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Relationship Between Personality Traits and Psychological Vulnerability: Mediating Role of Smartphone Social Network Usage

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Abstract

Background: According to the spread and popularity of social networks and easy access to them through smartphones, the impact of these networks' long-term application and consequences, including psychological vulnerability, could not be ignored.
Objectives: The present study investigated the mediating role of using smartphone social networks considering personality traits and psychological vulnerability.
Methods: The research population included all users (over 18 years of age) of social networks in Isfahan, Iran, from which 250 individuals (i.e. 96 male and 154 female subjects) were selected. The research method was descriptive and causal-correlational. For data collection, the short-form five-factor personality questionnaire neuroticism-extraversion-openness (NEO), the smartphone social media addiction questionnaire, and a psychological vulnerability questionnaire were used. The Pearson correlation coefficient and the path analysis of structural equation modeling were employed to analyze the data.
Results: The findings revealed that among personality factors, neuroticism and low extraversion could explain the use of social networks in a significant and desirable way. Moreover, using social networks could explain psychological vulnerability in the form of causal-structural relationships.
Conclusions: The findings indicated a relatively good fit of the measurement model. Accordingly, the variable of social network usage plays a mediating role in the relationship between psychological vulnerability and some personality traits.

Keywords: Iran, Personality Traits, Psychological Vulnerability, Social Networks

1. Background

The constant application of smartphones and online communication programs may lead to negative psychological impairments, compared to other behavioral or drug abuse disorders, which have been underlined by numerous studies (1). Previous studies have uncovered that the use of smartphones significantly correlates with some unpleasant consequences, such as depression, anxiety, stress, fatigue, and rumination (1-3). This could also be true for social network addiction. However, extreme dependence on social networks has a fundamental framework in common with dependence on other substances and behavioral addictions (4). The results of other studies have demonstrated significant correlations between depression, anxiety, duration of using social media, and life satisfaction with social media addiction rate (5).

According to previous studies, certain personality traits, such as neuroticism, low extraversion, lack of self-esteem, and low self-efficacy, can result in social network use and online communication (6). Among the big five personality traits (i.e. neuroticism, openness, extraversion, agreeableness, and conscientiousness), extraversion is considered the most consistent predictive feature of social network use (7). Moreover, psychopaths with psychiatric, neurological, and shy tendencies are more active and spend more time in social networks (8). Personality traits (e.g., anxiety, shyness, and low extraversion) might also play a significant role in psychological vulnerability through social networks, along with experiencing negative consequences of overusing online communication programs, which affect psychological vulnerability symptoms (e.g., depression or social anxiety) (6).

Major personality characteristics are effective on the mental perception of a situation. As a result, there is a tendency to use a specific program to mitigate negative emotional states (9). Based on the evidence, there is a considerable difference between internet and cyberspace

addicted and non-addicted students regarding their personality traits. According to the results, neuroticism was further observed in internet-addicted students than non-addicted students; however, three variables of extraversion, adaptability, and conscientiousness were higher in non-addicted students than addicted students (10).

The results indicated a positive and significant relationship between five personality factors of neuroticism with internet addiction. Nevertheless, a negative correlation was observed between conscientiousness, pleasantness, and extraversion with internet addiction (11). In another study, a positive and significant relationship was reported between neurosis (i.e. emotional imbalance) and smartphone addiction. Based on the findings, there was a negative relationship between conscientiousness and smartphone addiction (12); however, the mean scores of anxiety, stress, and depression were significantly higher in students addicted to the internet and cyberspace than non-addicted users (13).

2. Objectives

The present study aimed to investigate the mediating role of using smartphone social networks concerning personality traits and vulnerability. Undoubtedly, for a better understanding of internet users, it is imperative to predict their behaviors ultimately affecting their performance and recognize personal characteristics and damage extent caused by social networks.

3. Methods

3.1. Participants and Research Setting

The present study had a descriptive, cross-sectional, and correlational method. The statistical population included all social network users over 18 years of age in Isfahan, Iran, during 2018 - 2019. Numerous researchers believe that the minimum sample size should be 200 (14). In other words, in case of applying structural equation modeling (SEM), approximately 20 samples were required for each factor (hidden variable) (15). A total of 250 individuals were selected as the research sample using the convenience sampling method. For this purpose, after giving sufficient information about the study and emphasizing confidentiality, 15 respondents were asked to give their viewpoints regarding the questions, and this procedure was continued until obtaining their consensus. The inclusion criteria were proficiency in social network application and at least the age of 18 years; However, the exclusion criteria were insufficient literacy to respond, incomplete and distorted completion of the questionnaire, or questionnaire completion by someone else other than the respondent.

3.2. Measurements

In this study, a survey and questionnaires were used for data collection. The following questionnaires were used in this study:

(1) Five-factor personality questionnaire (NEO), the short form: For the measurement of the personality traits, the five-factor questionnaire of NEO Five-factor Inventory was used with 60 items and measured five major personality dimensions, including neuroticism, introversion-extroversion, (dimension E), openness to experience (dimension O), agreeableness (dimension A), and conscientiousness (dimension C) (16). Various studies argued that the short-form NEO has outstanding compatibility with its full version (17).

(2) Smartphone social network addiction questionnaire: For the assessment of the use of social networks, this 23-item questionnaire of Khajeahmadi et al. was used (18). The social network addiction level on a 5-point Likert scale in four user levels was achieved as below a normal user (23 - 46), a normal user (46 - 69), a user on the verge of addiction (69 - 92), and an addicted user (92 - 115). The internal reliability was calculated, and Cronbach's alpha coefficient was obtained at 0.92 (18). In the present study, Cronbach's total alpha was calculated at 0.91.

(3) Psychological Vulnerability Questionnaire: The Psychological Vulnerability Scale was used to assess psychological vulnerability (19). The questionnaire was a six-item measurement of a set of cognitions for assessing harmful reactions to stress. Higher scores indicated greater psychological vulnerability. The questionnaire-makers have reported a scale correlation coefficient of 0.51 (19). In a study conducted in Iran, the total score of the Mental Vulnerability Questionnaire was calculated, and the correlation coefficient was measured at 0.89 (20).

3.3. Data Collection and Analysis

The data obtained from the questionnaires were analyzed and classified under two descriptive and inferential sections. The inferential section studied the pre-assumptions, such as the measurement scale interval, the normal distribution of studied variables, the multilinearity of predictive variables, and their correlations. The SPSS software (version 23) and LISREL software (version 8.80) were used for the related precise data analysis.

4. Results

According to the statistical characteristics of the respondents, out of 250 participants, 96 (38.4%) and 154 (64.6%) subjects were male and female, respectively. The average age of the participants was 26.99 years. Moreover, 68% and 32% of the participants were single and married, respectively. The highest educational level was undergraduate, accounting for 54.4% of the sample population. All the participants answered the questions, and the frequency distribution showed that the participants have generally used social networks. Since the SEM defaults were met, the SEM method was considered to compare the appropriateness of measured models with theoretical models.

Table 1 shows that:

- The distributions of neuroticism, extroversion, openness, agreeableness, conscientiousness, and vulnerability are moderate.

- The distribution of social network usage varies from moderate to high level.

The correlation matrix of the studied variables was obtained as described in Table 2.

Table 2 shows that:

- The relationship between neuroticism and social network use is positive and statistically significant (P < 0.05).

- The relationship between agreeableness and social network use is positive and statistically significant (P < 0.01).

- The relationships between extroversion, openness, and conscientiousness with social network use are negative and statistically significant (P < 0.05).

- The relationship between psychological vulnerability and social network use is positive and statistically significant (P < 0.05).

- The relationship between psychological vulnerability and neuroticism is positive and statistically significant (P < 0.05).

- The relationships between psychological vulnerability with openness, extraversion, and conscientiousness are negative and statistically significant (P < 0.05).

For the examination of the direct relationship between personality traits and psychological vulnerability, the regression coefficient of personality traits was measured (Table 3).

According to the findings, the correlation coefficient was equal to 0.56, and the determination coefficient of personality traits was obtained at 0.31.

In addition, according to Table 4, the calculated *t*-values through the regression analysis of personality traits, including neuroticism (t = 5.02), extraversion (t = -5.25), openness (t = -3.00), and agreeableness (t = 4.07), were significant (P = 0.01). Nonetheless, the measured t-value of conscientiousness was not significant (t = 1.46 ; P = 0.14).

As it is shown in Table 5, the measurement indices indicate a relative fit and mediating role of using smartphone social networks concerning personality traits and psychological vulnerability; However, not all the relationships in the original model were significant. Subsequently, all non-significant relationships were removed from the model to determine the final values of the model parameters. Finally, considering the acceptable range of goodness-of-fit indicators, the modified model was presented (21).

Structural model 1 shows that the dual personality traits (i.e. neuroticism and extraversion) can explain psychological vulnerability through social networks in the form of causal-structural relationships. The values of the fit indices of the measurement model were all located at the optimal position; therefore, the root value of RMSEA was at the desired level (< 0.09) where the ratio of χ^2/df at the desired level was equal to 2/5103 (< 6), and this ratio was significant at 5% probability level (P < 0.05). On the one hand, GFI, CFI, AFI, NFI, and TLI were all desirable (> 0.70) (22). On the other hand, the explanatory coefficient value (B) and the t-test demonstrate the following issues:

(a) The neurotic agent with an explanatory coefficient of 0.39 and t-value of 2.13 can implicitly explain 39% of the changes in social network use (P > 0.05).

(b) The openness factor with an explanatory coefficient of 0.76 and *t*-value of 7.09 can explain 70% of negative and significant changes in social network use (P < 0.05).

(c) Using social networks with an explanatory coefficient of 0.76 and *t*-value of 7.09 can significantly explain 76% of psychological vulnerability (P < 0.05).

5. Discussion

The present study attempted to investigate and explain the mediating role of smartphone social network usage concerning personality traits and psychological vulnerability. Based on previous studies, the use of smartphones and social networks is affected by some personality traits (6, 7, 23). Introverts engage more significantly in online communications than extroverts (22, 24). Studies confirm the fact that neurotics establish less face-to-face communication. As the evidence underlines, anxious individuals are more enthusiastic about spending their time on social networks (25). Depression and anxiety symptoms are associated with an increase in the use of social networks (26).

Neurotic individuals use certain types of internet communications, including social networks, to spend their time and relax (22, 27, 28). The results of the comparison revealed that neurotic personality traits were related to the

Table 1. Mean and Standard Deviation of Studied Variables

Variable	Mean	Standard Deviation	Subject
Neuroticism	34.6680	4.64111	250
Extraversion	38.6800	4.37518	250
Openness	36.6360	3.90442	250
Agreeableness	37.5920	4.21909	250
Consciousness	35.6920	3.99763	250
Psychological vulnerability	19.4480	4.38408	250
Social network use	68.0040	16.57440	250

Table 2. Correlation Matrix of Studied Variables

Variable	1	2	3	4	5	6	7
Neuroticism	1						
Extroversion	-0.14[a]	1					
Openness	-0.03	0.27[b]	1				
Agreeableness	0.15[a]	0.18[b]	0.11	1			
Conscientiousness	-0.08	0.30[b]	0.24[b]	0.11	1		
Psychological vulnerability	0.36[b]	-0.37[b]	-0.26[b]	0.18[b]	-0.21[b]	1	
Social network use	0.35[b]	-0.34[b]	-0.31[b]	0.15[a]	-0.32[b]	0.67[b]	1

[a] $P < 0.05$
[b] $P < 0.01$

Table 3. Regression Model Index

Model	R	R-Squared	Adjusted R-Squared	Standard Error of Estimate
1	0.56	0.31	0.30	3.66654

Table 4. Regression Coefficients

Model	Un-standardized Coefficients		Standardized Coefficients	*t*	P
	B	Standard Error	Beta		
Constant	12.26	3.81		3.22	0.001
Neuroticism	-0.25	0.05	-0.27	-5.02	0.000
Extraversion	0.31	0.06	0.30	5.25	0.000
Openness	0.19	0.06	0.17	3.00	0.003
Agreeableness	-0.23	0.08	-0.22	-4.07	0.000
Conscientiousness	0.09	0.06	0.08	1.46	0.143

severity level of social network addiction, and the findings of users' personality traits are consistent with the findings of previous studies (6-8, 29). There is a common agreement that the relationship between conscientiousness and the time spent on the internet and other internet-related networks is negative (30). High conscientiousness might indicate a general avoidance from social networks (31).

The use of social networks significantly explained psychological vulnerability. This result is consistent with the results obtained by a group of other researchers (2, 4, 6). The individuals who frequently use social networks showed a higher depression rate, compared to that reported for the low-use individuals. Furthermore, smartphone overuse resulted in poor sleep quality, depression, and anxiety (32). The examination of the direct relationship between personality traits and psychological vulner-

Table 5. Final Model Fit Indices of Structural Relationships Among Personality Traits, Social Network Use, and Psychological Vulnerability

Index	Value	Acceptable Domain	Result
χ^2	2968.02	-	Fit model
DF	2920	-	Fit model
χ^2/df	1.016	6 >	Fit model
P.VALUE	0.00	0.05 >	Fit model
The Root Mean Square Error of Approximation (RMSEA)	0.07	0.1 >	Fit model
NFI	0.80	0.80 <	Fit model
NNFI	0.85	0.80 <	Fit model
CFI	0.85	0.80 <	Fit model
GFI	0.85	0.90 <	Fit model
AGFI	0.75	0.70 <	Fit model
IFI	0.85	0.80 <	Fit model

ability showed that vulnerability had the most positive association with the neurotic trait, which is consistent with the results of previous studies (33). Extroversion also negatively predicts psychological vulnerability (34). In other words, higher extroversion levels would assist an individual to better deal with adversity (35).

The openness trait negatively predicted psychological vulnerability, which is in line with the results of previous studies (36, 37). Nevertheless, compromise can positively predict psychological vulnerability. Agreeable individuals are usually altruistic, sociable, and obedient to others (16). Concerning this issue, the evidence also highlights that compromise and neuroticism may influence the adjustment of relationships (38). This study showed that neuroticism and low extraversion could significantly predict the addictive use of social networks. The higher neuroticism level would result in a greater possibility of addiction to social networks. This result is consistent with the results of previous studies (1, 25). Simultaneously, the addictive use of social media can significantly predict the symptoms of depression, anxiety, and vulnerability. In sum, the higher intensity of addictive social media use indicates a higher risk of vulnerability (39, 40). The combination of these two personality traits (i.e. high neuroticism and low extraversion) with the widespread use of smartphones could be assumed as the basis of a higher level of psychological vulnerability.

5.1. Limitations

One of the limitations of the current study was its cross-sectional design. It is also probable that asking a large number of questions (due to dealing with different variables) has caused fatigue and inaccuracy of participants' reactions. Another constraint of this study was using the convenience sampling method, making it hard to generalize the results. Therefore, it is suggested to perform further studies to consider the impact of singleness, marriage, gender, and socioeconomic and cultural status on the use of social networks.

5.2. Conclusions

As previously mentioned, the frequent use of the internet could lead to anxiety, depression, or anger in case there is no internet access and this could result in increasing the risk of psychological vulnerability. Consequently, the social network usage variable could play a mediating role between psychological acceptance and some personality traits.

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Footnotes

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Informed Consent: The authors visited the participants in their houses at designated areas in person and interviewed them after giving sufficient information about the study objectives, emphasizing the confidentiality of the data, and obtaining their consent.

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