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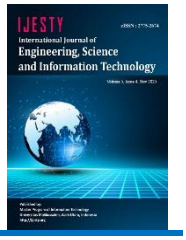

Smartphone Dependence and Academic Stress: A Psychological Analysis Among College Students

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Abstract

The General Stress Theory (GST) posits that stress results in many inappropriate actions. This research examined the correlation between Perceived Stress (PS) and dependence on Smartphones (SP). The study posited that this correlation is mediated by Diminished Self-Control (SC) and the first pathway of the mediating factor, which is influenced by safety. A survey was conducted using cluster sampling techniques on 400 undergraduates at an educational institution in Uzbekistan. The pupils were administered the Smartphone Addicted Scale-Short Variant (SAS-SV), the Depressive Anxiety Stress Score (DASS), the SC Scale (SCS), and the Safety Questionnaire (SQ) throughout scheduled class periods. The statistical program facilitated qualitative statistics and Pearson correlation evaluations. At the same time, the research was employed to examine the mediating impact of SC and the regulating influence of safety. The mediation study indicated that, as anticipated, PS correlated with less SC, which correlated with an increased risk of dependence on SP. As expected, moderated mediation analysis revealed that the relationship between PS and SC was influenced by security. The correlation between felt anxiety and SC was more pronounced in conditions of poor security. This research offers valuable insights into the relationship between PS and the heightened risk of dependence on SP. The findings align with the GST and suggest that tangible strategies are necessary for the avoidance and treatment of addiction to SP among undergraduates.

Keywords: *Smartphone, Academic Stress, Psychology, College.*

1. Introduction

The global demand for Smartphones (SP) underscores their importance in contemporary life [1]. The smartphone industry recorded around 1.62 billion units sold in 2022, reflecting a 1.8% rise in yearly sales. Significant smartphone ownership percentages amongst undergraduates were observed, notably in Ghana (75%), Australia (82%), the UK (87%), the US (92%), and between 95% and 97% in Saudi Arabia[2]. Sophisticated mobile devices and internet-enabled smartphones enhance communication, dissemination of data, and access to online resources [9]. For healthcare practitioners, the advantages of smartphones include accessible resources for health information pertinent to learning, wellness promotion, illness prevention, and administration. The emerging adverse characteristics associated with using SP pose potential concerns for all demographics across all dimensions of reliance, hazardous, and illicit uses. The sophisticated functionalities of SP have rendered their addiction an inescapable aspect of innovation. The dependence on smartphones, like other addictive behaviours, is shaped by emotional, psychological, and physical factors, making its definition complex [3]. While dependence on smartphones is not classified as a separate diagnostic group, excessive use of smartphones and dependence on the internet exhibit several characteristics similar to addictive behaviours, such as "excessive usage to the extent that it disrupts consumers' daily life[4]."

Extended durations of SP with contact with low-frequency radiofrequency Electromagnetic Fields (EMF) were associated with several clinical and neurological effects [13]. Numerous recent studies have focused on the brain as a significant target organ highly susceptible to EMF. Numerous EMF impacts were detailed regarding neurotransmitters' production, digestion, transportation, and binding partners, which affect significant brain circuits essential for cognitive and behavioural emotions. Stimulating voltage-gated calcium pathways in

the cerebellum facilitated specific neurobehavioral effects associated with EMF. Prolonged exposure to EMF was identified as a stressor, eliciting anxious responses and associated pathophysiological alterations in rats[10].

Numerous psychological issues, including anxiety, sadness, sleeplessness, and stress-related illnesses, have been associated with excessive use of smartphones and EMF radiation[6]. Various methodologies, including the Smartphone Addiction Score (SAS) and its abbreviated variant, were applied to discover potential high-risk populations for smartphone usage, particularly within social and academic settings, notably among adolescents [5].

University students experience considerable stress due to their rigorous academic and employment commitments, leading to unhappiness, diminished morale, and impaired performance. Excessive stress results in psychological effects like anxiety, anger, despair, sadness, and challenges in dealing with life [11]. Factors such as challenges in managing time, excessive workload, test pressure, familial demands, work-life balance problems, homesickness, and financial hardship exacerbate stress, resulting in diminished academic performance and general well-being. The elevated psychological strain experienced by college students accounts for the increased incidence of anxiety and depression identified among this demographic in comparison to other demographics and age-matched contemporaries. Anxiety and depressive disorders were more pronounced in female medical students, particularly during the latter stages of their education. Persistent anxiety, depression, stress, female race, and youth substantially elevated the probability of inappropriate use of SP [7]. It diminishes productivity, weakens social bonds, and exacerbates feelings of anxiety, depression, and stress[8]. An expanding corpus of evidence highlights the positive correlation between excessive mobile use, psychiatric disorders, and cognitive deterioration. Students hooked to smartphones experienced mental illness, ocular discomfort, cervical and shoulder pain, diminished performance in school, less physical activity, and compromised quality of sleep.

This research aims to analyse the prevalence of adverse smartphone usage, stress, and depression amongst college students, as well as to determine the influence of the use of smartphones on depressive and stress levels in this population [1]. The impact of gender, wealth, university, and duration of study on depressive disorders, anxiety, and smartphone usage among learners was assessed [12].

2. Methods

2.1 Subjects and Methodology

Volunteers were sourced from a college in a significant city in Uzbekistan. A total of 450 first-year students and sophomores were chosen by cluster selection. After eliminating incorrect questionnaires (those containing many omissions or duplicate responses), 400 participants were kept, resulting in a correct answer rate of 92%. The respondents' lifespan was 17 to 22 years, with 200 girls and 200 men. Of the total, 270 were first-year students and 130 were second-year students.

2.2 Actions

2.2.1 Concise Version of the Dependency on Smartphones Scale

The Uzbekistan edition of the Smartphone Addicted Scale-Short Variant (SAS-SV)was employed to assess addiction to SP. The scale has 10 items (example item: "I have neglected scheduled studies or work due to my SP usage"). Respondents evaluated each topic using a six-point measure (1 = entirely disagree, 6 = fully agree), where higher ratings indicate greater SP dependence. The Cronbach's alpha in this research was 0.85.

2.2.2. Depression, Anxiety, and Stress Index

The strain subscale from the Uzbekistan edition of the Depression-Anxiety-Stress Scale (DASS) was employed to evaluate the feelings of stress experienced by participants. The stress component has seven questions (for item: "I feel it difficult to remain calm") assessed on a four-point scale (1 = disagree to 4 = agree, with more points suggesting a greater degree of Perceived Stress (PS)) [14].In this research, Cronbach's alpha for this scale was 0.87.

2.2.3. Self-Regulation Scale

The Uzbekistan variant (39) of the Self-Control (SC) Score (SCS) (15) was employed to evaluate the level of SC. The scale has 14 questions that evaluate two aspects of SC: controlling the impulses (eight things, e.g., "I struggle to abandon detrimental behaviours") and self-discipline (five things, e.g., "I excel at resisting things that are harmful to me"). Respondents evaluated each topic using a five-point scale (1 = strongly agree to 5 = strongly disagree). Elevated scores indicate an enhanced degree of self-regulation. The Cronbach's alpha in this research was 0.88.

2.2.4. Security Assessment Survey

Securities were assessed using the Security Questionnaire (SQ). The rating scale has 15 questions that evaluate two aspects of security: personal safety, consisting of eight things (e.g., "I have never ventured to express my opinion"), and certainty oversight, including eight items (e.g., "I perceive life as consistently fraught with ambiguity and volatility"). The scale has a 4-point system (1 = entirely consistent, 5 = entirely inconsistent). A higher score correlates with an increased feeling of security for the person. In this research, Cronbach's alpha for this level was 0.93.

2.3. Procedure

Psychology undergraduates received training as researchers to administer surveys in every class. They provided guidelines and reiterated to the participants that taking part was optional. Completing the questions took around 15 minutes, and all respondents received an e-commerce coupon valued at five yuan as a reward for what they did. All the materials and processes received approval from the Ethics Board of Hunan College of Uzbekistan Medical Sciences, and all subjects and their legal representatives offered informed consent according to the rules of ethics established by the Statement of Helsinki.

2.4. Evaluation of Data

Statistical evaluations were performed using SPSS. Initially, qualitative statistics and Pearson correlation analysis were performed. The last stage included testing the negotiation and mediator-mediated mediation models via the SPSS macro-PROCESS 4.0 edition. Previous studies revealed that dependence on SP differs by gender and age; thus, these factors were added as variables in the current study. The

single-factor test developed by Harman was employed to examine common technique bias. The experiment's outcome indicated that the difference in the first component accounted for 24.5% of the total variation. This score was below the threshold of 42%, suggesting that common technique bias was not a significant issue.

3. Results and Discussions

3.1. Descriptive Statistics

The descriptive data and relationships for every factor were calculated and are shown in Fig 1. Correlation studies indicated that feelings of stress had a crucial positive association with SP dependency, while demonstrating a significant adverse association with SC and safety. SP addictions had a substantial negative correlation with SC and safety. SC showed a significant positive correlation with safety.

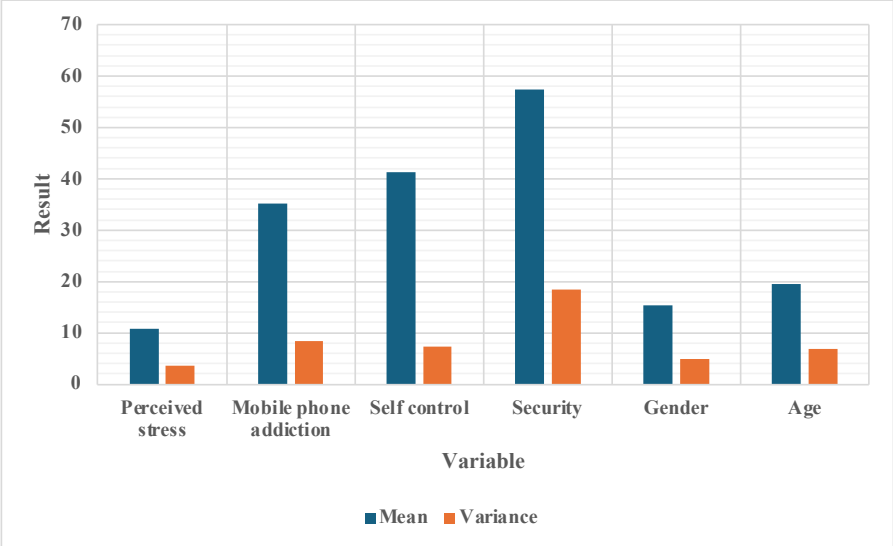

Fig 1. Descriptive Analysis

3.2. Testing for the Mediation Model

SPSS was used to examine mediation. Upon adjusting for age and sex, feelings of stress exhibited a positive correlation with SP addiction. It indicates that the direct predictive impact of PS remained substantial with the inclusion of SC as a facilitator. Feelings of stress significantly negatively correlated with SC.SC had a significant negative correlation with SP addictions. Fig. 2 presents a bootstrapping confidence range of 92% for each impact. An effect is deemed substantial when the confidence region excludes 0. The mediating impact constituted 64.1% of the overall effect.

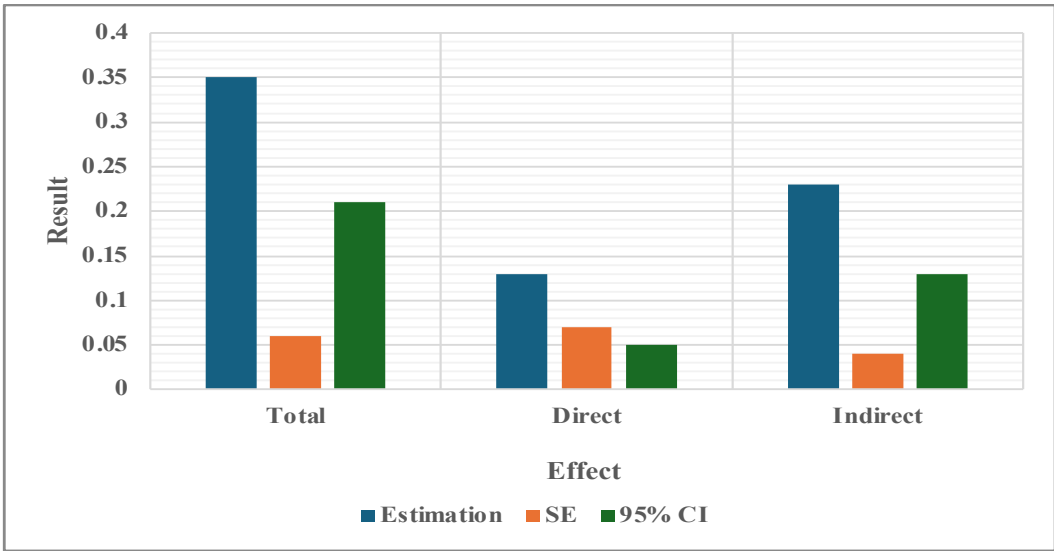

Fig 2. Mediation Analysis

3.3. Evaluation of the Moderated Mediation Approach

The model evaluated the suggested moderating mediation approach, using SC as the mediator and safety as the facilitator, while controlling for gender and age. Fig. 3 indicates that incorporating safety into the model results in an essential predictive relationship between feelings of stress and safety concerning SC, but not regarding addiction to SP. As anticipated, security attenuated the first pathway of the mediation mechanism (PS → SC).In contrast to the theories, safety did not influence the direct relationship between felt stress and SP dependence.

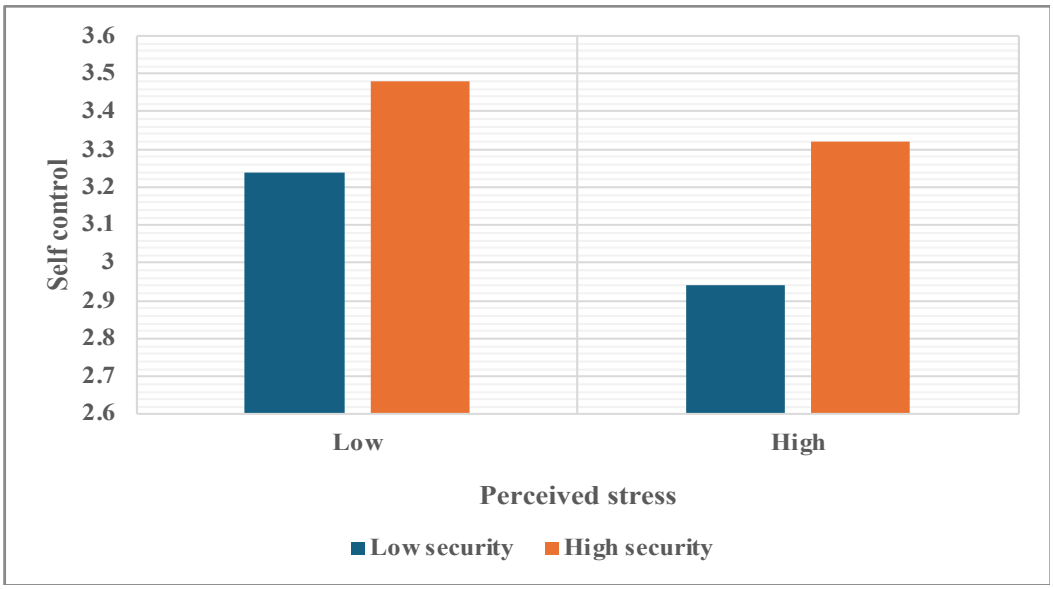

Fig 3. Self-control Analysis

A simple slopes study was used to elucidate the impact of the interaction. It illustrates the correlation between PS and SC at two levels of safety (low level, one standard deviation below the average; high level, one standard deviation above the median). Among those with inadequate safety, PS exhibited a substantial negative correlation with SC (basic slope = -0.42, $p < 0.002$); conversely, for those with high security, the predicted impact was not meaningful (basic slope = -0.08, $p > 0.02$). The findings revealed that the influence of PS on SC diminishes as safety increases. Safety modified the total indirect impact (as PS → SC → SP dependence), with a mediation score of -0.08, Boot SE of 0.02, and a 94% trust interval of [-0.12, -0.02].In those with elevated safety, the indirect impact of PS on using SP via SC was unimportant, with an effect size of -0.45, Bootstrapped Standard Error of 0.65, and a 92% trust interval of [-1.3, 1.4]. Among those with inadequate safety, the indirect impact of PS on using SP via SC was substantial, with an effect size of -0.21, Bootstrapped Standard Error of 0.12, and a 95% trust interval of [-0.35, -0.02].

4. Conclusion

Stress perceptions positively correlated with SP addiction among undergraduates. Self-regulation influenced the association between feelings of stress and SP addiction. Security regulated the initial pathway of the mediation activities. In comparison to pupils with lower safety, individuals with greater security exhibited a diminished relationship between feelings of stress and SC.

This study has some limitations that provide avenues for further investigation. This research develops a moderated mediation framework grounded in theoretical frameworks while rejecting other competing models; yet, it remains cross-sectional. Further research might employ an ongoing approach to examine the interrelations among PS, SC, and addiction to SP.

The respondents were first- and second-year students at a university in the province of Hunan. The applicability of the study findings to different populations requires further investigation. Future studies should explore various samples. Third, despite the anonymity of the self-report data, social desirability bias still has an influence. A range of assessment techniques is used, including integrating assessments from parents, classmates, and educators, or smartphone applications to monitor the frequency and duration of phone usage, to address the shortcomings of self-report data. Lastly, addiction to SP co-occurs with other psychiatric symptoms (e.g., sadness, anxiety, etc.), and these factors are managed or investigated as comorbidities in future research. The data were gathered during the pandemic, leading to elevated levels of some factors. This research primarily examines the mechanisms behind the use of smartphones among students in higher education in the context of ongoing epidemic detection and management; hence, its applicability to young people in non-epidemic regions requires additional confirmation in the future.

References

[1] Nawaz, S. (2023). Rethinking classifications and metrics for problematic smartphone use and dependence: Addressing the call for reassessment. *Computers in Human Behavior Reports*, *12*, 100327.https://doi.org/10.1016/j.chbr.2023.100327

[2] Karimov, N., Djurayeva, Y., Davidova, S., Djurayeva, Y., Usmonov, A., Madiyeva, A., Boliyeva, R., Qushnazarova, U., & Khasanova, S. (2025). The Impact of Islamic Libraries on the Compilation and Dissemination of Hadith. *Indian Journal of Information Sources and Services*, *15*(1), 183–187. https://doi.org/10.51983/ijiss-2025.IJISS.15.1.23

[3] Nawaz, S. (2023). Rethinking classifications and metrics for problematic smartphone use and dependence: Addressing the call for reassessment. *Computers in Human Behavior Reports*, *12*, 100327.https://doi.org/10.1016/j.chbr.2023.100327

[4] Shadmanova, S., Karimov, N., Taylanova, M., Asrorkhujaeva, M., Mavlyanova, U., Nazirova, S., ... &Pardaeva, Z. (2024). Ensuring the security of an internetbased e-learning system through the use of integrated encryption methods. *Journal of Internet Services and Information Security*, *14*(4), 389-400.

[5] Velliangiri, A. (2025). Multi-Port DC-DC Converters for Integrated Renewable Energy and Storage Systems: Design, Control, and Performance Evaluation. Transactions on Power Electronics and Renewable Energy Systems, 30-35.

[6] Peng, P., Chen, Z., Ren, S., Liu, Y., He, R., Liang, Y., ... & Liao, Y. (2023). Determination of the cutoff point for Smartphone Application-Based Addiction Scale for adolescents: a latent profile analysis. *BMC psychiatry*, *23*(1), 675.https://doi.org/10.1186/s12888-023-05170-4

[7] Aravindhan, S. (2023). A Flexible Structure's Active Vibration Suppression Using Smart Materials. *Association Journal of Interdisciplinary Technics in Engineering Mechanics, 1*(1), 55-61.
[8] Yu, R. A., Goulter, N., Godwin, J. W., & McMahon, R. J. (2023). Child and adolescent psychopathology and subsequent harmful behaviors associated with premature mortality: A selective review and future directions. *Clinical child and family psychology review, 26*(4), 1008-1024.
[9] Biswas, A. (2024). Modelling an Innovative Machine Learning Model for Student Stress Forecasting. *Global Perspectives in Management, 2*(2), 22-30.
[10] Bhandari, A., & Burroway, R. (2023). Hold the phone! A cross-national analysis of Women's education, mobile phones, and HIV infections in low-and middle-income countries, 1990–2018. *Social Science & Medicine*, *334*, 116217.https://doi.org/10.1016/j.socscimed.2023.116217
[11] Baggyalakshmi, N., Harrsini, M. S., & Revathi, R. (2024). Smart Billing Software. *International Academic Journal of Innovative Research, 11*(1), 51–60. https://doi.org/10.9756/IAJIR/V11I1/IAJIR1106
[12] Sindhu, S. (2025). Comparative Analysis of Battery-Supercapacitor Hybrids for Fast EV Charging Infrastructure. Transactions on Energy Storage Systems and Innovation, 1(1), 26-33.
[13] Spytska, L. (2024). Psychological stability of the individual in extreme situations. *European Journal of Trauma & Dissociation*, *8*(4), 100467.https://doi.org/10.1016/j.ejtd.2024.100467
[14] Ayesh, A. N. (2024). Enhancing Urban Living in Smart Cities Using the Internet of Things (IOT). *International Academic Journal of Science and Engineering, 11*(1), 237–246. https://doi.org/10.9756/IAJSE/V11I1/IAJSE1127
[15] Lai, H. (2022). Neurological effects of static and extremely-low frequency electromagnetic fields. *Electromagnetic Biology and Medicine, 41*(2), 201-221.
[16] Hashemi, S., Ghazanfari, F., Ebrahimzadeh, F., Ghavi, S., & Badrizadeh, A. (2022). Investigate the relationship between cell-phone over-use scale with depression, anxiety and stress among university students. *BMC psychiatry*, *22*(1), 755.https://doi.org/10.1186/s12888-022-04419-8