; King et al., 2013), stress (Tams et al., 2018), depression, avoidance, or antagonistic attitudes (Arpaci et al., 2017; Adawi et al., 2019), obsessiveness (Lee et al., 2018; Adawi et al., 2019), and FOMO (fear of missing out) (Mertkan et al., 2018).

Self control and nomophobia
Self-control refers to the ability to regulate one's actions and urges, evaluated through an individual's capacity to resist temptation, defer immediate gratification, and manage impulses. This skill involves a conscious effort to restrain or override reactions, promoting more positive behavior in accordance with moral principles, societal expectations, and long-term objectives (Baumeister et al., 2007; Tangney et al., 2004). Proficient self-control can aid in navigating smartphone and internet usage, steering clear of addictive behaviors associated with them, and prioritizing endeavors aligning with

future success (Baumeister et al., 2007; Güner & Demir, 2021). Additionally, adequate self-control facilitates effective time management by prioritizing essential tasks over less crucial ones (Adler, 2015; Servidio, 2021; Vohs & Faber, 2007).

Research indicates that individuals lacking self-control encounter challenges related to impulse management, such as overeating, substance abuse, criminal activities, impulsive sexual behavior, overspending, unintended pregnancies, and smoking (Baumeister et al., 2007; Tangney et al., 2004; Vohs & Faber, 2007). Self-control is also linked to emotional issues, academic underachievement, persistence issues, and relationship challenges (Vohs & Faber, 2007; Baumeister et al., 2007; Tangney et al., 2004). Moffitt et al.'s (2011) investigation of a cohort spanning from birth to age 32 revealed that adequate self-control predicts outcomes in physical health, personal finances, substance dependence, and criminal behavior. Similarly, a study involving 500 sibling pairs from the same cohort demonstrated that lower self-control in siblings correlated with poorer outcomes in physical health, personal finances, substance dependence, and criminal behavior. Furthermore, Güner & Demir (2021) identified a significant inverse relationship between self-control and nomophobia and smartphone addiction, while Qiufeng et al. (2021) established a connection between self-control and smartphone addiction.

Emotion Dysregulation

Effectively managing emotions plays a crucial role in our overall well-being and interpersonal connections (Webb et al., 2012; Cameron et al., 2017). Emotion regulation encompasses the capacity to handle and govern one's emotions, deal with stress, and control mood. Assessment of emotion regulation involves gauging an individual's ability to alter various aspects of their emotional response, such as the type, intensity, duration, and quality of emotion. These adjustments can occur spontaneously or through conscious effort and are aimed at influencing the emotional generation process (Mauss et al., 2006; Gross et al., 2011).

On the contrary, improper emotion regulation can negatively impact individuals (Salovey & Mayer, 2002; Parrott, 1993; Gruber et al., 2011). For instance, uncontrolled anger directed toward someone could lead to violent actions, such as murder or molestation. Therefore, emotions are considered maladaptive when expressed inappropriately, at the wrong time, or at an excessive level. In such situations, individuals require adaptive emotion regulation strategies (Gross, 2007; 2006; 2011).

According to the self-regulation deficit model theory, deficiencies in controlling urges and negative emotions are identified as the underlying cause of nomophobic behavior (Tangney, Baumeister, & Boone, 2004). Individuals with self-regulation deficits tend to overuse their smartphones as a compensation mechanism for perceived pressure and stress, resulting in a situation where the inability to use their smartphones triggers fear and anxiety. Previous studies have indicated a connection between regulating emotions related to mobile device anxiety, namely nomophobia (Ali et al., 2017). Additionally, it was found that extroverts with deficits in awareness, attention, emotional stability, and self-esteem were more susceptible to experiencing nomophobia (Argumosa-Villar et al., 2017; Arpaci et al., 2017; Arpaci, 2019).

Smartphone use and Nomophobia

Prior research has indicated that the frequency and duration of smartphone usage increase negative consequences among others is nomophobia (Kara et al., 2019; Arpaci et al., 2020; Durak, 2018; Dongre et al., 2017). The propensity for nomophobia tends to increase with longer periods of smartphone use, and a higher frequency of smartphone use also correlates with a stronger nomophobia tendency (Dongre et al., 2017; Kara et al., 2019). The excessive use of smartphones has been linked to a decline in academic achievement and work productivity (Ozdemir et al., 2018), fostering a significant dependence on smartphones (Gutiérrez-Puertas et al., 2019), and causing distractions during academic learning and laboratory activities (Mendoza et al., 2018; Aguilera-Manrique et al., 2018).

From the perspective of operant conditioning theory, the enjoyment and rewards associated with smartphone use are influenced by the frequency and duration of such behavior (Skinner, 1985; Skinner, 1984; Dragoi & Staddon, 1999). According to operant conditioning theory, behaviors that yield pleasure are likely to be repeated (Gatzounis et al., 2012; Kirsch et al., 2004), eventually leading to dependence and addiction (Dragoi, 1997; Dragoi & Staddon, 1999; Gatzounis et al., 2012; Kirsch et al., 2004; Logan, 1913; Skinner, 1984). The desire for repeated pleasure results in an obsessive and addictive pattern of behavior over time.

Current Study

Analyzing cultural variations across different nations is a crucial aspect of cross-cultural research on human behavior, sparking substantial academic discourse (Madden, 2005). Leung (1989) asserted that merely identifying cross-cultural differences is insufficient; instead, the primary objective should be exploring the connection between these differences and cultural processes. Several scholars have

recommended to test a theory in cross-cultural studies to enhance the comprehension of such differences (Berry et al., 2002). Berry et al. (2002) proposed that, in conducting cross-cultural research, it is essential to scrutinize data both within and across cultures to test explanatory variables at multiple levels, ensuring the cross-cultural reliability and validity of theories.

Within a nation, numerous cultures coexist, each characterized by distinct norms, beliefs, and values. This study focuses on the cultural differences between the Javanese people in Indonesia and the Malay people in Malaysia. Tangible characteristics, such as values, norms, beliefs, behavioral patterns, and situations, differentiate the Javanese from the Malays. Javanese culture places emphasis on values such as calmness, harmony, and balance, integral to both Javanese mysticism and daily life (Walton, 2008). Geertz (1975) underscores the significance of the "rasa" concept in Javanese society, influencing mystical practices, art, and etiquette. The supreme values guiding Javanese life include being "bener" (correct), "pener" (appropriate), and "slamet" (safe), embodying the ideal Javanese individual who is wise and committed to doing good things (Sutarto, 2006).

In contrast, Malay culture places importance on self-respect, politeness, sensitivity to feelings, and valuing relationships. Apologetic behavior signifies humility among Malays (Asma, 1992). Influenced by Islamic principles, which most Malays adhere to, the Malays' code of conduct is shaped by Islamic values. Malays, constituting the largest ethnic group in Malaysia, exhibit a collective orientation, being motivated by affiliations with groups, families, and individuals. They respond positively to increased productivity when benefits extend beyond the organization to include family, community, and nation. Tangible rewards and opportunities for showing and receiving appropriate respect are key factors in satisfying Malays in their work (Asma, 1992).

As of 2022, the smartphone user penetration in Malaysia was estimated to surpass 89 percent, exceeding the overall smartphone adoption rate in the Asia-Pacific region (Statista, 2023). The anticipated growth in the number of smartphone users in Malaysia is projected to reach over 30 million by 2025. Predominantly, Millennials and Gen Z users constitute the majority of smartphone consumers in the country, boasting the highest percentage of smartphone ownership across different age groups. Over 98 percent of Malaysian consumers are connected to the internet through their handheld phones (Statista, 2023). In 2022 alone, Malaysians downloaded more than 1.2 billion mobile apps, with popular choices including messenger apps like Whatsapp and social media platforms such as Instagram and TikTok (Statista, 2023).

Meanwhile, in 2023 Indonesia is projected to have over 190 million smartphone users, positioning it as the fourth-largest global market for smartphones after China, India, and the United States (Statista, 2023). Anticipated smartphone penetration in Indonesia is expected to grow by 18.8 percentage points from 2024 to 2028, reaching a peak of 70.94 percent (Statista, 2023). Noteworthy is the consistent increase in the penetration rate over the past nine years. As of the third quarter of 2022, Indonesians, on average, spent 7 hours and 42 minutes daily on the internet, with an additional average of 3 hours and 18 minutes dedicated to social media (Statista, 2023). These statistics highlight the pervasive integration of the internet into daily activities across the country.

This study aims to propose and validate the nomophobia model cross-nationally among a sample of students in Yogyakarta, Indonesia, and Pahang, Malaysia. Additionally, this study will investigate variations in nomophobia among Indonesian and Malaysian student samples, delving into cross-national differences. This study will also analyze the connection between self-control and emotion dysregulation in relation to nomophobia, with smartphone use as a mediating factor. The examination of cultural distinctions between Indonesia and Malaysia adds an intriguing aspect to the research, and the investigation of relationships among the specified variables is a central focus. Notably, there is a gap in existing research as no prior studies have explored nomophobia in these two countries simultaneously.

This research will explore cross-national differences related to nomophobia in samples of Indonesian and Malaysian students. Furthermore, the study will examine the relationship between self-control and emotion dysregulation on nomophobia, mediated by smartphone use. The cultural differences between Indonesia and Malaysia will be interesting to observe, while also testing the relationships among the variables that are the focus of this research. Further more, there is no study have yet examined nomophobia among two countries. Therefore, this study test the following hypotheses:

Major Hypothesis
(H1) There is a fit between the proposed theoretical model and empirical data on the roles of self-control and emotional dysregulation mediated by smartphone use in nomophobia among samples from Indonesia and Malaysia.

Minor Hypotheses
(H2) Self-control has a direct relationship with nomophobia.

(H3) Emotional dysregulation has a direct relationship with nomophobia.

(H4) Self-control has a direct relationship with smartphone use.

(H5) Emotional dysregulation has a direct relationship with smartphone use.

(H6) Smartphone use has a direct relationship with nomophobia.

Method

Participants

This cross-national study was conducted in Yogyakarta, Indonesia and Pahang, Malaysia, involving university students from these two cities. The study included a private university in Yogyakarta and a public university in Pahang. This study recruited 215 university students from Yogyakarta and 211 students from Pahang. The total number of respondents was 426. Among the respondents, 110 (25.8%) were female, and 316 (74,2%) were male, with an average age of 18 years (SD= 3.4). Informed consent was obtained before participation, ensuring voluntary involvement without coercion. Data collection, conducted through purposive sampling, occurred over one months from 12 September 2023 to 24 November 2023. Participants received ballpoint pens as a token of appreciation. The research adhered to the principles outlined in the Declaration of Helsinki and received approval from the Research Ethics Committee of Universitas Ahmad Dahlan (Ethics Number: 012306101 KEP UAD). Additionally, the researchers secured a data collection permit from the university administration.

Measurement

Nomophobia was assessed using the No Mo Phobia-Questionnaire, developed by Yildirim and Correia (2015). The questionnaire identified four factors through Factor Analysis (EFA): "unable to communicate," "lost connection," "unable to access information," and "providing information" or "fear of losing comfort." The scale modification included back to back translation and adjustment of item sentences. Example of the items like "I would feel uncomfortable without constant access to information through my smartphone" "i would be nervous because i would be disconnected from my online identity" "Running out of battery in my smartphone would scare me". The nomophobia scale exhibited a total item correlation ranging from 0.311 to 0.775, with a Cronbach's alpha coefficient of 0.855.

Self-control was gauged using the scale developed by Tangney, Baumeister & Boone (2004), covering aspects like regulating thought and emotion, resisting temptation, breaking habits, and maintaining self-discipline. The example of the items such as "People would describe me as impulsive" "I

sometimes drink or use drugs to excess" "I have a hard time breaking bad habits". The back-to-back translation during adaptation, involving English-fluent experts, yielded a total item correlation between 0.324 and 0.479. The alpha-Cronbach coefficient for the self-control scale was 0.726.

Emotion dysregulation was assessed using The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), consisting of six aspects: strategies, non-acceptance, clarity, awareness, goals, and impulse. The adaptation process incorporated back-to-back translation by English-fluent experts. Example of the items like "When I'm upset, I become angry with myself for feeling that way" "I pay attention to how I feel" "When I'm upset, I lose control over my behaviors". The emotion regulation scale exhibited a total item correlation between 0.275 and 0.679, with an alpha-Cronbach coefficient of 0.609.

Data analysis

Manova and regression analyses were performed to investigate the hypothesis. Prior to analysis, data normality and homogeneity assumptions were assessed. SPSS 26 for Windows was utilized for all data calculations.

Result

Manova was conducted to examine whether there are differences in nomophobia, self-control, emotion dysregulation, and smartphone use between Indonesian and Malaysian students. Additionally, regression analysis was performed to test the relationships between smartphone use, self-control, and emotion dysregulation with nomophobia separately among Indonesian and Malaysian students. Path analysis was also carried out to investigate the mediating model of smartphone use on self-control and emotion dysregulation with nomophobia in both countries.

Table 1 presents the descriptive statistics of the results of the Manova test for Indonesia and Malaysia. The analysis results indicate that there is a difference in the level of nomophobia between Indonesia (M= 37.023) and Malaysia (M= 52.137), where Malaysia has a higher mean value compared to Indonesia (F (1, 424) = 151.19, p < .000, $\acute{\eta}^2$p= .263). In the self-control variable, it is shown that there is a difference between Indonesia (M= 35.16) and Malaysia (M= 52.53), with Malaysia having a higher level of self-control compared to Indonesia (F (1, 424) = 494.61, p < .000, $\acute{\eta}$2= .538). In the emotion dysregulation variable, there is no significant difference between Indonesia (M= 21.55) and Malaysia (M= 20.46)(F (1, 424) = 1.554, p < .213, $\acute{\eta}^2$p= .004). In the smartphone use variable, there is a

difference between Indonesia (M= 12.72) and Malaysia (M= 16.23), where Malaysian students have a higher frequency of smartphone use compared to Indonesia (F (1, 424) = 63.705, p < .000, ή2= .131).

Table 1
DF, mean, standard deviations (σ), F-test, and effect size

	df1	df2	Indonesia* Mean	Malaysia** Mean	F	p	$ή^2$
Nomophobia	1	424	37.023 (6.49)	52.137 (16.78)	151.19	.000	.263
Self-control	1	424	35.16 (4.75)	52.53 (10.39)	494.61	.000	.538
Emotion dysregulation	1	424	21.55 (11.79)	20.46 (4.72)	1.554	.213	.004
Smartphone use	1	424	12.72 (3.78)	16.23 (5.21)	63.705	.000	.131

*N= 215
**N= 211

The results of intercorrelation among variables in the Yogyakarta sample indicate that self-control is not significantly correlated with nomophobia. Meanwhile, smartphone use (r= .549) and emotion dysregulation (r= .196) show a positive correlation with nomophobia. The higher the smartphone use and emotion dysregulation, the higher the level of nomophobia. Conversely, the lower the level of smartphone use and emotion dysregulation, the lower the level of nomophobia. Table 2 presents the mean, standard deviation, and intercorrelation in the Yogyakarta sample.

Table 2
Mean, SD, and intercorrelation between variables for Yogyakarta samples

	Mean	SD	1	2	3	4
nomophobia	37.218	6.466	-			
self-control	35.712	4.888	.039	-		
emotion dysregulation	23.329	12.335	.196**	.684**	-	
smartphone use	12.992	3.716	.549**	.297**	.627**	-

P< .05*; p< .00**

The next testing with regression analysis on the Yogyakarta sample indicates that smartphone use (β= .701) and emotion dysregulation (β= .240) predict nomophobia (F= 40.578, df= 3, p= .000).

Meanwhile, self-control (β= -.126) does not make a significant contribution to nomophobia. The jointly proposed regression model predicts 32.9% of nomophobia in the Yogyakarta sample. Table 3 presents the results of the regression analysis on the Yogyakarta sample.

Table 3

Regression analysis for determinant variables for nomophobia (Yogyakarta samples)

	R	Adj. R	df	F	B	β	t	p
Self-control	.581ᵃ	.329	3	40.578	-.006	-.126	-.059	.953
Emotion dysregulation					.126	.240	.2,642	.009
Smartphone use					1.220	.701	10.087	.000

The next path analysis conducted on the Yogyakarta sample reveals several key findings. First, there is a significant negative relationship between self-control and smartphone usage (β= -.191, p= .000). This indicates that higher levels of self-control are associated with lower smartphone usage, suggesting that individuals with higher self-control tend to use smartphones less.

The second finding indicates a significant positive relationship between emotion dysregulation and smartphone usage (β= .797, p= .000). This implies that higher levels of emotion dysregulation are associated with increased smartphone usage. Individuals with lower emotional control or difficulty managing their emotions tend to use smartphones more intensively.

The third finding demonstrates that the level of nomophobia is influenced by two variables: smartphone usage and emotion dysregulation. Smartphone usage is significantly positively related to nomophobia (β= .701, p= .000). This suggests that as smartphone usage becomes more intensive, the level of nomophobia in individuals also increases. Meanwhile, emotion dysregulation is significantly positively related to nomophobia (β= -.240, p= .008). This indicates that individuals struggling to regulate their emotions tend to have higher levels of nomophobia compared to those with good emotion regulation.

The fifth finding shows that the role of self-control in nomophobia is not statistically significant (β= -.004, p= .953). This suggests that, in this model, the level of self-control does not have a significant impact on the level of nomophobia. The model provides an overview that the tendencies of smartphone usage and nomophobia can be understood through the crucial roles of self-control and emotion

dysregulation in this context. Figure 1 illustrates the results of the path analysis model for the Yogyakarta sample.
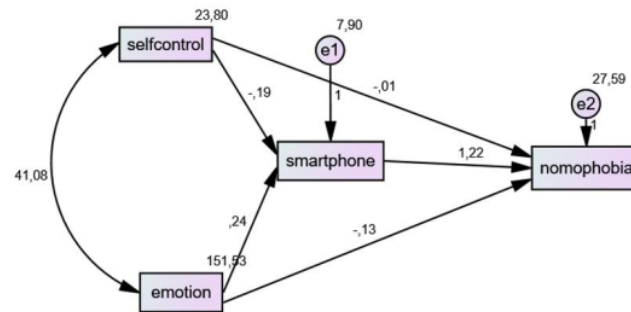

Figure 1. Path analysis model on Yogyakarta sample.

In the Pahang sample, the intercorrelation results indicate that self-control (r= .097) does not have a significant correlation with nomophobia. However, smartphone use (r= .428) and emotion dysregulation (r= .260) are significantly correlated with nomophobia. Table 4 presents the mean, standard deviation, and intercorrelations in the Pahang sample.

Table 4

Mean, SD, and intercorrelation between variables for Pahang samples

	Mean	SD	1	2	3	4
nomophobia	52.137	16.788	-			
self-control	52.526	10.394	.097	-		
emotion dysregulation	20.459	4.719	.260	.241	-	
smartphone use	16.227	5.207	.428	-.090	.116	-

P< .05*; p< .00**

Then, regression analysis was conducted to test the contribution of each predictor variable to nomophobia. The results of the regression analysis indicate that smartphone use (β= .414) and emotion dysregulation (β= .191) significantly contribute to nomophobia (F= 21.234, df= 3, p= .000).

Meanwhile, self-control (β= .088) does not have a significant contribution to nomophobia. Table 5 presents the results of the regression analysis on the Pahang sample.

Table 5. Regression analysis for determinant variables for nomophobia (Pahang samples)

	R	Adj. R	df	F	B	β	t	p
Self-control	.485[a]	.224	3	21.234	.143	.088	1.400	.163
Emotion dysregulation					.681	.191	3.024	.003
Smartphone use					1.333	.414	6.708	.000

In the Pahang sample, the results of the path analysis indicate, first, a non-significant negative relationship between self-control and smartphone use ($\beta=-0.125$, $p=0.076$). The second finding reveals a significant positive relationship between emotion dysregulation and smartphone use ($\beta=-0.146$, $p=0.038$). This suggests that smartphone use may increase with an individual's higher level of emotion dysregulation.

Furthermore, the third finding demonstrates a significant positive relationship between smartphone use and nomophobia ($\beta=-0.414$, $p=0.000$). This indicates that higher smartphone usage is associated with increased levels of nomophobia in individuals. The fourth finding shows a non-significant positive relationship between self-control and nomophobia ($\beta=0.088$, $p=0.159$), suggesting that the level of self-control is not significantly related to the level of nomophobia.

Lastly, the fifth finding indicates a significant positive relationship between emotion dysregulation and nomophobia ($\beta=0.191$, $p=0.002$). This implies that an increase in emotion dysregulation correlates with an increase in individual nomophobia. Figure 2 below illustrates the path analysis model in the Pahang sample.
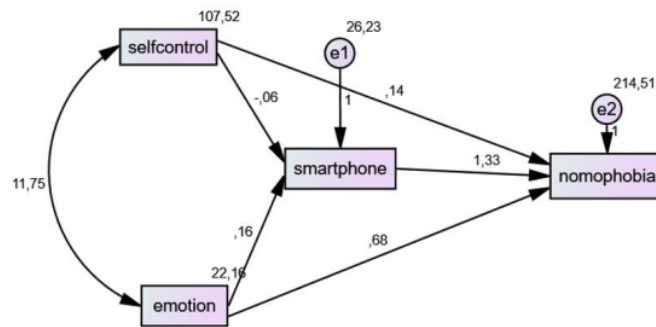
Figure 2. Path analysis model on Pahang sample.

Discussion

The purpose of this research is to confirm the cross-national applicability of the nomophobia model. The study will focus on university student samples from Yogyakarta, Indonesia, and Pahang, Malaysia. Moreover, the research also aims to explore differences in self control, emotion dysregulation, smartphone use and nomophobia levels between Indonesian and Malaysian student samples.

In both Indonesia and Malaysia, students are early adopters of communication technology advancements, especially those provided by smartphones (Lee, 2014). The use of social media and internet technology has become a crucial part of students' lives, not only for entertainment purposes but also for academic tasks (Winskel et al., 2019).

The initial findings indicate that Pahang students have a higher level of smartphone usage compared to Yogyakarta students. This is evident in terms of both frequency and duration, with Malaysian students showing higher smartphone usage than their Indonesian counterparts. On average, Malaysians spend around 7.5 hours on the internet and 2.45 hours on social media daily. While , Indonesians, on average, spent 7 hours and 42 minutes daily on the internet, with an additional average of 3 hours and 18 minutes dedicated to social media (Statista, 2020). This is supported by the meta-analysis study conducted by Olson et al., (2022), which identified Malaysia as the third-ranked country in smartphone addiction after China and Saudi Arabia. According to a study by Lee et al. (2023), four out of ten teenagers in Malaysia are addicted to smartphones. Furthermore, the HPUS 2021 survey involved interviewing 1,916 participants through an online questionnaire revealed a record-breaking

smartphone user penetration rate of 94.8% in 2021. Key everyday activities included text messaging (82.9%), social networking (78.9%), voice calls (78.6%), and video calls (71.0%). In contrast, shopping (41.1%) and banking (38.9%) ranked as the least frequently performed daily tasks (MCMC, 2021).

This research also found that Pahang students (M= 52.137) have a higher level of nomophobia compared to Yogyakarta students (M= 37.023). This is directly related to the higher use of smartphones among Pahang students compared to Yogyakarta students in the findings of this research. Additionally, several previous studies have found a significant and strong positive relationship between the frequency and duration of smartphone usage and nomophobia (Yildirim et al., 2016; Dasgupta et al., 2017; Ayar et al, 2018; Kaviani et al., 2020; Rodrigurez-Garcia et al., 2020; Moreno-guerrero et al., 2020). According to the operant conditioning theory, the frequency and duration of smartphone usage are associated with the experience of pleasure and reward (Skinner, 1985; Skinner, 1984; Dragoi & Staddon, 1999). This theory suggests that behaviors resulting in pleasure are more likely to be repeated (Gatzounis et al., 2012; Kirsch et al., 2004). The repetition of such behavior may lead to dependence and addiction (Dragoi, 1997; Dragoi & Staddon, 1999; Kirsch et al., 2004; Skinner, 1984). As individuals seek to continually experience the same pleasure, this pattern eventually transforms into an obsessive and addictive behavior.

In the self-control variable, it was found that students from Pahang, Malaysia (M=52.53), have a higher level compared to students from Yogyakarta, Indonesia (M=35.16). One factor that may contribute to the high level of self-control among Pahang students is the influence of Islamic values and teachings (Asma, 1992). In Islam, the values of repentance and self-control play a crucial role. Students from Pahang, Malaysia, might exhibit a higher level of self-control due to the emphasis on values such as patience, self-discipline, and remorse for wrongdoing in Islamic teachings. Awareness of accountability to Allah and the desire for self-improvement can motivate individuals to have better self-control.

Students from Pahang, Malaysia, may also have a stronger understanding of how Islamic values play a role in maintaining their self-control in various situations. Additionally, Islam teaches values of virtue, morality, and ethics in everyday behavior. Students who adhere to these principles may tend to have better self-control in facing challenging situations or temptations that may arise (Asma, 1992).

Another interesting finding from the regression analysis results is the discovery of similar outcomes between the regression models for Pahang and Yogyakarta. In both samples, emotional dysregulation and smartphone use significantly predict nomophobia. However, self-control does not show a significant contribution to nomophobia. Subsequently, the researchers conducted path analysis in both samples. The path analysis results showed different outcomes, where in the Yogyakarta sample, self-control is significantly positively correlated with smartphone use but not significant with nomophobia. Meanwhile, in the Pahang sample, it was found that self-control does not have a significant correlation with either smartphone use or nomophobia. A similar finding from the path analysis results in both Yogyakarta and Pahang samples is the significant positive correlation of emotional dysregulation with smartphone use and nomophobia. Additionally, smartphone use is positively correlated with nomophobia.

Based on regression analysis and path analysis, emotional dysregulation and smartphone use consistently exhibit a significant role in relation to nomophobia in the samples from Pahang and Yogyakarta. Smartphone use also consistently demonstrates a significant role as a mediator of the influence of self-control and emotional dysregulation on nomophobia across national boundaries. This indicates the universality of the significant roles of both variables across national and cultural contexts. Interventions aimed at reducing nomophobia among students need to involve the roles of emotional regulation and smartphone use as crucial factors.

In line with the self-regulation deficit model, individuals with insufficient self-regulation skills are prone to encountering adverse emotions, such as stress or anxiety (Bian & Leung, 2015). Moreover, they are inclined to partake in activities offering immediate satisfaction, like substance use or excessive reliance on technology. While these behaviors may offer momentary relief from negative emotions, they ultimately result in unfavorable outcomes, encompassing social, financial, or health-related issues (Tangney, Baumeister, & Boone, 2004).

The significant role of emotional disregulation in relation to nomophobia aligns with several previous studies. A study conducted by Vonasch, Maranges, & Baumeister (2016) revealed that a heightened susceptibility to addiction, specifically to substances like alcohol or drugs, was linked to deficient self-regulation abilities. Similarly, another investigation by Billieux, Van der Linden, and Rochat (2008) found an association between poor self-regulation abilities and an elevated risk of developing problematic internet use. Additional research has indicated that individuals grappling with addiction display altered neural circuitry in brain regions crucial for self-regulation, such as the prefrontal cortex

and the striatum (Koob & Volkow, 2010). These neurological changes may contribute to challenges in managing emotions and impulses, thereby increasing vulnerability to addictive behaviors. Furthermore, studies have demonstrated that interventions focusing on enhancing self-regulation skills, encompassing emotion regulation and impulse control, can effectively mitigate addictive behaviors and problematic smartphone use. For instance, mindfulness-based interventions have been proven to enhance emotion regulation and decrease substance use in individuals dealing with addiction (Garland et al., 2019).

The intensity of smartphone usage was identified in this research as having a significant and robust impact on nomophobia. Furthermore, it was revealed that smartphone use serves as a mediator for emotions regulation, self-control, and spiritual meaningfulness in relation to nomophobia. These findings align with prior research, indicating a consistent connection between the frequency and duration of smartphone use and the presence of nomophobia (Kara et al., 2019; Arpaci et al., 2020; Durak, 2018; Dongre et al., 2017). The study emphasizes that longer durations of smartphone usage are associated with a heightened tendency toward nomophobia. Additionally, increased smartphone usage frequency is linked to a stronger likelihood of experiencing nomophobia (Dongre et al., 2017; Kara et al., 2019). Notably, the research highlights the adverse effects of excessive smartphone use, including diminished academic achievement and work productivity (Ozdemir et al., 2018), heightened dependence on smartphones (Gutiérrez-Puertas et al., 2019), and increased distractions during academic learning and laboratory practicum activities (Mendoza et al., 2018; Aguilera-Manrique et al., 2018).

Theoretical Implications

This research offers theoretical advancements in understanding nomophobia by extending its model to encompass cross-national applicability and cultural variations in smartphone usage patterns among university students. By integrating cultural factors into the nomophobia model, scholars gain deeper insights into how socio-cultural contexts influence individuals' technological relationships and subsequent anxiety levels. The study also underscores the pivotal role of emotional dysregulation in predicting nomophobia, irrespective of cultural backgrounds, highlighting the significance of emotional regulation within the framework of technology-related anxiety. Additionally, the identification of smartphone usage as a mediating factor in the relationship between emotional dysregulation and nomophobia adds nuance to existing theoretical perspectives, emphasizing the dynamic interplay between psychological factors and behavioral patterns.

Practical Implications

The findings of this study hold practical implications for the development of targeted intervention strategies aimed at reducing nomophobia among university students. Given the cultural differences in smartphone usage patterns and nomophobia levels, tailored intervention approaches are warranted, taking into account specific cultural norms and values surrounding technology use. Educational programs designed to enhance emotional regulation skills, such as mindfulness-based techniques or cognitive-behavioral strategies, can be effective in mitigating smartphone-related anxiety. Moreover, promoting healthy technology habits within educational institutions and policymaking circles, including digital literacy programs and initiatives encouraging digital detox practices, is crucial for fostering balanced technology use and overall well-being among students.

In summary, this research contributes both theoretically and practically to the understanding and management of nomophobia. By addressing the intricate interplay between emotional regulation, smartphone usage patterns, and cultural factors, scholars and practitioners can work towards developing culturally sensitive interventions that promote healthier relationships with technology and enhance the well-being of university students across diverse cultural contexts.

Conclusion

In conclusion, the research provides valuable insights into the prevalence and correlates of nomophobia among university students in Yogyakarta, Indonesia, and Pahang, Malaysia. By confirming the cross-national applicability of the nomophobia model and identifying significant differences in smartphone usage patterns between the two samples, the study sheds light on the cultural and contextual factors influencing technology-related anxiety. The findings highlight the crucial role of emotional dysregulation in predicting nomophobia across both samples, underscoring the importance of addressing emotional regulation in interventions aimed at reducing smartphone-related anxiety among students. Moreover, the study underscores the mediating role of smartphone usage in the relationship between emotional dysregulation and nomophobia, suggesting the universal significance of smartphone usage patterns in influencing technology-related anxiety levels. Importantly, the research emphasizes the adverse effects of excessive smartphone use, including diminished academic achievement and increased dependence on smartphones, highlighting the pressing need for interventions aimed at promoting healthier technology habits among university students. Ultimately, the study contributes to our understanding of nomophobia and its correlates,

providing valuable insights for the development of targeted interventions to address smartphone-related anxiety in diverse cultural contexts.

It is noteworthy that the present investigation employed a cross-sectional design, limiting the ability to establish causality or the directionality of relationships among the variables. To address this limitation, longitudinal studies tracking individuals over time could shed light on the temporal connections between these variables and nomophobia. The utilization of purposive sampling in this study to recruit participants may not render a sample representative of the broader population of interest. Therefore, future research should consider employing a probabilistic sampling method, such as random sampling or stratified random sampling, to enhance the generalizability of findings. In conclusion, further research is essential to gain a deeper understanding of the intricate relationships involving emotion dysregulation, self-control, and nomophobia. Additionally, investigating potential mediators and moderators of these relationships would contribute to a more comprehensive comprehension of the subject matter.

Conflicts of Interest: The author(s) declare(s) that there are no conflicts of interest regarding the publication of this article

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nomophobia cross national study