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Meghna Sharma & Dr. Bijender Singh

Nomophobia: The Silent Saboteur of Executive Functions in Young Adults

Meghna Sharma* Dr. Bijender Singh**

Abstract

Nomophobia or the apprehension experienced when separated from one's mobile phone has become a common issue in modern culture, particularly among young adults. This study investigates how nomophobia associated with executive functions, including both behavioural and metacognitive aspects, in a sample of 422young adult respondents between the ages of 19 to 35. Data were collected using a convenient sample strategy, including self-reported questionnaires of nomophobia and executive functions. The findings show a significant link between nomophobia and deficiencies in executive functions, which affect cognitive processes critical for directed behaviour, planning, decision-making, and self-regulation, all of which lead to compromised everyday functioning and efficiency. Furthermore, nomophobia appears to hinder metacognitive functioning, resulting in decreased self-awareness and self-monitoring abilities about one's technological usage patterns.This study's analysis of how nomophobia affects executive functioning provides important insights into the complex link between technological dependency and cognitive ability. These findings have larger ramifications beyond individual well-being, possibly impacting social productivity and mental health. Dealing with nomophobia and its effects on executive functions necessitates interdisciplinary approaches, including psychological interventions and technological design changes, to promote healthier interactions with mobile devices and alleviate the cognitive challenges associated with the digital age.

Key words : Nomophobia, executive functions, metacognition, behaviour regulation

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About authors: ***R**esearch Scholar ** Associate Professor, Department of Psychology, Maharshi Dayanand University, Rohtak-124001.*

INTRODUCTION:

In today's digital era, the young population has grown enamoured with technology, frequently resembling slaves to its charm. Smartphones, social networking, and digital entertainment rule their life, controlling every action (Bragazzi & del Puente, 2014). Constant contact promotes reliance, reducing patience and attention span. The need to be current and connected fosters a never-ending cycle of consumerism, leaving little space for true human engagement or contemplation. This addiction to technology not only reduces productivity and social skills (Sharma et al., 2015), but it also harms mental health (Prathap,2020), causing anxiety, despair, and a sense of separation from reality (Suli & Alkhunaizan, 2019). Thus, modern kids are shackled by the shackles of technology's grasp.Nomophobia is a modern-day phobia (Bartwal & Nath,

2020) that arose as a result of people's interactions with mobile information and communication devices (Akoijam, Asok, Singh & Meetei, 2020) particularly cellphones that referred as"no mobile phone phobia," (Yildirim& Correia, 2015).Nomophobia is a situational phobia similar to agoraphobia that involves the dread of being unwell and not obtaining rapid treatment (King et al., 2014).

It is becoming increasingly popular among young adults (Bragazzi & del Puente,2014), who rely significantly on smartphones for social contact, employment, and pleasure. Nomophobia can have serious consequences (Abdoli et al., 2023), such as increased stress, lower productivity, poor social skills owing to over-reliance on virtual communication (Kumar, Kumari, Bharti & Sharma, 2021), sleep difficulties caused by continual connection, and even physical symptoms like as headaches or muscular strain (Demircioglu& Genc, 2023). Furthermore, nomophobia can worsen feelings of loneliness and reliance, limiting one's capacity to cope with solitude or in-person contact (Arumuganathan et al., 2023).

The phrase "executive functions" include planning, working memory, inhibition, mental flexibility, and action monitoring(Chan, Shum, Toulopoulou & Chen, 2008).According to the literature on nomophobia, it impairs a variety of executive functions in the brain (Best & Miller, 2010). Smartphones' widespread use in modern culture has made people increasingly reliant on them for communication, information retrieval, and entertainment, unwittingly impairing cognitive functions (Cepeda & Gonzalez de Sather,2001). One noteworthy impact is the deterioration of attentional abilities, as people constantly check their phones, resulting in decreased focus and productivity. Decision-making skills suffer as well, as the constant desire for digital connection frequently trumps sensible decisions, resulting in impulsivity and poor judgement. Furthermore, nomophobia affects memory retrieval processes since people rely on their smartphones for external memory storage (Ferguson, Brunsdon, & Bradford, 2021), which interferes with the brain's normal methods for encoding and recalling information (Dimkpa & David, 2021). Symptoms of nomophobia that are particularly difficult to cure are related with damage to the frontal lobes that indicate an interwoven large number of symptoms together referred to as 'dysexecutive symptoms' (Burgess & Simons, 2012).

Objectives

1. To assess the relationship between the nomophobia and executive functions.
2. To evaluate the contribution of the nomophobia in predicting executive functions (behavioural, Metacognitive and Global) in young adults.

Hypotheses

1. There would be a substantial association between nomophobia and behavioural regulation executive functions.
2. There would be a substantial link between nomophobia and behavioural metacognitive executive functions.
3. There would be a substantial correlation between nomophobia and global (BRI and MI) executive functions.

4. Nomophobia would contribute significantly to the prediction of executive functions in young adults.

Rationale of the study

Nomophobia has become a common concern among young people, impairing their executive functions—critical cognitive abilities such as decision-making, problem-solving, and impulse control. This study seeks to shed light on the hidden repercussions of excessive smartphone reliance by looking at the behavioural and metacognitive elements influenced by nomophobia. Understanding how nomophobia affects executive processes is critical since these functions are essential for academic and professional success, as well as overall well-being. Furthermore, the findings may guide treatments and efforts to reduce the negative consequences of nomophobia, assisting young adults in developing healthy connections with technology. Finally, this study seeks to shed light on an underappreciated yet crucial factor influencing the cognitive landscape of the digital age.

METHOD

Sample

research focused on young adults residing in India (Haryana, Delhi and Rajasthan) and employed a convenience sampling techniques to collect relevant data. The sample comprised 422 individuals within the age bracket of 19 to 35 years (as illustrated in Table 1). The data of the sample include both, female and male participants. This sampling approach enables researchers to explore potential differences and similarities in nomophobia experiences among young adults in different regions and age groups, contributing to a richer analysis of the phenomenon.

Design

In this quantitative study, a correlational approach was used to evaluate the link between nomophobia and executive skills in young adults. Researchers used this technique to determine the extent to which worries about nomophobia impact various executive processes in everyday life. Correlational analysis allowed for the investigation of how degrees of nomophobia connect with performance across several domains of executive functioning, offering significant insights into the complex interplay between smartphone dependency and cognitive processes. This methodological decision enabled a thorough investigation of the influence of nomophobia on critical cognitive functions, revealing insight on the consequences for young people' functioning and well-being in today's digitally linked society.

Tools

a) Nomophobia Questionnaire

The NMP-Q, a measuring instrument designed to gauge the intensity of anxiety or distress experienced by individuals when unable to access their smartphones, comprises twenty statements divided into four distinct factors or dimensions. These dimensions include "loss of connectivity, inability to communicate, denial of comfort, and inability to access information" (Yildirim& Correia, 2015). Participants are tasked with assessing their level of agreement with each statement on a five-degree scale, ranging from complete disagreement to complete agreement. The total score on each subscale, as well as the

questionnaire as a whole, is derived by summing the participant's ratings on the relevant statements. Notably, a higher score on any subscale indicates a more pronounced level of the corresponding nomophobic factor. The original version of NMP-Q demonstrated exceptional reliability, as evidenced by an extremely high Cronbach's alpha of 0.95, indicating robust internal consistency.

b) BRIEF-A

The Behaviour Rating Inventory of Executive Functions-Adult (BRIEF-A), created by Roth et al. in 2005, is a rigorously validated measure that provides a thorough understanding of adults' executive functioning in everyday activities. Its adaptability is useful in a variety of fields, including neuropsychology, psychology, medicine, and rehabilitation, both in study and therapy. Notably, BRIEF-A's credibility spans several demographics, including various age groups, educational backgrounds, and racial features, ensuring a fair evaluation regardless of race or ethnicity. The self-report form, which has 75 items and three response possibilities, allows for a full examination, including nine clinical measures and three validity scores. These variables condense into two broad indices, the Behaviour Regulation Index (BRI) and the Metacognition Index (MI), plus an overall 'Global Executive Composite' (GEC) score, allowing for finer comparisons.

Procedure

To fulfil the study's aims, participants were approached individually and their replies were guaranteed to be confidential. After establishing rapport, self-rated questionnaires evaluating nomophobia and executive functioning using the nomophobia questionnaire and BRIEF-A were distributed successively. Clear instructions were supplied for each scale independently, and the sequence in which they were presented was randomised to avoid inadvertent bias. Participants were required to finish all tasks without leaving any questions unanswered. The scores were then tallied in accordance with the different manuals. To investigate relationships and prediction, data was analysed using descriptive statistics, correlation analysis and regression analysis using SPSS software (IBM SPSS Statistics 29).

RESULTS AND DISCUSSION

To achieve the objectives of the study the descriptive statistical analysis for a sample size of N=422 revealed the following results are as follows:nomophobia exhibited a mean of 80.06 (SD = 0.66), behavior regulation scores had a mean of 48.12 (SD = 0.33), reflecting a relatively stable level across participants. Metacognitive functions displayed a mean of 65.45 (SD = 0.31) Overall executive functions demonstrated a mean of 113.61 (SD = 0.56),this statistical analysis provide insights into the distribution and central tendency of nomophobia and executive functions within the studied population (Illustrated in Table 1).

Table 2 displays the coefficients of correlation between nomophobia and behaviour regulation executive functions in young adults. The correlation coefficients indicate the strength and direction of the relationship between nomophobia and various executive functions. Specifically, the correlation coefficients between nomophobia and executive functions such as Inhibit, Shift,

Emotional Control, Self-Monitor, and overall behaviour regulation are shown.

The values indicatepositive correlations, with Inhibit exhibiting the highest correlation coefficient (r) at .372suggests that individuals with greater fear or anxiety regarding phone separation may find it challenging to inhibit impulsive behaviours or suppress irrelevant stimuli that manifest in behaviours such as excessive checking of one's phone or difficulty focusing on tasks without constant phone usage, followed by Emotional Control at .361 indicated thatas heightened anxiety or distress when separated from one's phone or encountering situations where phone use is restricted the lack of emotional control increases

.**Table 1:**

Descriptive statistics (mean and standard deviation) of nomophobia and executive functions.

	N	Mean	SD
NMP	422	80.06	0.66
BRI	422	48.12	0.33
MI	422	65.45	0.31
GEC	422	113.61	0.56

Self-Monitor (r =.368) implies that individuals with greater nomophobia may have challenges in monitoring and regulating their own behaviour and cognitive processes, Shift at .258, and overall behaviour regulation at .480. Importantly, all correlation coefficients are significant at the .01 level of significance, indicating a robust relationship between nomophobia and these executive functions in young adults.This implies that individuals with higher levels of nomophobia may exhibit deficits across multiple domains of executive functioning, contributing to difficulties in effectively managing their behaviour in everyday life.

[1]**Table 2:**

Coefficients of correlation between the nomophobia and behaviour regulation executive functionsin young adults.

	NMP	INT	SFT	EC	SM	BRI
NMP	-					
INT	.372**	-				
SFT	.258**	.261**	-			

[1]***NMP:*** *Nomophobia,* ***INT:*** *Inhibit,* ***SFT:*** *Shift,* ***EC:*** *Emotional Control,* ***SM:*** *Self-monitor,* ***BRI:*** *Behaviour Regulation Index,* ***INI:*** *Initiate,* ***WM:*** *Working Memory,* ***P/O:*** *Plan or Organise,* ***TM:*** *Task Monitor,* ***OM:*** *Organisation of Material,* ***MI:*** *Metacognitive Index,* ***GEC:*** *Global Executive Composite.*

EC	.361**	.347**	.341**	-		
SM	.368**	.332**	.255**	.450**	-	
BRI	.480**	.671**	.608**	.824**	.702**	-

***Significant at .01 level and *Significant at .05 Level*

Nomophobia exhibits various correlations with different aspects of cognitive functions in young adults. The correlation between nomophobia and initiation skills yields a weak positive association (r = 0.169, p<.001), indicating that heightened levels of nomophobia may coincide with slightly enhanced initiation abilities. Similarly, positive correlation was found (r = 0.358, p<.001) between nomophobia and working memory, suggesting that individuals experiencing greater levels of nomophobia tend to demonstrate better working memory performance. However, the correlation between nomophobia and planning/organizational skills (r = 0.077) is nonsignificant, reflecting inadequate evidence to discern the relationship between these variables. Nomophobia also exhibits a positive correlation (r = 0.193, p<.001) with task monitoring, suggesting a possible association with improved monitoring capabilities. Similarly, the correlation between nomophobia and organization of material (r = 0.30) lacks significance, indicating uncertainty regarding their relationship. Lastly, there's a positive correlation (r = 0.311, p<.001) between nomophobia and overall metacognitive functions, suggesting that heightened nomophobia may correspond to enhanced metacognitive abilities. These findings collectively shed light on the nuanced associations between nomophobia and various cognitive functions in young adults.These correlations illuminate how nomophobia interacts with different cognitive processes such as initiation, working memory, task monitoring, and overall metacognitive abilities. However, the significance of these correlations varies, with some relationships being statistically significant while others lack significance. This discrepancy underscores the differing levels of certainty regarding the observed associations. While certain correlations suggest clear connections between nomophobia and cognitive functions, others indicate uncertainty and highlight the need for further research to elucidate the precise nature of these relationships. Overall, these findings contribute to a deeper understanding of how nomophobia may influence various aspects of cognitive functioning in young adults.

Table 3

Coefficients of correlation between the nomophobia and metacognitive executive functionsin young adults.

	NMP	***INI.***	***WM***	***P/O***	***TM***	***OM***	***MI***
NMP	-						

INI	.169**	-					
WM	.358**	.206**	-				
P/O	.077	.221**	.166**	-			
TM	.193**	.083	.203**	.092	-		
OM	.030	.146**	.100*	.131**	.121**	-	
MI	.311**	.575**	.672**	.599**	.474**	.476**	-

***Significant at .01 level and *Significant at .05 Level*

The discovery of a substantial correlation between nomophobia and the global executive composite among young adults, represented by a correlation coefficient (r) of 0.464, highlights a compelling link between excessive smartphone reliance and cognitive performance. This finding accentuates the intricate relationship between the two constructs, particularly within the domain of executive functions. It suggests that individuals grappling with nomophobia, or fear of being without a mobile device, may experience discernible impacts on their ability to execute cognitive tasks effectively. Understanding this correlation sheds light on the intricate interplay between technology usage patterns and cognitive processes, underscoring the need for further research and potentially targeted interventions to address the implications of smartphone dependency on cognitive functioning in young adults. Hence, these findings illuminate the intricate relationship between smartphone addiction, characterized by nomophobia, and essential cognitive processes vital for effective decision-making, attention, and self-regulation. The comprehension of these correlations is essential for devising interventions aimed at alleviating the detrimental impacts of excessive smartphone usage on cognitive function and overall well-being within this demographic.

Table 4:

Coefficients of correlation between the nomophobia and global executive composite (behavioural and metacognitive) executive functionsin young adults.

	NMP	**BRI**	**MI**	**GEC**
NMP	-			
BRI	.480**	-		
MI	.314**	.484**	-	
GEC	.464**	.870**	.852**	-

***Significant at .01 level and *Significant at .05 Level*

A simple linear regression analysis was conducted to examine the relationship between nomophobia and global executive functions in young adults. The results

revealed varying R-square values across different facets of executive function. Specifically, nomophobia demonstrated a modest relationship with inhibitory control (R^2 = 0.138)indicating that 13.8% of the variance in executive function can be explained by nomophobia.Nomophobia explained 13.0% of the variance in emotional control (R^2 = 0.130) and 13.6% of the variance in self-monitoring (R^2 = 0.136), and working memory (R^2 = 0.128). A stronger association of nomophobia was observed with the behaviour regulation index (R^2 = 0.230) and the global executive composite (R^2 = 0.215). However, nominal relationships were found with the ability to shift (R^2 = 0.066), initiate (R^2 = 0.028), plan or organize (R^2 = 0.037), and task monitoring (R^2 = 0.097). These findings suggest that while certain aspects of executive function may be influenced by nomophobia in young adults, the strength of this relationship varies across different domains, highlighting the complexity of their interaction.In conclusion, the findings of this simple linear regression analysis shed light on the nuanced relationship between nomophobia and global executive functions in young adults. The results revealed a modest yet significant association between nomophobia and various facets of executive function, with R-square values indicating the extent to which nomophobia explains the variability in each domain. Notably, nomophobia showed a stronger correlation with some aspects of executive function, such as inhibitory control, emotional control, self-monitoring, working memory, the behaviour regulation index, and the global executive composite. However, nominal relationships were observed with certain other domains, including the ability to shift, initiate, plan or organize, and task monitoring.

These findings underscore the complexity of the interaction between nomophobia and executive function, suggesting that while nomophobia may indeed impact certain cognitive processes in young adults, its influence varies across different domains. Future research endeavours should delve deeper into understanding the mechanisms underlying this relationship and explore potential interventions to mitigate the negative effects of nomophobia on executive function and overall well-being in this population. Moreover, incorporating longitudinal designs and employing diverse methodological approaches could offer further insights into the dynamic nature of nomophobia and its implications for cognitive functioning. Ultimately, addressing these complexities is essential for developing tailored interventions and strategies to support the cognitive health of individuals navigating the digital age.

Table 5

Regression analysis between the nomophobia and global executive functionsin young adults.

Predictor	**Criterion**	***Young Adults***				
		R^2	**β**	**B**	**F**	**Sig.**
Nomophobia	*INT*	.138	. 372	.063	67.27	<.001
	SFT	.066	.258	.037	29.86	<.001
	EC	.130	.361	.087	63.03	<.001

SM	.136	.368	.058	65.99	<.001
BRI	.230	.480	.245	125.78	<.001
INI	.028	.169	.026	12.28	<.001
WM	.128	.358	.077	61.71	<.001
TM	.037	.193	.026	16.31	<.001
MI	.097	.311	.147	44.99	<.001
Global Executive Composite	.215	.464	.396	115.06	<.001

Frequent media multitaskers typically struggle with daily executive functions. The task of juggling many media sources at once has been shown to have a negative impact on cognitive functions. As a result, these people usually struggle to focus their attention, organise their ideas, and prioritise work properly (Baumgartner et al., 2014) and Inhibition contributed considerably to the difference beyond executive functioning, implying that for boys, inhibition and other executive functioning accounted nearly fifty percent of the variability in inattention difficulties (Berlin, Bohlin & Rydell, 2003).Smartphone separation leads to increased anxiety levels. This anxiety serves as a mediator for the negative impact of smartphone separation on key executive functions such as shifting, inhibitory control, and working-memory capacity(Hartanto & Yang, 2016).Different types of screen interventions displayed varying impacts on cognitive abilities related to executive function, highlighting the importance of considering the nature of screen exposure in assessing its effects (Huber et al., 2018).Nomophobia, alongside emotional skills and competence, emerges as pivotal indicators in anticipating the manifestation of distress factors. These elements play a crucial role in determining how individuals express various forms of distress, highlighting their significance in understanding and addressing emotional well-being(Santl, Brajkovic & Kopilas, 2022;Lantrip,2016).Females have considerably greater degrees of nomophobia and metacognition problems compared to males (Yavuz et al., 2019), also emphasises the changing psychological and behavioural features among smartphone users, such as compulsiveness, frustration, stress, poor academic performance, and attachment to cellphones (Mallya & Mashal, 2018).

Conclusion

In conclusion, the findings show that nomophobia has a considerable influence on critical cognitive functions. A comprehensive analysis reveals that nomophobia significantly impairs both behavioural and metacognitive executive skills in young individuals. These findings highlight the urgent need to address this current issue, which has a detrimental impact on decision-making, problem-

solving, attention management, and self-regulation abilities. Furthermore, the study emphasises the importance of tailored therapies and educational measures to reduce nomophobia's harmful influence on executive functioning. Recognising cell phones' extensive effect on cognitive processes is critical for encouraging healthy tech connections and boosting general well-being in young adults. Further study and intervention measures are required to counteract nomophobia and its negative impact on executive functioning in today's culture.

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