

Prediction of Internet Addiction in University Students Based on Personality, Attachment Styles, and Emotion Regulation

Abstract

The Internet and social networks and their important and practical role in human life can also be destructive and addictive. Internet addiction in students can have negative effects on their education process. This study investigated the predictive relationship between personality traits, attachment styles, and emotional regulation with internet addiction. The research method of this study was cross-sectional, and a convenience sampling method was used for recruiting participants. Forty-two males and 188 females completed the self-reported questionnaires through the online link. All analyses were performed by SPSS software version 24.

The results indicated that Ambivalent/Anxious Attachment, Conscientiousness, Agreeableness, and Neuroticism were the best predictors of Internet Addiction ($p < 0.001$) and their combination could predict 20.3 % of its variance. Screening internet addiction in at-risk people and incorporating prevention programs are needed. Future research using multiple assessment methods, including longitudinal designs, and identifying pathways between internet addiction and health risks is recommended.

Keywords: *Internet, Addiction, Attachment, Personality, Emotion Regulation.*

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Introduction

It has been more than five decades since the invention of the Internet, and the world has witnessed remarkable growth in this phenomenon (1). All researchers have emphasized the addictive nature of the Internet. There are several statistics on the prevalence of Internet addiction in different societies, and 2 to 96 percent of internet users use it addictively (2). Internet addiction is defined as uncontrollable Internet use that causes distress and disruption to life (3). Current research on internet addiction confirms that internet addiction is associated with serious injuries in individual, social and occupational performance (4). Some studies have shown that internet addiction disrupts the management of time, sleep, and daily activities, which can cause immune system weakness (5) as

well as affect social relationships (6) and increase the likelihood of developing depression (7). Attachment styles are one of the factors that can be involved in students' internet addiction (8). According to the definition, the primary emotional relationships the child establishes with his caregivers create safe and unsafe (avoidant and anxious) styles (9). People who acquire a secure attachment style can get support from others, consider themselves valuable, and easily become intimate with others (10). People with an anxious attachment style have a strong desire for intimacy and also a great fear of not being accepted (11). People with avoidance styles are also characterized by decreased expression of affection and intimacy (12).

Previous studies have demonstrated that internet addiction has a positive association with insecure attachment styles (8). Also, other research has shown that the Ambivalent/Anxious attachment style is more predictive of Internet addiction than the other two styles (13). A growing body of research has examined the impact of personality and its influence on internet addiction. Research has indicated that neuroticism positively correlates with internet addiction, whereas conscientiousness, openness to experiences, agreeableness, and extraversion correlate negatively (14). Much empirical literature on internet addiction has focused on Emotion regulation strategies as predictors of internet addiction. Emotional regulation refers to all the processes that affect the emotions one experiences and how they are expressed (15). Studies have indicated negative correlations between Internet addiction and functional emotion regulation (16). This relationship is not only specific to internet addiction but also a relationship between emotion regulation and other addictions (17).

Although previous studies have examined the relationship between these factors and people's involvement in internet addiction separately, no comprehensive research has examined the contribution of all these factors together. Therefore, this study aimed to predict internet addiction based on emotional regulation, attachment styles, and personality to identify the contribution of each of these factors in predicting internet addiction in university students

MATERIALS AND METHODS

Procedure

The current study was descriptive-analytical and was conducted cross-sectionally among Iranian university students that are internet users. Because of the virtuality of universities due to the coronavirus outbreak, the convenience sampling method was used for recruiting participants. The nature of the research and the anonymity of responses were informed in several lines and sent to the participants along with the questionnaires. Among 240 participants who responded to the study questionnaires, 10 individuals were excluded from the analysis because they had graduated. Inclusion criteria were being a university student, having access to the internet, and having the ability to read and write.

Measurements

Young's Internet Addiction Questionnaire

This questionnaire is a reliable and valid tool for measuring Internet addiction and includes 20 items that have been adjusted on the 5-degree scale in the Lickert scale (very rarely, rarely, often, very often, and always). The minimum score obtained in this questionnaire is 20, and the maximum is 100 (18). The scale reflects six dimensions of Internet addiction: neglecting work responsibilities, salient preoccupation, lack of self-control, overuse of the Internet, expectation, and

neglecting social life and also measures three levels of mild internet addiction (20-39), moderate Internet addiction (40-69) and severe Internet addiction (100-70). Cronbach's Alpha for this scale is obtained at 0.90 (18). In Iran, Cronbach's Alpha was 0.88 in a study (19). In the present study, Cronbach's Alpha for the Internet Addiction Test was equal to 0.915.

Big Five Scale - Short Version (BFI-10)

This scale is the short version of the Big Five Inventory that Ramstad and John prepared to measure the personality dimensions (20). The BFI-10 has five subscales with two bidirectional items for each big-five personality factor. The items are rated on a five-point Likert scale wherein the subjects choose from responses ranging from "strongly disagree to strongly agree." In Iran, Mohammad Zadeh has applied the retest method to estimate reliability. The retest reliability was reported at 0.88 after one month (21). In the present study, the Cronbach's Alphas for the BFI-10 factors were as follows: Extraversion = 0.04; Agreeableness = 0.28; Conscientiousness = 0.44; Neuroticism = 0.52; Openness to Experience = 0.46. Alpha above 0.7 is desirable. But because some subscales have few questions, it is normal that the reliability is less than 0.7 (22).

Revised Adult Attachment Scale (RAAS)

This scale was made by Collins (1996). This questionnaire consists of 18 items and 3 subscales: secure attachment style, avoidant attachment style and ambivalent attachment style. Each item was rated on a five-point Likert scale. Cronbach's Alpha of this questionnaire has reported more than 0.8 for secure and ambivalent attachment styles and 0.8 for avoidant attachment style (23). In the present study, the Cronbach's Alphas for the attachment styles were as follows: Secure = 0.60; Avoidant = 0.47; Ambivalent/Anxious = 0.83.

Gross & John emotion regulation scale (ERQ)

Gross and John have developed this scale to measure emotion regulation strategies. This scale consists of 10 items with two subscales, Reappraisal and Suppression. The answers are based on the Likert scale (7 degrees), from the opposite (1) to completely agreeable (7). Cronbach's alpha coefficient was 0.79 for Reappraisal and 0.73 for Suppression and 0.69 after 3 months for the whole scale. (24) The validation of this questionnaire in Iran was obtained by Faraj pour et al. at 2018, and Cronbach's Alpha was reported above 0.7 (25). In the present study, Cronbach's Alphas for Emotional Suppression and Emotional Reappraisal were equal to 0.68 and 0.7, respectively.

Statistical analysis

Data were analyzed descriptively and inferentially. The mean and standard deviation were reported at the descriptive level for each variable. At the inferential level, hypotheses were tested using Pearson's correlation and stepwise regression analysis. Before conducting the regression analysis, its

assumptions were evaluated. These include the absence of uni- and multivariate outliers, the normal distribution of the criterion variable (i.e., Internet Addiction), the linear relationship between criterion and predictor variables, and the absence of multiple collinearities (26). Inspecting the standard scores indicated that some participants had z-scores > 3 or < -3 on some variables (two participants on Internet Addiction, one on Secure Attachment, one on Agreeableness, and three on Emotional Reappraisal). However, Mahalanobis distances indicated no multivariate outliers. In total, seven participants were excluded due to being the univariate outlier. Therefore, the final sample included 230 participants. The histogram of Internet Addiction showed a close-to-normal distribution. Inspecting the scatter plots revealed a linear relationship between Internet Addiction and predictors. Finally, Since the

Table 1

Demographic characteristics of the sample.

Demographic characteristics	n (%) / M. (S.D.)
Age	24.51 (5.89)
Gender	
Female	188 (81.7 %)
Male	42 (18.3 %)
Educational level	
Associate student	10 (4.3 %)
Undergraduate student	160 (69.6 %)
Masters student	44 (19.1 %)
PhD student	16 (7.0 %)

The descriptive statistics of the study variables and the correlations between them are presented in Table 2. As is evident from Table 2, Internet Addiction was correlated with some predictors. Internet Addiction had a moderate positive correlation with Ambivalent/Anxious Attachment ($r = 0.35, p < 0.01$). Unexpectedly, it had a negative but small correlation with Avoidant Attachment ($r = -0.17, p < 0.05$). However, its correlation with Secure Attachment was not significant ($r = -$

Table 2

Descriptive statistics of the study variables and the correlations between them

Var.	INT	SEC	AVO	AMB	E	A	C	N	O	SUP	REA
INT	1										
SEC	-.13	1									
AVO	-.17*	.09	1								
AMB	.35**	-.33**	-.32**	1							
E	.07	.49**	.14*	-.20**	1						
A	-.26**	.09	.05	-.18**	-.08	1					
C	-.30**	.13	.08	-.18**	.07	.25**	1				
N	.26**	-.06	-.10	.18**	.07	-.24**	-.25**	1			
O	.01	.08	.11	-.03	.05	.16*	.15*	-.07	1		
SUP	.03	-.29**	-.13*	.17**	-.41**	.02	-.08	-.25**	-.11	1	
REA	-.10	.11	.09	.02	.06	.19**	.20**	-.21**	.18**	.13	1

Variance Inflation Factor (VIF) and the Tolerance statistics were close to 1, multiple colinearity was not present among the predictors. After ensuring these statistical assumptions, stepwise regression analysis was carried out. All analyses were conducted utilizing SPSS version 24.

Results

The demographic characteristics of the sample are presented in Table 1. The final sample included 230 students. Their ages' mean was 24.51 ($SD = 5.89$). Among them, 81.7 % ($n = 188$) were female and 18.3 % ($n = 42$) were male. Finally, the educational level of the sample was as follows: 4.3 % ($n = 10$) associate students, 69.6 % ($n = 160$) undergraduate students, 19.1 % ($n = 44$) masters students, and 7.0 % ($n = 16$) were PhD students.

0.12, $p > 0.05$). Among BFI-10 factors, Internet Addiction had a significant correlation with Agreeableness ($r = -0.26, p < 0.01$), Conscientiousness ($r = -0.30, p < 0.01$), and Neuroticism ($r = 0.26, p < 0.01$). However, it did not correlate with Extraversion ($r = 0.06, p > 0.05$) and Openness to Experience ($r = 0.01, p > 0.05$). Finally, Internet Addiction was not significantly correlated with emotion regulation strategies, i.e., Suppression ($r = 0.03, p > 0.05$) and Reappraisal ($r = -0.10, p > 0.05$).

<i>M</i>	43.20	12.25	12.88	11.60	5.65	8.18	6.57	6.19	7.28	13.71	28.03
<i>SD</i>	13.22	2.95	2.43	5.47	2.32	1.55	1.94	2.15	1.97	4.61	5.09

* $p < 0.05$ ** $p < 0.01$

Note: INT = Internet Addiction; SEC = Secure Attachment; AVO = Avoidant Attachment; AMB = Ambivalent/Anxious Attachment; E = Extraversion; A = Agreeableness; C = Conscientiousness; N = Neuroticism; O = Openness to Experience; SUP = Suppression; REA = Reappraisal; M = Mean; SD = Standard Deviation.

A stepwise regression analysis was conducted to identify the best predictors of Internet Addiction. The results are reported in Table 3. As is evident from Table 3, the regression model involved four steps. The final step was significant ($F = 15.607$, $p < 0.001$). Based on the standard coefficients in the final model, Ambivalent/Anxious Attachment, Conscientiousness, Agreeableness, and Extraversion were the strongest to weakest predictors, respectively.

Table 3

The results of the stepwise regression analysis for predicting Internet Addiction

step	predictor	Unstandardized		Standardized	t	p	Variables'	Model's	Model's
		coefficients	S.E.						
		b		β			R ²		R ²
1	constant	33.544	1.926	-	17.420	0.000	-	30.743	0.115
	ambivalent	0.832	0.150	0.345	5.545	0.000	0.115		
2	constant	45.748	3.582	-	12.772	0.000	-	24.343	0.169
	ambivalent	0.725	0.148	0.300	4.899	0.000	0.115		
	conscientiousness	-1.667	0.418	-0.244	-3.991	0.000	0.054		
3	constant	56.111	5.920	-	10.607	0.000	-	18.966	0.191
	ambivalent	0.670	0.147	0.278	4.545	0.000	0.115		
	conscientiousness	-1.422	0.423	-0.208	-3.363	0.001	0.054		
	Agreeableness	-1.387	0.527	-0.163	-2.634	0.009	0.022		
4	constant	50.302	5.903	-	8.521	0.000	--	15.607	0.203
	ambivalent	0.737	0.150	0.305	4.927	0.000	0.115		
	conscientiousness	-1.481	0.420	-0.217	-3.524	0.001	0.054		
	Agreeableness	-1.239	0.527	-0.146	-2.350	0.020	0.022		
	Extraversion	0.745	0.347	0.131	2.149	0.033	0.012		

In the first step, Ambivalent/Anxious Attachment was entered into the model ($b = 0.832$, $\beta = 0.345$, $p < 0.001$) and predicted 11.5 % of the Internet Addiction's variance. In the second step, Conscientiousness was also entered into the model ($b = -1.665$, $\beta = -0.244$, $p < 0.001$) and predicted additional 5.4 % of the Internet Addiction's variance. In the third step, Agreeableness was also entered into the model ($b = -1.387$, $\beta = -0.163$, $p < 0.01$) and predicted additional 2.2 % of the Internet Addiction's variance. Finally, in the fourth step, Neuroticism was also entered into the model ($b = 0.745$, $\beta = 0.131$, $p < 0.05$) and predicted additional 1.2 % of the Internet Addiction's variance. Combining these four predictors in the final model could predict 20.3 % of Internet Addiction's variance. The final model implies that students with higher scores on Ambivalent/Anxious Attachment and Neuroticism and those with lower scores on Conscientiousness and Agreeableness experienced more Internet Addiction.

Discussion

The current study aimed to investigate the predictive relationships between emotion regulation strategies, personality traits, and attachment styles with Internet addiction among university students. Based on the results obtained in this study, the following were found: Ambivalent/Anxious Attachment, Conscientiousness, Agreeableness, and Neuroticism predicted internet addiction. Overall they explained 11.5%, 5.4%, 2.2%, and 1.2% (respectively) of variance on Internet addiction. The results of previous studies on the role of attachment styles on internet addiction reported similar results in this study (8). Attachment theory can be a good explanation for specific aspects of internet engagement. For instance, Attachment styles can effectively explain how long people spend on the internet and the motivation for using it (27). It seems that people with insecure attachments use the Internet to compensate and replace the lack of affection from important people in life, like family (8). This study found a negative correlation between avoidance attachment style and

internet addiction. Probably most people who have internet addiction spend much time on social networks; as mentioned in the introduction, people who have an avoidance attachment style need fewer close relationships and expression of emotions; this explanation can be a justification for the results obtained in this study because probably these people do not feel a great need for intimacy and spending time with other people on networks, so they get less internet addiction. Several studies have been conducted to explain the relationship between personality traits and internet addiction, and their results are in line with the present study (28). The results of our study showed that people who achieve higher scores in conscientiousness and agreeableness traits are likely to show less addictive behaviors on the Internet. On the contrary, these results are true for neuroticism. These results can be justified by examining the features of personality traits. People who score high in conscientiousness are described with characteristics such as ambition, discipline, being focused on progress, and being controlled (29), so it can probably be concluded that these people spend their time doing targeted acts and spending less time on the Internet. Similar results can also be achieved for people who are high in agreeableness. They also have a flexibility feature (29) that enables them to deal with anxiety more accurately, unlike neurotics. Neuroticism is commonly known as emotional instability (30), so probably one of the reasons these people spend more time online is trying to reduce negative emotions. This study investigated the role of two emotional regulation mechanisms (Suppression and Reappraisal) in internet addiction, but no correlation was observed between them. However, previous studies reported different results. For example, a study found that the suppression mechanism is a coping skill against addiction (31). Since only two emotional regulation mechanisms were investigated in this study, it is likely that by examining more mechanisms, different results were obtained.

Limitation

This study had limitations. First, the study was conducted cross-sectionally, and the results of these studies can only be cited temporarily. Second, the data collection process was carried out by using self-report measures rather than actual behaviors that could be biased due to the respondents' inaccuracy in answering the questions.

Conclusion

In conclusion, this study suggests a predictive relationship between Ambivalent/Anxious Attachment, Conscientiousness, Agreeableness, and Neuroticism with Internet addiction among university students. Considering the expansion of internet use and decreasing the age of its use, studies such as the present study are necessary for educational planning and policy-making. Future studies should examine other individual variables such as the role of experienced traumas or

intelligence in internet addiction and longitudinal studies to investigate the relationship between Internet addiction and other addictions that can be important.

Ethical approval

The research proposal was approved by "Religion and Health Research Center Shahid Beheshti University of Medical Sciences" (Grant No27829) with IR.SBMU.RETECH.REC.1400.436 ethics code. Before participating in the research, all participants filled up informed consent forms and were informed about this research and any ethical considerations relevant to the study.

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References

1. Yen CF, Ko CH, Yen JY, Chang YP, Cheng CP. Multi-dimensional discriminative factors for Internet addiction among adolescents regarding gender and age. *Psychiatry and clinical neurosciences*. 2009;63(3):357-64.
2. Shek TL, Sun RC, Yu L. *Internet addiction. Neuroscience in the 21st century: From basic to clinical*: Springer New York; 2013. p. 2775-811.
3. Shaw M, Black DW. Internet addiction. *CNS drugs*. 2008;22(5):353-65.
4. Van Rooij AJ, Ferguson CJ, Van de Mheen D, Schoenmakers TM. Time to abandon internet addiction? Predicting problematic internet, game, and social media use from psychosocial well-being and application use. *Clinical Neuropsychiatry*. 2017;14(1):113-21.
5. Li S, Ren P, Chiu MM, Wang C, Lei H. The Relationship Between Self-Control and Internet Addiction Among Students: A Meta-Analysis. *Frontiers in psychology*. 2021;12.
6. Tsitsika A, Janikian M, Schoenmakers TM, Tzavela EC, Olafsson K, Wójcik S, et al. Internet addictive behavior in adolescence: a cross-sectional study in seven European countries. *Cyberpsychology, behavior, and social networking*. 2014;17(8):528-35.
7. Lam LT, Peng Z-W. Effect of pathological use of the internet on adolescent mental health: a prospective study. *Archives of pediatrics & adolescent medicine*. 2010;164(10):901-6.
8. D'Arienzo MC, Boursier V, Griffiths MD. Addiction to social media and attachment styles: a systematic literature review. *International Journal of Mental Health and Addiction*. 2019;17(4):1094-118.
9. Bowlby J. *Developmental psychiatry comes of age*. The American journal of psychiatry. 1988.
10. Fraley RC, Shaver PR. Adult romantic attachment: Theoretical developments, emerging controversies, and unanswered questions. *Review of general psychology*. 2000;4(2):132-54.
11. Shaver PR, Mikulincer M. Attachment-related psychodynamics. *Attachment & human development*. 2002;4(2):133-61.

12. Edelstein RS, Shaver PR. Avoidant attachment: Exploration of an oxymoron. *Handbook of closeness and intimacy*: Psychology Press; 2004. p. 407-22.
13. Lin Y-C, Wang C-H, Wu C-h. The influence of attachment style and internet interpersonal interactions on internet addiction. *Chinese Journal of Psychology*. 2005;47(3):289-309.
14. Kayış AR, Satici SA, Yılmaz MF, Şimşek D, Ceyhan E, Bakiöğlü F. Big five-personality trait and internet addiction: A meta-analytic review. *Computers in Human Behavior*. 2016;63:35-40.
15. Rottenberg J, Gross JJ. When emotion goes wrong: realizing the promise of affective science. 2003.
16. Caplan SE. Theory and measurement of generalized problematic Internet use: A two-step approach. *Computers in human behavior*. 2010;26(5):1089-97.
17. Macklem GL. Emotion regulation in the classroom. *Practitioner's guide to emotion regulation in school-aged children*: Springer; 2008. p. 63-81.
18. Young K. Internet addiction: The emergence of a new clinical disorder. *Cyberpsychology & Behavior*, 1, 237-244. 1998.
19. Ghassemzadeh L, Shahraray M, Moradi A. Prevalence of Internet addiction and comparison of Internet addicts and non-addicts in Iranian high schools. *CyberPsychology & Behavior*. 2008;11(6):731-3.
20. Rammstedt B, John OP. Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of research in Personality*. 2007;41(1):203-12.
21. Ali Mohammad Zadeh MN. Validating of the Big Five Inventory (BFI-10): A very brief measure of the five factor personality model. *Educational Measurement Quarterly*. 2011:117-30.
22. Tavakol M, Dennick R. Making sense of Cronbach's alpha. *International journal of medical education*. 2011;2:53.
23. Collins NL. Revised adult attachment scale. *Behavior Therapy*. 1996.
24. Gross JJ, John OP. Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. *Journal of personality and social psychology*. 2003;85(2):348.
25. Majid Mahmud Alilou SN, Touraj Hashemi Nosratanad. Structural relationships of borderline, psychopoc and narcissistic personality traits with attitude to extramarital relationships: the mediating role of emotional regulation. *Biennial Congress on Psychology and Behavioral Sciences*. 2019.
26. Howell DC. *Statistical methods for psychology*: Cengage Learning; 2012.
27. Flores PJ. *Addiction as an attachment disorder*: Jason Aronson; 2004.
28. Abboud E, Atik AL. Attachment Patterns, Big 5 Personality Traits, and Impulsivity as Predictors of Internet Addiction. 2021.
29. Costa Jr PT, McCrae RR. Longitudinal stability of adult personality. *Handbook of personality psychology*: Elsevier; 1997. p. 269-90.
30. Borgogna NC, Aita SL. Problematic pornography viewing from a Big-5 personality perspective. *Sexual Addiction & Compulsivity*. 2019;26(3-4):293-314.
31. Gross JJ. *Handbook of emotion regulation*: Guilford publications; 2013.