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Predicting Nomophobia in Adolescents Based on Personality Traits and Psychopathological Symptoms

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A B S T R A C T

Objective: The detrimental and excessive use of communication technologies today can have negative psychological effects on individuals. Among these negative effects is a phenomenon known as nomophobia. Nomophobia, an abbreviation for "no mobile phone phobia," is considered a 21st-century disorder that can be caused or exacerbated by various factors in an individual. Therefore, this study aimed to determine the extent to which personality traits and psychopathological symptoms play a role in predicting nomophobia in adolescents.

Methods and Materials: This study was a cross-sectional correlational research. The population consisted of adolescents aged 12 to 18 years in the city of Isfahan, who were selected through convenience sampling to a total of 250 participants. Data were collected using the Yildirim and Correia (2015) Nomophobia Questionnaire, the NEO Personality Inventory (1986), and the SCL-90-R Psychopathological Symptoms Checklist (1976). Multiple regression analysis was used for data analysis.

Findings: Personality traits (neuroticism, extraversion, openness, agreeableness, and conscientiousness) could predict nomophobia in adolescents at a significance level of less than 0.05. Likewise, psychopathological symptoms (depression, anxiety, hostility, phobia, obsession, paranoid thoughts, psychosis, interpersonal sensitivity, somatization) could also predict nomophobia in adolescents at a significance level of less than 0.05.

Conclusion: Nomophobia is among the social problems in adolescents, where numerous personality and psychopathological factors can play a significant role in its development and progression. These factors should be considered by researchers in more extensive samples and various cultures when dealing with adolescents with nomophobia. Additionally, these predictive factors should be taken into account in the counseling process of adolescents.

Keywords: *Nomophobia, Personality Traits, Psychopathological Symptoms.*

1. Introduction

Adolescence is the most sensitive, critical, and significant period of human development. During this time, adolescents

seek independence and detachment from the dependencies of childhood, which is why they often do not have a stable psychological state and usually face the most behavioral problems. Moreover, due to rapid technological, cultural, and social changes in today's societies, some adolescents may experience various risky behaviors (Souto et al., 2023). On the other hand, mobile phones, as one of the information and communication technologies, have seen remarkable growth in recent years. Some researchers state that mobile phones are possibly the biggest non-drug addiction of the 21st century (Parsakia, Rostami, Darbani, et al., 2023; Parsakia, Rostami, Saadati, & Navabinejad, 2023). The increased use and penetration of mobile phones in people's habits, behaviors, and daily lifestyle have brought about significant changes and may cause serious and significant problems in individuals' lives (Parsakia, Rostami, Darbani, et al., 2023; Parsakia, Rostami, Saadati, & Navabinejad, 2023; Parsakia, Rostami, & Saadati, 2023).

One of the main problems with phone use is nomophobia, or no-mobile-phone phobia. Nomophobia, recently defined as discomfort and anxiety caused by the unavailability of a mobile phone, computer, or any virtual communication device for individuals accustomed to their use (Mechraoui, 2023). According to the DSM-V, nomophobia is identified as a specific phobia and recognized as a modern world phobia (Bhattacharya et al., 2019). The term nomophobia, first popularized by British researchers from 2010, is an abbreviation for No Mobile Phobia. It describes a condition where an individual experiences severe anxiety and worry when separated from their mobile phone (Aini et al., 2021; Rodríguez-García et al., 2020). The occurrence of nomophobia leads to various issues in personality, behaviors, perspectives, emotions, and feelings, especially among youths and adolescents. It is estimated that about five hundred million people worldwide use mobile phones (Bhattacharya et al., 2019; Lin et al., 2021; Sharma, 2023; Sharma et al., 2019), with the highest usage rates found in China and India, emphasizing the increase among adolescents and young adults. A study in Iran involving 637 adolescents showed that 95.3% have moderate dependency, 3.4% have severe dependency, and 1.2% are addicted to mobile phone use (Çobanoğlu et al., 2021).

Personality traits are involved in excessive use of mobile phones (Argumosa-Villar et al., 2017; Bhattacharya et al., 2019). The Five-Factor Model of Personality (FFM), theorized by McCrae and Costa in 1991, provided a strong conceptual framework for research findings in the domain of personality traits. Extraversion, neuroticism, conscientiousness, openness to experience, and agreeableness are the five major factors of the personality Five-Factor Theory. Findings demonstrate the relationship between personality traits, feelings of loneliness, and identity styles with mobile phone dependency. Also, further studies showed that personality traits, social anxiety, and feelings of loneliness are related to mobile phone use (Aydemir & Bayram Arlı, 2022; Gehrig & Bonnstetter, 2017; Reynolds et al., 2021).

Furthermore, one of the points that has garnered significant attention in recent years regarding excessive mobile phone use is the impact that the use of communication tools can have on individuals' mood states, emotions, or psychopathological symptoms (AlMarzooqi et al., 2022). The everyday use of smartphones provides easy and constant access, facilitating current communications and entertainment, hence leading to potentially excessive and time-consuming use. This behavior might lead to damages and changes comparable to other behavioral disorders or substance abuse disorders as indicated by various research studies (Mechraoui, 2023). Individuals seeking excitement, stimulation, and pleasure from smartphones show increased levels of psychopathology (Sharma et al., 2019; Yılmaz & Bekaroğlu, 2021). Research has shown that the type of smartphone use is significantly related to negative effects such as depression, anxiety, stress, fatigue, and rumination, and has a lesser relationship with demographic characteristics (age, gender, race, marital status) (Aini et al., 2021; Argumosa-Villar et al., 2017). Psychological symptoms like depression, interpersonal sensitivity, and anxiety can lead to increased use of smartphones and social networks. This behavior is reinforced when individuals encounter specific stimuli (virtual communications) and wish to use smartphones on a particular social network. Those with specific expectations from internet communications, such as escaping problems, reality, or avoiding loneliness, appear to reach signs of psychopathology. For these individuals, choosing to use social smartphones becomes the primary choice for distraction from negative states and experiencing satisfaction, increasing the risk of losing control over phone and internet use (AlMarzooqi et al., 2022). Fear and anxiety are among the most important components of psychological disorders and damages in humans, and there seems to be a relationship between these psychological damages and nomophobia. Clinical definitions suggest nomophobia occurs when an individual experiences anxiety due to fear of being without a mobile phone, showing higher levels of fear

JAYPS Adolescent and Youth Psychological Studies E-ISSN: 2981-2526

or discomfort when unable to access mobile phones (AlMarzooqi et al., 2022; Farchakh et al., 2021). Therefore, it seems there is a reciprocal relationship between psychological damages and nomophobia that needs thorough investigation.

2. Methods and Materials

2.1. Study Design and Participants

The present study was a descriptive correlational study, and the population included all adolescents aged 12 to 18 years in the city of Isfahan. For the execution of the research and sample selection according to the research criteria, 250 adolescents were selected using convenience sampling. The inclusion criteria for the research are as follows:

Average to above-average intelligence performance; 2) Being within the age range of 12 to 18 years; 3) No emotional-behavioral disturbances; 4) Healthy visual and auditory senses; 5) Interest and willingness to participate voluntarily in the research. Also, to observe ethical research principles, verbal consent for participation in the research was obtained from the individuals, and voluntary participation, respect for the privacy of the participants, and honest dissemination of the results were ensured. Data analysis was performed using multiple regression tests with SPSS software version 24.

2.2. Measures

2.2.1. Nomophobia

This questionnaire was developed by Yildirim and Correia (2015) as the first instrument to measure nomophobia. The research by Yildirim and Correia was designed in two sequential exploratory and confirmatory phases. The first phase included the qualitative identification of nomophobia through semi-structured interviews with 9 undergraduate students at Midwestern University in the United States, resulting in the identification of four dimensions of nomophobia: 1) the inability to communicate; 2) losing connection; 3) not having access to information; and 4) giving up convenience and comfort. In the second phase, the nomophobia questionnaire was validated with a sample of over 301 undergraduate students, where exploratory factor analysis showed four structural factors related to the dimensions of nomophobia. This study also demonstrated that the nomophobia questionnaire generates valid scores and, as a result, can be used to assess the severity of nomophobia. The questionnaire consists of 4 subscales and 20 questions, rated on a 7-point Likert scale from 1 "strongly disagree" to 7 "strongly agree" for severe cases. Questions 10 to 15 relate to the subscale of the inability to communicate, questions 16 to 20 to losing connection, questions 1 to 4 to not having access to information, and questions 5 to 9 to losing convenience and comfort. The total score is calculated by summing the response to each question, resulting in a score range from 20 to 140, where a score of 20 or less indicates no nomophobia, more than 20 and less than 60 mild nomophobia, equal to or greater than 60 and less than 100 moderate nomophobia, and a score equal to or greater than 100 severe nomophobia. Yildirim and Correia (2015) reported Cronbach's alpha coefficients for the entire scale and mentioned subscales between .81-.94. In Iran, Siyah, Ghadami, and Azadi (2017) confirmed the validity of the questionnaire with exploratory analysis and reported Cronbach's alpha between .79 to .83 (Farchakh et al., 2021).

2.2.2. Personality Traits

A 60-item questionnaire used to evaluate the five main personality factors: neuroticism, extraversion, openness (to new experiences), agreeableness (compliance), and conscientiousness. Each item measures a trait with 12 questions. Each question is rated on a five-point Likert scale from "strongly disagree" to "strongly agree." The NEO-FFI personality questionnaire was administered to 208 American students with a three-month interval, resulting in reliability coefficients between .83 and .75. The long-term validity of this questionnaire has also been evaluated. A 6-year longitudinal study on the scales of neuroticism, extraversion, and openness showed reliability coefficients between .68 and .83 in personal reports and also in partner reports. The reliability coefficients for the agreeableness and conscientiousness factors over a two-year period were .79 and .63, respectively (Costa Jr & McCrae, 1992). In the standardization of the NEO test by Garoosi Farshi (2001), the correlation coefficient of the five main dimensions was reported between .56 and .87. Cronbach's alpha coefficients for each of the main factors of neuroticism, extraversion, openness, agreeableness, and conscientiousness were .86, .73, .56, .68, and .87, respectively. For assessing content validity, the correlation between the self-report (S) form and the observer-rating (R) form was used, with the highest correlation of .66 in the extraversion factor and the lowest of .45 in the agreeableness factor. In the study by Mirzaei, Mehrabi, Gohari Alhosseini, and Fathi Ashtiani (2015) using

JAYPS Adolescent and Youth Psychological Studies E-ISSN: 2981-2526

internal consistency method, Cronbach's alpha for the subscales and total score ranged from .76 to .86 (Mosadegh et al., 2023).

2.2.3. *Behavioral Symptoms*

The Symptom Checklist-90-Revised (SCL-90-R) questionnaire consists of 90 questions for assessing psychological symptoms, which can distinguish healthy individuals from those with illnesses. The final form of this questionnaire was prepared by Derogatis and colleagues in 1976. Responses to each of the test items are determined on a 5-point scale of distress ranging from "none" to "extreme." The scale assesses issues including somatic complaints, obsessive-compulsive disorders, interpersonal sensitivity, depression, anxiety, aggression, phobic anxiety, paranoid ideation, and psychosis. Scoring and interpretation of the test are based on three indices: the Global Severity Index, the Distress Index, and the Positive Symptom Total. The reliability of the nine dimensions of this test was assessed using the test-retest method (Achenbach & Rescorla, 2014). For calculating the internal consistency of the test, which was conducted on 219 individuals in the United States to measure stability and uniformity of the questions, Cronbach's alpha and the Kuder-Richardson 20 coefficients were used. The results obtained for all nine dimensions were completely satisfactory. Regarding concurrent validity, Derogatis and Rickels (1976) conducted this test alongside the MMPI on 19 volunteer subjects. The correlation for the depression criterion was 0.73, and the lowest correlation for phobic anxiety was 0.36. In Iran, Zaki and colleagues (2015) conducted a comprehensive evaluation of this questionnaire, confirming its factor structure and reported the questionnaire's reliability ranging from 0.78 to 0.90 (Alijani et al., 2015; Derogatis & Savitz, 1999).

2.3. *Data analysis*

Data were analyzed using SPSS24 compatible computer software after the sampling was completed. Initially, a descriptive analysis of the data was presented using tables and central and dispersion statistical indices (mean and standard deviation), followed by the use of correlation coefficients and multiple regression analysis considering the numerical nature of the research variables.

3. Findings and Results

The findings from the demographic data indicate that 41 members of the sample are in the age range of 12-14, 126 members are in the age range of 14-16, and 83 members are in the age range of 16-18. Furthermore, in terms of gender, there are 98 girls and 152 boys. Subsequently, the descriptive statistics of the study, including the mean and standard deviation related to the scores of variables such as nomophobia, personality traits (psychoticism, openness, extraversion, conscientiousness, and agreeableness), and pathological symptoms and their dimensions (depression, anxiety, phobia, obsession, paranoid thoughts, psychosis, sensitivity in interpersonal relations, aggression, and somatic complaints) in a sample of 250 adolescents, are presented, which can be observed in Table 1.

Table 1

Descriptive Statistics of Means and Standard Deviations for Variables (Nomophobia, Personality Traits, and Psychopathological Symptoms)

Concepts	Components	Mean	Standard Deviation
Nomophobia	Total Score	90.0360	4.620
Personality Traits	Neuroticism	27.1920	11.004
	Extraversion	16.8840	2.880
	Openness	38.4520	4.023
	Agreeableness	18.1640	2.755
	Conscientiousness	27.9440	2.861
Psychopathological Symptoms	Total Score	208.520	14.374
	Depression	36.560	5.785
	Anxiety	27.856	4.076
	Phobia	17.576	3.456
	Interpersonal Sensitivity	15.420	3.719
	Psychoticism	25.128	5.929
	Aggression	13.328	3.628
	Obsession	28.432	3.654
	Somatic Complaints	27.504	5.892
	Paranoid Thoughts	16.716	1.937

JAYPS Adolescent and Youth Psychological Studies E-ISSN: 2981-2526

In the inferential findings section, to examine the research hypothesis and the significance of the observed differences, multiple regression analysis was used. Therefore, to examine the assumptions of multiple regression, the normality of data distribution using the Kolmogorov-Smirnov test, the normality of regression errors, collinearity among predictor variables, independence of errors, and normality of errors were investigated and confirmed (P<0.05). Table 2 reports the relationship between nomophobia, personality traits, and psychopathological symptoms. The results indicate a significant negative relationship between openness, interpersonal sensitivity, somatic complaints, depression, and aggression with nomophobia in adolescents (P<0.05). Also, the results show that as the levels of neuroticism, agreeableness, and conscientiousness increase, nomophobia in adolescents increases because the significance level is less than 5% error, and a positive correlation value was obtained (P<0.05). Other results from this table indicate that there was no significant relationship between extraversion, anxiety, phobia, obsession, paranoid thoughts, and psychosis with nomophobia in adolescents. This is because the level of significance was greater than the 5% error (P<0.05).

Table 2

Correlation Between Psychopathological Dimensions, Personality Traits, and Nomophobia in Adolescents

Component	Correlation with Nomophobia	Significance Level
Neuroticism	0.124	0.050
Depression	-0.189	0.003
Extraversion	0.063	0.324
Anxiety	0.062	0.332
Openness	-0.164	0.009
Aggression	-0.172	0.006
Agreeableness	0.283	0.001
Phobia	0.064	0.317
Conscientiousness	0.254	0.001
Obsession	0.110	0.082
Interpersonal Sensitivity	-0.145	0.022
Paranoid Thoughts	-0.101	0.110
Somatic Complaints	-0.180	0.004
Psychoticism	0.036	0.574

Then, to predict nomophobia in adolescents based on the dimensions of psychopathological symptoms and personality traits, a multiple regression model is used. According to the results in Table 3, among personality traits and psychopathological dimensions of adolescents in the presence of each other, the effects of agreeableness, conscientiousness, and paranoid thoughts on nomophobia in adolescents are significant. This is because the significance level of the regression coefficient for these components is less than 5% error (P<0.05). In Table 2, openness, interpersonal sensitivity, somatic complaints, depression, aggression, and neuroticism have a significant relationship with nomophobia in adolescents. However, the results of Table 3 show that the effect of openness, interpersonal sensitivity, somatic complaints, depression, aggression, and neuroticism, in the presence of personality traits and psychopathological dimensions, on nomophobia in adolescents is not significant (P<0.05).

Table 3

Regression Coefficients of the Impact of Psychopathological Dimensions and Personality Traits on Nomophobia in Adolescents

Predictor Variables	Unstandardized Coefficients	t-Statistic	Significance Level	Determination Coefficient (R^2)
Constant	63.479	9.139	0.0001	0.392
Neuroticism	0.005	0.243	0.808	
Extraversion	0.142	1.711	0.088	
Openness	-0.105	-1.674	0.095	
Agreeableness	0.685	7.302	0.0001	
Conscientiousness	0.717	8.052	0.0001	
Depression	-0.096	-1.262	0.208	

JAYPS Adolescent and Youth Psychological Studies E-ISSN: 2981-2526

Anxiety	0.083	1.351	0.178
Aggression	-0.117	-1.744	0.083
Phobia	0.109	1.552	0.122
Obsession	0.030	0.442	0.659
Paranoid Thoughts	-0.271	-2.067	0.040
Psychoticism	0.015	0.346	0.729
Interpersonal Sensitivity	-0.113	-1.703	0.090
Somatic Complaints	0.054	0.723	0.471

The regression model, a stepwise regression model fitted to predict nomophobia in adolescents based on personality traits (agreeableness, conscientiousness) and paranoid thoughts as one of the psychopathological dimensions, is presented in Table 4. The results indicate that a one-unit decrease in agreeableness and conscientiousness in adolescents respectively leads to a decrease of 0.730 and 0.781 units in nomophobia in adolescents, with conscientiousness having a greater contribution. Also, a one-unit decrease in paranoid thoughts in adolescents leads to an increase of 0.278 units in nomophobia in adolescents.

Table 4

Regression Coefficients of the Impact of Agreeableness, Conscientiousness, and Paranoid Thoughts on Nomophobia in Adolescents

Predictor Variables	Unstandardized Coefficients	t-Statistic	Significance Level	Determination Coefficient (R^2)
Constant	59.597	15.149	0.0001	0.330
Agreeableness	0.730	8.022	0.0001	
Conscientiousness	0.781	8.940	0.0001	
Paranoid Thoughts	-0.278	-8.940	0.027	

The results in Table 5 show the analysis of variance results for the significance of the regression model. The obtained results confirm the significance of the entire model with 99% confidence. Therefore, the linear combination of personality traits and psychopathological symptoms had a significant contribution to predicting nomophobia in adolescents.

Table 5

Analysis of Variance for the Significance of the Regression Model

Model	Sum of Squares	Degrees of Freedom	Mean Square	F-Statistic	Significance Level
Regression	2083.224	14	148.802	10.815	0.0001
Residual	3233.452	235	13.759	-	-
Total	5316.676	249	-	-	-

4. Discussion and Conclusion

The findings indicated that personality traits and psychopathological symptoms can predict nomophobia in adolescents. This finding aligns with the results of previous research: (Aini et al., 2021; AlMarzooqi et al., 2022; Argumosa-Villar et al., 2017; Bhattacharya et al., 2019; Çobanoğlu et al., 2021; Farchakh et al., 2021; Lin et al., 2021; Mechraoui, 2023; Peris et al., 2020; Rodríguez-García et al., 2020; Sharma, 2023; Sharma et al., 2019; Yılmaz & Bekaroğlu, 2021). Therefore, in explaining nomophobia in relation to psychopathological symptoms, it should be stated that mobile phones, like other technologies such as the internet, television, and video, in addition to having many positive aspects, can have negative social, ethical, and psychological effects (Bhattacharya et al., 2019; Çobanoğlu et al., 2021; Sharma, 2023). Mobile phones, as emerging phenomena of the electronic age and the digital world, especially in the last decade and recent years due to the COVID-19 conditions, have made a significant place in families, particularly among adolescents and young people globally and in Iran. Recent advancements in smartphones have led to the increasing prevalence of nomophobia and the transformation of its psychopathological aspects, such that nomophobia has become limited to smartphones and has become more concerning than before (Mechraoui, 2023). Currently, as smartphones are an upgraded generation of

JAYPS Adolescent and Youth Psychological Studies E-ISSN: 2981-2526

mobile phones that have combined the capabilities previously specific to several different devices, they have become multi-purpose tools. These capabilities have led to the widespread use of smartphones and excessive reliance and dependency of users on them (AlMarzooqi et al., 2022). In this context, evidence suggests that nomophobia is rooted in excessive use of smartphones (Aini et al., 2021) and arises due to pathological or neurotic dependency on them. In fact, when nomophobic individuals cannot access their phone or its features, they experience fear, anxiety, disturbance, and severe discomfort due to this dependency (Bhattacharya et al., 2019). Specifically, nomophobic individuals fear losing their phone, not receiving a signal for calls and internet access, missed calls, not receiving messages, running out of credit, and their phone's battery dying (Aini et al., 2021; Lin et al., 2021). It should be noted that these fears cannot be superficially considered merely as pseudo-fear symptoms (Bhattacharya et al., 2019; Yılmaz & Bekaroğlu, 2021), especially for individuals with high psychopathology who experience these fears and nomophobia more intensely. Generally, when people face frustration and inability to perform their duties, they automatically revert to their previous habits. If the use of mobile phones has become a habit, reducing anxiety and unpleasant feelings turns to the use of mobile phones. Among the reasons for involuntary behaviors are achieving self-esteem goals, enhancing interpersonal relationships, and reducing stress. It appears that adolescents with higher mental health show fewer involuntary behaviors. One of the advantages of mobile phones is establishing relationships with others. Establishing a non-physical relationship is a characteristic of dependent behaviors. It seems that students excessively use mobile phones for this purpose, and the lower their mental health, the more dependent behaviors are exhibited. Some common motivations for mobile phone use include social interaction, filling the void of loneliness, personal and identity expression, security feeling, work-related reasons, and rumor spreading (Aini et al., 2021; Yılmaz & Bekaroğlu, 2021). Therefore, a society witnessing the spread of this phenomenon will have an unpleasant future in terms of mental health. Besides increasing aggression, depression is another outcome of nomophobia. Experts believe that the anxiety of separation from the mobile phone is similar to the anxiety a child feels when separated from their mother, potentially causing a sense of psychological insecurity in the individual (Peris et al., 2020; Rodríguez-García et al., 2020).

Explaining the relationship between nomophobia and personality traits, it can be said that personality traits such as extraversion and nomophobia, studies indicate that extraverts, due to specific personality characteristics such as sociability, diversity seeking, and the desire to establish and maintain contact with more people, use mobile phones more to expand their social connections and become dependent on them; the daily usage pattern of mobile phones can predict nomophobia; when the duration of smartphone and mobile internet usage increases, nomophobia becomes more common (AlMarzooqi et al., 2022; Bhattacharya et al., 2019). Regarding the relationship between conscientiousness and nomophobia, it can be said that individuals who score high in conscientiousness are meticulous, obsessive, punctual, and inflexible, and order, planning, and a sense of reliability are of great importance to them (Aini et al., 2021; Argumosa-Villar et al., 2017). Therefore, it is expected that these individuals use mobile phones more in business and academic and personal appointments (Bhattacharya et al., 2019) and due to internal order and the capabilities that smartphones provide in this regard, they use mobile phones more; also, responsible individuals use a wide range of mobile applications in communication plans and academic business (Mechraoui, 2023) and subsequently develop a dependency that leads to fear and anxiety in the absence of their smartphones. Explaining the relationship between the personality trait of neuroticism and nomophobia, it can be said that neurotic individuals are those who experience more negative and impulsive emotions than others. Furthermore, research showed that neuroticism is a predictor and a risk factor for dependency on mobile phones and social sites (Çobanoğlu et al., 2021). Neurotic individuals react to any stimulus and experience more negative emotions such as sadness, confusion, anger, shyness, guilt, and disgust, have less adaptability with others, and are emotionally unstable; such that many findings indicate that these individuals use mobile phones more to suppress their anxiety and tensions (Aini et al., 2021; Rodríguez-García et al., 2020; Yılmaz & Bekaroğlu, 2021). Therefore, over time, they develop a dependency on mobile phones and ultimately may experience greater nomophobia. In explaining the relationship between the personality trait of openness to experience and nomophobia, it can be said that openness includes active imagination, aesthetic sensitivity, attention to inner feelings, and mental curiosity. And openness is considered the most heterogeneous of the five personality dimensions related to both thinking ability and exploratory behavior. The lack of predictability of openness to experience for smartphone use is somewhat surprising

JAYPS Adolescent and Youth Psychological Studies E-ISSN: 2981-2526

(Afshari & Esmaeili, 2016; Ansari et al., 2021). The present research findings were that there is a negative relationship between openness to experience and nomophobia. Possibly, openness to experience may only be associated with specific behaviors that people do not prefer to extensively use smartphone applications, and these individuals have high flexibility in mobile phone use (Bhattacharya et al., 2019; Sharma, 2023). Due to the lack of desire to use smartphones, these individuals do not develop a dependency and, ultimately, nomophobic behavior does not occur in them. Regarding explaining the relationship between agreeableness and nomophobia, it is necessary to mention that agreeableness or empathy, a personality trait, is seen in individual behavioral characteristics recognized as kind, caring, cooperative, warm, and considerate (Mechraoui, 2023; Peris et al., 2020). In personality psychology, agreeableness is one of the five main dimensions of personality structure that shows individual differences in social cooperation and harmony. Therefore, individuals with high scores in this dimension have a spirit of cooperation and social harmony, which itself leads to a greater inclination towards mobile phones, causing nomophobia in them.

5. Limitations & Suggestions

Therefore, explanations show that personality traits and psychopathological symptoms can predict nomophobia. Like other research in the behavioral sciences and psychology, this study had limitations, 1) Convenience sampling necessitated cautious generalization of the results, 2) Cross-sectional design is not the best method for evaluating causal relationships, limiting the results, 3) The presence of COVID-19 conditions was one of the most significant limitations that made the execution conditions difficult and sampling faced errors, 4) The large number of questions due to the different variables might cause fatigue and lack of precision in participant responses. Research recommendations include 1) Considering motivational factors such as the desire for communication, seeking social support, and the value of entertainment to understand the factors influencing symptoms of nomophobia and smartphone use, 2) Conducting a longitudinal study seems necessary to precisely determine the causal relationships between the constructs of the research, 3) Repeating the research with samples that have smartphone uses such as using social networks, internet games, online shopping, or internet use, and 4) Considering the role of the phone in changing identities, scientifically investigating mobile phones in terms of application and usage, 5) Holding sessions for parents of adolescents with high neurotic personality traits, warning about the dangers of smartphone and mobile use for this group of adolescents, considering limitations on mobile phone use, and providing alternatives such as physical activities, social interactions, and physical communications.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors contributed equally.

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