

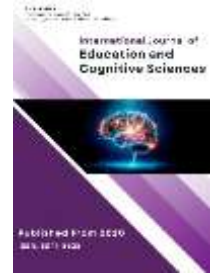


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# Developing a Model of Fear of Missing Out Based on Identity Styles, Attachment, and Parenting Styles with the Mediating Role of Behavioral Brain Systems in Female Students Using Virtual Social Networks at Islamic Azad University of Arak

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### ABSTRACT

**Purpose:** The present study aimed to develop a structural model of fear of missing out (FoMO) based on identity styles, attachment styles, and parenting styles with the mediating role of behavioral brain systems among female university students using virtual social networks.

**Methods and Materials:** The present study employed a correlational design using Structural Equation Modeling (SEM). The statistical population consisted of female undergraduate students at Islamic Azad University during the 2025–2026 academic year. Based on the recommendation of Rex B. Kline (2023), 224 participants were selected through convenience sampling. Data were collected using the Fear of Missing Out Scale developed by Andrew Przybylski et al. (2013), the Erikson Psychosocial Stage Inventory developed by Rosenthal et al. (1981), the Adult Attachment Style Questionnaire developed by Cindy Hazan and Phillip Shaver (1987), the Baumrind Parenting Styles Questionnaire (1971), the Behavioral Brain Systems Questionnaire developed by Charles Carver and White (1994), and the Internet Addiction Questionnaire developed by Kimberly Young (1999). Data were analyzed using SPSS version 27 and LISREL version 8.8.

**Findings:** The results indicated that the proposed structural model demonstrated acceptable fit indices (RMSEA = .074, CFI = .92, IFI = .92, GFI = .91,  $\chi^2/df = 2.21$ ). Identity coherence had a significant negative relationship with behavioral inhibition and FoMO and a positive relationship with behavioral activation. Identity confusion showed a positive and significant relationship with behavioral inhibition. Secure attachment negatively predicted behavioral inhibition and FoMO, whereas avoidant and anxious attachment styles positively predicted behavioral inhibition and FoMO. Authoritative parenting style negatively predicted FoMO and behavioral inhibition and positively predicted behavioral activation, whereas authoritarian and permissive parenting styles positively predicted FoMO and behavioral inhibition. Behavioral brain systems significantly mediated the relationships between identity styles, attachment styles, parenting styles, and FoMO.

**Conclusion:** The findings suggest that FoMO among female university students is influenced by a combination of identity-related, attachment-related, familial, and neuropsychological factors. Identity coherence, secure attachment, and authoritative parenting functioned as protective factors against FoMO, whereas identity confusion,

insecure attachment styles, and maladaptive parenting styles increased vulnerability to FoMO. Furthermore, behavioral brain systems played a significant mediating role in explaining these relationships. The results highlight the importance of considering psychological, familial, and neurobiological mechanisms in understanding and preventing problematic social media engagement and FoMO among university students.

**Keywords:** *Fear of Missing Out, Identity Styles, Attachment Styles, Parenting Styles, Behavioral Brain Systems*

## 1. Introduction

Fear of Missing Out (FoMO) has emerged as one of the most significant psychological phenomena associated with the rapid expansion of social networking platforms and virtual communication environments among adolescents and young adults. The widespread use of smartphones, online social networks, and digital communication technologies has transformed patterns of interpersonal interaction, emotional regulation, identity formation, and social comparison. Within this context, FoMO refers to a pervasive apprehension that others may be having rewarding experiences from which one is absent, accompanied by a persistent desire to remain continually connected with what others are doing (Przybylski et al., 2013). Contemporary studies indicate that FoMO is not merely a transient emotional state but a multidimensional psychological construct associated with emotional distress, problematic social media use, anxiety, depressive symptoms, reduced psychological well-being, and impaired interpersonal functioning (Tandon, 2021; Thomas, 2025). University students, particularly female students, appear to be especially vulnerable to FoMO due to developmental transitions, increased social comparison, identity exploration, and extensive engagement with social networking applications (Ansari & Nouhi, 2024; Bayani & Omrani, 2025).

The growing prevalence of FoMO has attracted substantial scholarly attention because of its relationship with problematic technology use and psychological maladjustment. Research has consistently demonstrated that FoMO predicts problematic smartphone use, excessive engagement with social networking sites, emotional instability, sleep disturbances, anxiety, and depression (Elhai et al., 2020; Wolniewicz et al., 2020; Yang et al., 2020). Moreover, adolescents and young adults who experience higher levels of FoMO often demonstrate greater dependency on online social interactions and reduced capacity for self-regulation (Barry et al., 2017; Keles et al., 2020). Recent Iranian studies have also confirmed that FoMO is associated with social comparison processes,

virtual network dependency, and psychosocial harms among students and adolescents (Bayani & Omrani, 2025; Heidari & Izadi, 2024; Salehi, 2025). Consequently, identifying the psychological and familial determinants of FoMO has become an important priority in contemporary psychological research.

One of the important variables associated with FoMO is identity style. Identity formation is considered one of the central developmental tasks during adolescence and emerging adulthood. According to Eriksonian theory, successful identity development contributes to psychological coherence, emotional stability, and adaptive social functioning, whereas identity confusion is associated with uncertainty, emotional vulnerability, and maladaptive coping strategies. Individuals with coherent identity structures typically possess greater self-awareness, stronger emotional regulation abilities, and more stable interpersonal relationships, while those with identity confusion may seek external validation and social approval through virtual interactions (Barry et al., 2023; Chen et al., 2019). In online social environments, individuals experiencing identity confusion may become increasingly dependent on social media feedback and virtual acceptance, thereby intensifying FoMO experiences.

Empirical evidence supports the relationship between identity-related variables and problematic digital behaviors. Barry et al. reported that maladaptive identity styles were positively associated with social media dependency among emerging adults (Barry et al., 2023). Similarly, Mousivand et al. demonstrated that maladaptive identity styles significantly predicted internet addiction among university students (Mousivand et al., 2021). Chen et al. also found that identity disturbances predicted internet addiction, depression, and suicidality among college students (Chen et al., 2019). These findings suggest that individuals with less coherent identity structures may rely excessively on virtual environments to compensate for deficiencies in self-concept clarity and emotional security, thereby increasing susceptibility to FoMO.

Attachment styles also constitute an important psychological factor associated with FoMO and online

behavioral patterns. Attachment theory proposes that early interactions with caregivers shape internal working models of self and others, influencing emotional regulation, interpersonal trust, and relational security throughout life. Securely attached individuals generally exhibit healthier interpersonal relationships, greater emotional resilience, and reduced dependency on external validation, whereas insecure attachment styles are associated with anxiety, emotional instability, and interpersonal sensitivity (Waters et al., 2000). In the context of social networking environments, insecurely attached individuals may experience heightened concern regarding social exclusion and interpersonal disconnection, thereby increasing vulnerability to FoMO.

Recent studies have emphasized the significant relationship between attachment insecurity and problematic social media use. Alfasi demonstrated that attachment insecurity was positively associated with FoMO and problematic social media engagement, with intolerance of uncertainty serving as a mediating factor (Alfasi, 2021). Likewise, Li et al. found that attachment anxiety significantly predicted excessive social media use through increased FoMO experiences (Li et al., 2023). Gori et al. also reported that insecure attachment patterns were associated with lower self-esteem, higher FoMO, and problematic social media use (Gori et al., 2023). In addition, systematic reviews have shown that insecure attachment styles are consistently related to maladaptive social networking behaviors and emotional dependence on virtual communication (Stoven & Herzberg, 2020). Iranian studies similarly support these findings, indicating significant relationships between attachment styles, online social support, internet addiction, and FoMO among adolescents and young adults (Tamanaeifar & Khanshan, 2022; Yousefi & Gholami, 2022). These findings suggest that attachment insecurity may increase the need for continuous online social reassurance, thereby intensifying fears of social exclusion and missing rewarding experiences.

Another influential factor in the development of FoMO is parenting style. Parenting styles play a central role in shaping emotional regulation, self-esteem, interpersonal competence, and behavioral adjustment in children and adolescents. Baumrind conceptualized parenting styles as authoritative, authoritarian, and permissive, each characterized by distinct levels of responsiveness and control. Authoritative parenting, characterized by emotional warmth and appropriate behavioral regulation, is generally associated with healthier psychological outcomes, whereas

authoritarian and permissive parenting styles are often linked to emotional dysregulation, anxiety, impulsivity, and behavioral problems (Aref & Jalali Garmaroud, 2024).

Research findings indicate that parenting styles significantly influence adolescents' online behaviors and emotional adjustment. Koca and Saatci reported that FoMO mediated the relationship between parent-adolescent relationship quality and problematic internet use (Koca & Saatci, 2022). Schmuck also found that supportive communication with parents reduced FoMO among adolescents following social media influencers (Schmuck, 2021). Iranian studies similarly indicate that maladaptive parenting patterns are associated with FoMO, internet addiction, and psychological vulnerability among adolescents and university students (Heidari & Izadi, 2024; Salehi, 2025; Tamanaeifar & Khanshan, 2022). These findings suggest that parenting environments characterized by inadequate emotional support, inconsistent regulation, or excessive control may increase adolescents' emotional dependency on virtual social environments and exacerbate FoMO experiences.

Despite the demonstrated importance of identity styles, attachment patterns, and parenting styles, the mechanisms through which these variables influence FoMO remain insufficiently understood. One potential explanatory mechanism involves behavioral brain systems. Gray's Reinforcement Sensitivity Theory proposes that human behavior is regulated by two primary neuropsychological systems: the Behavioral Inhibition System (BIS) and the Behavioral Activation System (BAS). The BIS is associated with sensitivity to punishment, anxiety, and avoidance motivation, whereas the BAS is associated with reward sensitivity, approach motivation, and impulsivity (Anderson & Perone, 2023; Gomez et al., 2020). Individual differences in these systems influence emotional responses, behavioral regulation, reward-seeking tendencies, and vulnerability to addictive behaviors.

Behavioral brain systems have been increasingly examined in relation to problematic digital behaviors and emotional dysregulation. Jiang and Zhao found that BIS/BAS sensitivity significantly predicted problematic mobile phone use (Jiang & Zhao, 2017). Lechner also reported that sensitivity to behavioral activation and inhibition systems was significantly associated with FoMO experiences (Lechner, 2021). Moreover, Bacon et al. demonstrated that reinforcement sensitivity was related to maladaptive behavioral tendencies among students (Bacon et al., 2020). Neuropsychological evidence further indicates

that behavioral brain systems are linked with cortico-striatal-thalamic neural circuits involved in emotional processing, reward sensitivity, and compulsive behaviors (Fettes et al., 2017). These findings suggest that individuals with heightened behavioral inhibition may experience greater anxiety regarding social exclusion, while individuals with heightened behavioral activation may exhibit stronger reward-seeking tendencies toward social networking engagement.

Recent Iranian research has also highlighted the mediating role of behavioral brain systems in problematic technology use. Pourmohseni Kalvardi et al. reported that behavioral brain systems mediated the relationship between alexithymia, communication problems, and mobile phone addiction among students (Pourmohseni Kalvardi et al., 2023). Such findings imply that behavioral brain systems may function as an underlying neuropsychological mechanism connecting personality, attachment, and family variables to FoMO and problematic online engagement.

Theoretical and empirical evidence therefore suggests that FoMO is a multifactorial phenomenon shaped by intrapersonal, interpersonal, familial, and neuropsychological factors. However, despite the increasing body of literature concerning FoMO, several gaps remain evident. First, many studies have focused primarily on direct relationships between FoMO and psychological variables without examining integrated structural models. Second, limited research has simultaneously investigated identity styles, attachment styles, parenting styles, and behavioral brain systems within a single explanatory framework. Third, relatively few studies have examined these relationships among female university students, despite evidence suggesting heightened vulnerability among young women due to greater social comparison tendencies and emotional sensitivity in online environments (Bloemen, 2020; Cha & Seo, 2018; Gezgin, 2018). Fourth, although previous studies have independently linked FoMO with attachment insecurity, maladaptive parenting, and identity disturbances, insufficient attention has been devoted to the mediating role of behavioral brain systems in explaining these associations.

Considering the increasing prevalence of social networking use among university students and the psychological consequences associated with FoMO, investigating the underlying mechanisms contributing to this phenomenon appears essential. Understanding the role of identity coherence, attachment security, parenting practices, and behavioral brain systems may contribute to the development of more effective preventive and therapeutic

interventions targeting problematic online behaviors and emotional maladjustment among young adults. Therefore, the present study aimed to develop a structural model of fear of missing out based on identity styles, attachment styles, and parenting styles with the mediating role of behavioral brain systems among female university students using virtual social networks.

## 2. Methods and Materials

### 2.1. Study Design and Participants

The present study employed a non-experimental correlational design using Structural Equation Modeling (SEM). The statistical population consisted of female undergraduate students using virtual social networks at Islamic Azad University during the first semester of the 2026–2027 academic year. To determine the sample size, the recommendation of Rex B. Kline (2023), who suggested a minimum sample size of 200 participants for structural equation modeling analyses, was adopted. Accordingly, considering the inclusion criteria and possible sample attrition due to incomplete questionnaires, an initial sample of 300 participants was selected through convenience sampling. Of these, 224 participants were ultimately included as the final research sample. The inclusion criteria consisted of obtaining a score higher than 50 on the Internet Addiction Scale, willingness to participate, and providing informed consent. The exclusion criteria included failure to answer at least 5% of the questionnaire items and withdrawal from the study during the response process. Ethical considerations included ensuring the confidentiality of participants' information, allowing participants to withdraw from the study at any stage, providing sufficient information regarding the objectives and procedures of the study, and avoiding the use of scientifically invalid sources.

### 2.2. Measures

Fear of Missing Out Scale (FoMO; Przybylski et al., 2013): This scale was developed by Andrew Przybylski et al. in 2013 and consists of 10 items. Responses are rated on a 5-point Likert scale ranging from “not at all true of me” (0) to “extremely true of me” (5). Total scores range from 10 to 50, with higher scores indicating greater fear of missing out on events and information. Andrew Przybylski et al. assessed the convergent validity of the FoMO questionnaire by calculating correlation coefficients between the total score of the FoMO scale and the Psychological Need

Satisfaction Questionnaire developed by La Guardia et al. (2000). The results indicated a correlation coefficient of .83, demonstrating good validity of the questionnaire. In addition, the reliability of the scale, assessed using Cronbach's alpha in a sample of university students, was reported as .86. In Iran, the scale was translated by Bayrami et al. and standardized among students at Urmia University of Medical Sciences. Furthermore, convergent validity was confirmed through the significant relationship between duration of social network use and FoMO at the .05 significance level, and Cronbach's alpha reliability coefficient was reported as .87. In the present study, Cronbach's alpha coefficient was .82.

Erikson Psychosocial Stage Inventory for Identity Styles (Rosenthal, Gurney, & Moore, 1981): The Erikson Psychosocial Stage Inventory developed by Rosenthal et al. (1981) includes six subscales corresponding to Erikson's first six psychosocial stages. Each subscale consists of 12 items, half reflecting successful resolution and half reflecting unsuccessful resolution of the crisis associated with each stage. Participants respond on a 5-point Likert scale ranging from "strongly agree" (5) to "strongly disagree" (1). The identity subscale was translated using the back-translation method. First, a psychologist fluent in both English and Persian translated the instrument into Persian. Subsequently, another specialist with the same qualifications translated the Persian version back into English. The back-translated version was then compared with the original English version, and discrepancies between the two forms were reviewed by a third specialist. The identity subscale measures adolescents' perceptions regarding who they are and their personal beliefs. Six items are positively worded to assess identity coherence, while six items are negatively worded to assess identity confusion. Sample items include "I know exactly what kind of person I want to be" (identity coherence) and "I really do not know who I am" (identity confusion). The Erikson Psychosocial Stage Inventory was designed for use with adolescents and adults. Rosenthal et al. (1981) reported alpha coefficients above .70 for both female and male participants. Their findings also indicated that identity scale scores were positively correlated with the identity subscale of the Greenberger and Sorensen Personal Development Inventory (1974) ( $r = .56$ ). Reis and Youniss (2004) also provided evidence supporting the validity and reliability of the inventory. The inventory can be administered individually or in groups. In the present study, Cronbach's alpha coefficients were .78 for identity coherence style and .77 for identity confusion style.

Adult Attachment Style Questionnaire (AASQ; Hazan & Shaver, 1987): This scale was developed by Cindy Hazan and Phillip Shaver in 1987. The questionnaire consists of 15 items assessing three attachment styles: secure, ambivalent, and avoidant, rated on a 5-point Likert scale ranging from 1 ("very low") to 5 ("very high"). The attachment style in which the participant obtains the highest score is considered the dominant attachment style. Minimum and maximum scores for each subscale are 5 and 25, respectively. Items 6–10 assess secure attachment, items 1–5 assess avoidant attachment, and items 11–15 assess ambivalent attachment. Cindy Hazan and Phillip Shaver (1987) reported a test–retest reliability coefficient of .81 for the entire questionnaire. In Ng's (2000) study, Cronbach's alpha coefficients for secure, avoidant, and ambivalent attachment styles were .65, .62, and .63, respectively. Khaledian (2010) administered the questionnaire to a sample of 60 participants and obtained a Cronbach's alpha coefficient of .83. Vafaiean (2006) reported the validity coefficients of this questionnaire using Main's structured interview for adult attachment as .79 for secure, .87 for anxious, and .84 for avoidant attachment styles. In the present study, Cronbach's alpha coefficients were .66 for secure attachment, .67 for avoidant attachment, and .63 for anxious attachment.

Baumrind Perceived Parenting Styles Questionnaire (1971): This questionnaire was developed by Diana Baumrind in 1971 to assess patterns of parental influence and parenting practices. The questionnaire consists of 30 items, including 10 items measuring permissive parenting style, 10 items measuring authoritarian parenting style, and 10 items measuring authoritative parenting style. Items 1, 6, 10, 13, 14, 17, 19, 21, 24, and 28 assess permissive parenting; items 2, 3, 7, 9, 12, 16, 18, 25, and 26 assess authoritarian parenting; and items 4, 5, 8, 11, 15, 20, 22, 23, 27, and 30 assess authoritative parenting. Participants respond to each item using a 5-point scale ranging from "strongly disagree" to "strongly agree," scored from 0 to 4. Summing the item scores yields separate scores for permissive, authoritarian, and authoritative parenting styles. In Iran, Esfandiari reported test–retest reliability coefficients of .69 for permissive parenting, .77 for authoritarian parenting, and .73 for authoritative parenting. Hosseini Dolatabadi and Saadat (2012), using exploratory factor analysis, confirmed the three-factor structure of the questionnaire. Their findings indicated that permissive parenting explained 45.1% of the variance, authoritarian parenting explained 41.7%, and authoritative parenting explained 44.3% of the total variance of the parenting scale.

In addition, factor loadings ranged from .58 to .74, indicating satisfactory validity of the instrument. They also reported an overall reliability coefficient of .71 and Cronbach's alpha coefficients of .62 for permissive parenting, .62 for authoritarian parenting, and .75 for authoritative parenting. In the present study, Cronbach's alpha coefficients were .79 for authoritative parenting, .76 for authoritarian parenting, and .70 for permissive parenting.

**Behavioral Brain Systems Questionnaire (Carver & White, 1994):** This scale was developed by Charles Carver and White (1994) and consists of 24 self-report items. Items are rated on a 5-point Likert scale from 1 to 5. Four additional items (items 1, 6, 11, and 17) are included as filler items and are not scored. These items do not contribute to the total score and are included solely for consistency with the remaining items. Items 2 and 22 are reverse scored. The Behavioral Inhibition System (BIS) subscale includes 7 items (2, 8, 13, 16, 19, 22, and 24) assessing sensitivity to threat and anxiety responses to threatening cues. The Behavioral Activation System (BAS) scale includes three subscales: Drive, Reward Responsiveness, and Fun Seeking, assessed through items 3, 4, 5, 7, 9, 10, 12, 14, 15, 18, 20, 21, and 23. Charles Carver and White (1994) reported internal consistency coefficients of .74 for BIS and .71 for BAS. The psychometric properties of the Persian version of the scale were reported as satisfactory by Mohammadi (2008) among university students in Shiraz. Test-retest reliability coefficients were .68 for BAS and .71 for BIS. In the present study, Cronbach's alpha coefficients were .69 for behavioral inhibition and .71 for behavioral activation.

**Young Internet Addiction Questionnaire (1994):** The Internet Addiction Questionnaire was developed by Kimberly Young in 1999. The questionnaire consists of 20

items rated on a 5-point Likert scale ranging from "rarely" (1) to "always" (5). Scores range from 20 to 100, with higher scores indicating greater dependence on and addiction to the Internet. Scores are categorized into three levels: 20–49 indicating no Internet addiction, 50–79 indicating risk of Internet addiction, and 80–100 indicating Internet addiction. The questionnaire yields a total score. In the study conducted by Young and Rogers (1998), the internal consistency of the questionnaire was reported to be above .92, and test-retest reliability was also found to be significant. Alavi et al. (2010) reported test-retest and split-half reliability coefficients of .82 and .72, respectively, and confirmed the content validity and satisfactory psychometric properties of the instrument. In the present study, Cronbach's alpha coefficient was .74.

### 2.3. Data Analysis

For data analysis, descriptive statistics including means and standard deviations were used in the descriptive section, while Structural Equation Modeling was employed in the inferential section. Data analysis was conducted using SPSS version 27 and LISREL version 8.8.

## 3. Findings and Results

In the present study, 224 female psychology students who were studying in the first semester of the 2025–2026 academic year participated. A total of 128 participants (57.2%) were in the age range of 20–22 years, 67 participants (29.9%) were in the age range of 23–25 years, and 29 participants (12.9%) were older than 25 years. Moreover, 38 participants (16.9%) were married and 186 participants (83.1%) were single.

**Table 1**

*Correlation Coefficients, Mean, Standard Deviation, Skewness, and Kurtosis of Identity Styles, Parenting Styles, Behavioral Brain Systems, and Fear of Missing Out*

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Coherence	—										
2. Confusion	-.44**	—									
3. Secure attachment	.41**	-.33**	—								
4. Avoidant attachment	-.40**	.45**	-.38**	—							
5. Anxious attachment	-.46**	.40**	-.16*	.44**	—						
6. Authoritative style	.27**	-.22**	.26**	-.23**	-.30**	—					
7. Authoritarian style	-.21**	.19**	-.21**	.20**	.27**	-.31**	—				
8. Permissive style	-.39**	.28**	-.28**	.31**	.37**	.02	.14*	—			
9. Behavioral inhibition	-.34**	.36**	-.30**	.32**	.36**	-.37**	.34**	.25**	—		
10. Behavioral activation	.45**	-.35**	.38**	-.24**	-.27**	.31**	-.24**	-.37**	-.32**	—	
11. FoMO	-.53**	.51**	-.41**	.35**	.45**	-.40**	.42**	.50**	.58**	-.54**	—

Mean	21.11	17.59	15.08	14.29	13.01	31.32	15.05	21.62	18.81	32.58	26.61
Standard deviation	5.18	5.04	4.09	4.16	4.08	7.49	9.08	8.03	3.48	6.31	8.20
Skewness	-.73	.02	.01	.23	.45	-1.41	.85	.10	-.25	-.24	-.02
Kurtosis	.17	-.58	-.33	-.24	-.08	1.17	.29	.08	-.21	.59	-.64

\*p < .05, \*\*p < .01.

According to Table 1, there were significant relationships between identity styles, attachment styles, parenting styles, and behavioral brain systems with fear of missing out. Moreover, given that the skewness and kurtosis values were within the ±1 range, the assumption of normality of the variables was confirmed. In addition, the tolerance values of

all variables were higher than .40 and all variance inflation factor values were lower than 3; therefore, the absence of multicollinearity among the variables was confirmed. Furthermore, the Durbin–Watson value was 1.95, and because it fell within the range of 1.5 to 2.5, the independence of errors was accepted.

**Table 2**

*Fit Indices of the Model of Fear of Missing Out Based on Identity Styles, Attachment Styles, and Parenting Styles with the Mediating Role of Behavioral Brain Systems*

Model Fit Indices	$\chi^2$	df	$\chi^2/df$	GFI	IFI	CFI	RMSEA
Acceptable range	—	—	< 3	> .90	> .90	> .90	< .08
Obtained values	766.73	346	2.21	.91	.92	.92	.074

In Table 2, values lower than 3 are considered acceptable for the  $\chi^2/df$  fit index; in the present model, this index was 2.21. For the Goodness-of-Fit Index (GFI), Incremental Fit Index (IFI), and Comparative Fit Index (CFI), values close to .90 and above indicate acceptable fit, and all these values in the table above were greater than .90. The RMSEA value in the present study was .074, which is acceptable. Overall,

based on the reported goodness-of-fit indices, the model demonstrated a good level of fit.

Figure 1 shows the results of structural equation modeling for fear of missing out based on identity styles, attachment styles, and parenting styles with the mediating role of behavioral brain systems.

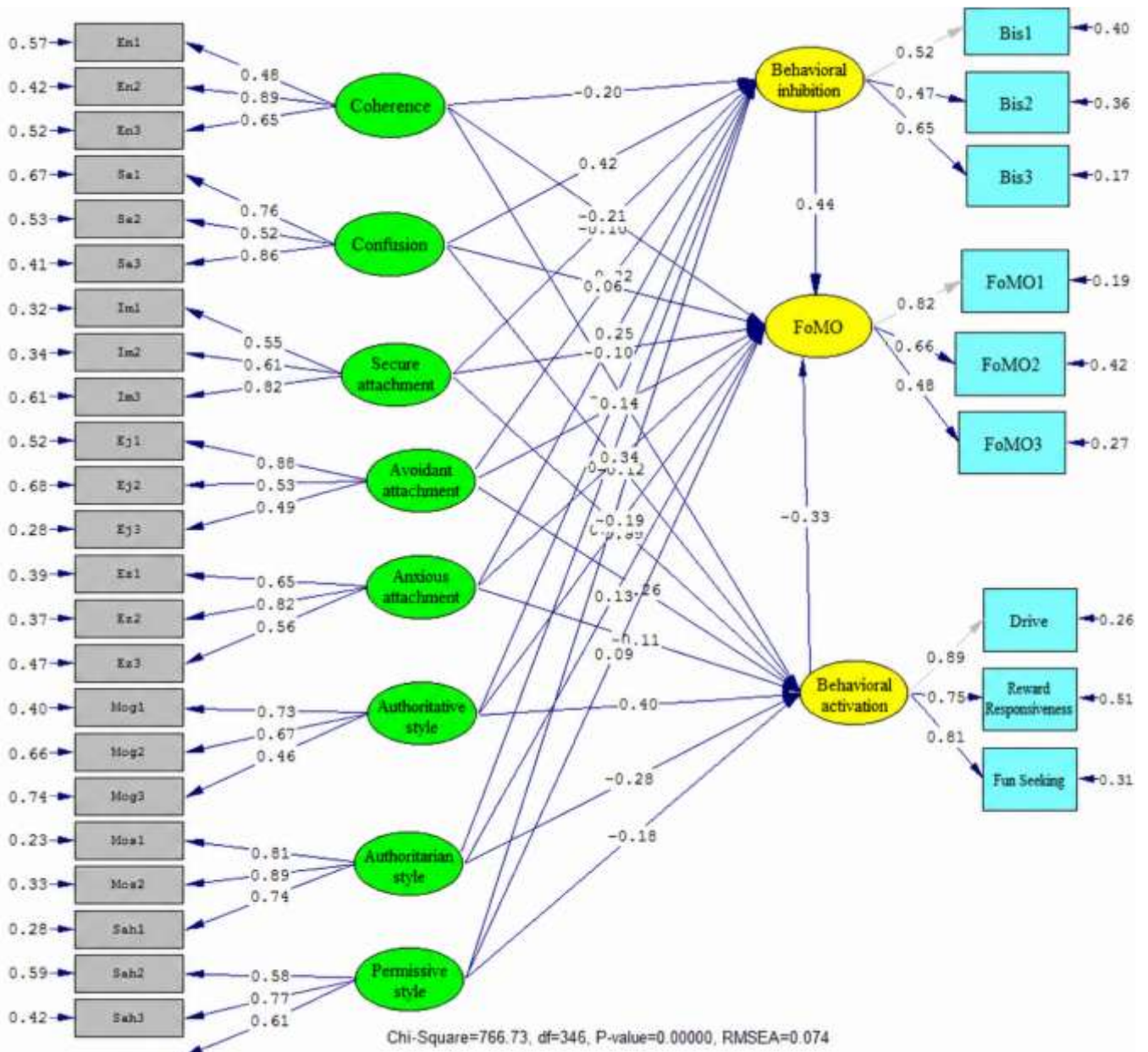
**Table 3**

*Standardized Coefficients and Significance Levels of the Relationships of Identity Styles, Attachment Styles, and Parenting Styles with Behavioral Brain Systems*

Variable	Standardized coefficient	T value	p
Identity coherence → Behavioral inhibition	-.20	-2.59	.008
Identity coherence → Behavioral activation	.31	3.82	.001
Identity confusion → Behavioral inhibition	.42	6.18	.001
Identity confusion → Behavioral activation	-.12	-1.77	.068
Secure attachment → Behavioral activation	.39	5.15	.001
Avoidant attachment → Behavioral inhibition	.32	3.93	.001
Avoidant attachment → Behavioral activation	-.26	-3.02	.001
Anxious attachment → Behavioral inhibition	.25	2.93	.001
Anxious attachment → Behavioral activation	-.11	-1.67	.072
Authoritative style → Behavioral inhibition	-.23	-2.85	.001
Authoritative style → Behavioral activation	.40	5.91	.001
Authoritarian style → Behavioral inhibition	.32	3.94	.001
Authoritarian style → Behavioral activation	-.28	-3.21	.001
Permissive style → Behavioral inhibition	.27	3.12	.001
Permissive style → Behavioral activation	-.18	-2.38	.027

**Figure 1**

*Structural Equation Modeling Results*



The results of Table 3 show that the direct relationship between identity coherence and behavioral inhibition was negative and significant ( $\beta = -.20, p < .01$ ), while its relationship with behavioral activation was positive and significant ( $\beta = .31, p < .01$ ). The direct relationship between identity confusion and behavioral inhibition was positive and significant ( $\beta = .42, p < .01$ ), whereas its relationship with behavioral activation was not significant ( $\beta = -.12, p > .05$ ). The results of Table 3 also show that the direct relationship between secure attachment and behavioral inhibition was negative and significant ( $\beta = -.48, p < .01$ ), while its relationship with behavioral activation was positive and significant ( $\beta = .39, p < .01$ ). The direct relationship between avoidant attachment and behavioral inhibition was

positive and significant ( $\beta = .32, p < .01$ ), while its relationship with behavioral activation was negative and significant ( $\beta = -.26, p < .01$ ). The direct relationship between anxious attachment and behavioral inhibition was positive and significant ( $\beta = .25, p < .01$ ), whereas its relationship with behavioral activation was not significant ( $\beta = -.11, p > .05$ ). The results of Table 3 further show that the direct relationship between authoritative parenting style and behavioral inhibition was negative and significant ( $\beta = -.23, p < .01$ ), while its relationship with behavioral activation was positive and significant ( $\beta = .40, p < .01$ ). The direct relationship between authoritarian parenting style and behavioral inhibition was positive and significant ( $\beta = .32, p < .01$ ), while its relationship with behavioral activation was

negative and significant ( $\beta = -.28, p < .01$ ). The direct relationship between permissive parenting style and behavioral inhibition was positive and significant ( $\beta = .27, p$

$< .01$ ), while its relationship with behavioral activation was negative and significant ( $\beta = -.18, p < .05$ ).

**Table 4**

*Standardized Coefficients and Significance Levels of the Relationships of Identity Styles, Attachment Styles, and Parenting Styles with FoMO*

Variable	Standardized coefficient	T value	p
Identity coherence → FoMO	-.21	-2.66	.002
Identity confusion → FoMO	.06	1.04	.142
Secure attachment → FoMO	-.10	-1.42	.084
Avoidant attachment → FoMO	.14	2.10	.032
Anxious attachment → FoMO	.34	5.42	.001
Authoritative style → FoMO	-.19	-2.51	.013
Authoritarian style → FoMO	.13	1.97	.046
Permissive style → FoMO	.09	1.42	.088

The results of Table 4 show that the direct relationship between identity coherence and FoMO was negative and significant ( $\beta = -.21, p < .01$ ), whereas the relationship between identity confusion and FoMO was not significant ( $\beta = .06, p > .05$ ). The results show that the direct relationship between avoidant attachment and FoMO ( $\beta = .14, p < .05$ ) and the relationship between anxious attachment and FoMO ( $\beta = .34, p < .01$ ) were positive and significant. The

relationship between secure attachment and FoMO was not significant ( $\beta = -.10, p > .05$ ). The table also shows that the direct relationship between authoritative parenting style and FoMO was negative and significant ( $\beta = -.19, p < .05$ ), while the relationship between authoritarian parenting style and FoMO was positive and significant ( $\beta = .13, p < .05$ ). The relationship between permissive parenting style and FoMO was not significant ( $\beta = .09, p > .05$ ).

**Table 5**

*Results of the Indirect Effects of Identity Styles, Attachment Styles, and Parenting Styles on FoMO through the Mediation of Behavioral Brain*

*Systems*

Path	Standardized coefficient	Standard error	Lower bound	Upper bound
Coherence → Behavioral inhibition → FoMO	-.088	.023	-.117	-.053
Coherence → Behavioral activation → FoMO	-.102	.017	-.136	-.072
Confusion → Behavioral inhibition → FoMO	.184	.033	.151	.219
Confusion → Behavioral activation → FoMO	.038	.007	-.012	.067
Secure → Behavioral inhibition → FoMO	-.211	.019	-.242	-.183
Secure → Behavioral activation → FoMO	-.128	.024	-.159	-.096
Avoidant → Behavioral inhibition → FoMO	.140	.031	.112	.171
Avoidant → Behavioral activation → FoMO	.085	.017	.054	.114
Anxious → Behavioral inhibition → FoMO	.110	.027	.078	.142
Anxious → Behavioral activation → FoMO	.036	.027	-.012	.076
Authoritative style → Behavioral inhibition → FoMO	-.101	.008	-.134	-.076
Authoritative style → Behavioral activation → FoMO	-.132	.025	-.166	-.098
Authoritarian style → Behavioral inhibition → FoMO	.141	.034	.116	.175
Authoritarian style → Behavioral activation → FoMO	.092	.019	.068	.127
Permissive style → Behavioral inhibition → FoMO	.118	.014	.087	.144
Permissive style → Behavioral activation → FoMO	.059	.027	.021	.087

In the bootstrap method, if the upper and lower bounds of the confidence interval do not include zero, the mediating role of the mediator variable is significant.

Based on the bootstrap results with a 95% confidence interval in Table 5, the indirect effect of coherence on FoMO

through behavioral inhibition ( $\beta = -.088$ , confidence interval:  $-.117$  to  $-.053$ ) and through behavioral activation ( $\beta = -.102$ , confidence interval:  $-.136$  to  $-.072$ ) was significant. According to the results, the indirect effect of confusion on FoMO through behavioral inhibition ( $\beta = .184$ , confidence

interval: .151 to .219) was significant, but its indirect effect through behavioral activation ( $\beta = .038$ , confidence interval: -.012 to .067) was not significant.

As shown in Table 5, the indirect effect of secure attachment on FoMO through behavioral inhibition ( $\beta = -.211$ , confidence interval: -.242 to -.183) and through behavioral activation ( $\beta = -.128$ , confidence interval: -.159 to -.096) was significant. According to the results, the indirect effect of avoidant attachment on FoMO through behavioral inhibition ( $\beta = .140$ , confidence interval: .112 to .171) and through behavioral activation ( $\beta = .085$ , confidence interval: .054 to .114) was significant. The indirect effect of anxious attachment on FoMO through behavioral inhibition ( $\beta = .110$ , confidence interval: .078 to .142) was significant, whereas its indirect effect through behavioral activation ( $\beta = .036$ , confidence interval: -.012 to .076) was not significant.

As shown in Table 5, the indirect effect of authoritative parenting style on FoMO through behavioral inhibition ( $\beta = -.101$ , confidence interval: -.134 to -.076) and through behavioral activation ( $\beta = -.132$ , confidence interval: -.166 to -.098) was significant. According to the results, the indirect effect of authoritarian parenting style on FoMO through behavioral inhibition ( $\beta = .141$ , confidence interval: .116 to .175) and through behavioral activation ( $\beta = .092$ , confidence interval: .068 to .127) was significant. The indirect effect of permissive parenting style on FoMO through behavioral inhibition ( $\beta = .118$ , confidence interval: .078 to .144) and through behavioral activation ( $\beta = .059$ , confidence interval: .021 to .087) was significant.

#### 4. Discussion and Conclusion

The present study aimed to develop a structural model of fear of missing out (FoMO) based on identity styles, attachment styles, and parenting styles with the mediating role of behavioral brain systems among female university students using virtual social networks. The findings demonstrated that the proposed model had acceptable fit indices, indicating that identity-related, attachment-related, familial, and neuropsychological variables jointly contributed to explaining FoMO among students. The obtained fit indices, including RMSEA, GFI, IFI, and CFI, confirmed the adequacy of the structural model and supported the assumption that FoMO is a multidimensional phenomenon influenced by interacting psychological and environmental factors. These findings are consistent with previous theoretical perspectives emphasizing the

multifactorial nature of FoMO and problematic social media engagement (Przybylski et al., 2013; Tandon, 2021; Thomas, 2025).

One of the important findings of the present study was the significant relationship between identity coherence and FoMO. The results indicated that identity coherence was negatively associated with FoMO both directly and indirectly through behavioral brain systems, whereas identity confusion demonstrated positive relationships with behavioral inhibition and FoMO. These findings suggest that students with coherent and stable identity structures are less likely to experience anxiety regarding social exclusion or missing rewarding social experiences. In contrast, students with confused identities may increasingly depend on social media environments for external validation and social belonging. Individuals with identity confusion often experience uncertainty regarding self-definition and interpersonal acceptance; consequently, they may become more psychologically vulnerable to FoMO-related cognitions and compulsive online monitoring behaviors. These findings are in line with the studies of Barry et al., who found that maladaptive identity styles were associated with greater social media dependency among emerging adults (Barry et al., 2023). The results are also consistent with the findings of Chen et al., who reported that identity disturbances predicted internet addiction and emotional maladjustment among college students (Chen et al., 2019). Similarly, Mousivand et al. found that maladaptive identity styles significantly contributed to internet addiction among university students (Mousivand et al., 2021).

From a theoretical perspective, individuals with coherent identities generally possess greater emotional stability, internal self-worth, and self-regulatory capacity, reducing their dependence on continuous social approval through online platforms. Conversely, identity confusion may intensify social comparison tendencies and increase sensitivity to social exclusion cues, thereby enhancing FoMO experiences. Since social networking environments provide constant opportunities for social comparison and external validation, individuals with unstable self-concepts may engage excessively in online interactions to compensate for deficiencies in psychological coherence. This interpretation is consistent with Eriksonian developmental perspectives and with contemporary findings regarding identity disturbances and problematic social media engagement (Barry et al., 2023; Moghaddas & Ghasempour, 2021).

Another important finding was the significant relationship between attachment styles and FoMO. Secure attachment demonstrated negative associations with behavioral inhibition and FoMO, whereas avoidant and anxious attachment styles positively predicted FoMO both directly and indirectly through behavioral brain systems. These findings indicate that insecure attachment patterns may contribute substantially to fears of social exclusion and compulsive online connectedness. Individuals with anxious attachment often exhibit heightened interpersonal sensitivity, fear of abandonment, and excessive need for reassurance, which may increase dependence on virtual communication platforms. Similarly, avoidantly attached individuals may experience interpersonal insecurity despite attempts to maintain emotional distance, thereby increasing maladaptive online engagement patterns.

These findings align with previous research emphasizing the relationship between attachment insecurity and problematic social media use. Alfasi demonstrated that attachment insecurity significantly predicted FoMO and problematic social media engagement through intolerance of uncertainty (Alfasi, 2021). Likewise, Li et al. found that attachment anxiety predicted social media overuse through heightened FoMO experiences (Li et al., 2023). Gori et al. also reported that insecure attachment patterns were associated with lower self-esteem, greater FoMO, and problematic social networking behaviors (Gori et al., 2023). The present findings are additionally supported by the systematic review conducted by Stoven and Herzberg, which demonstrated consistent associations between insecure attachment styles and maladaptive social networking behaviors (Stoven & Herzberg, 2020). Iranian studies have similarly indicated significant relationships between attachment insecurity, internet addiction, and online social dependency among adolescents and university students (Tamanaeifar & Khanshan, 2022; Yousefi & Gholami, 2022).

The observed relationships may be explained through attachment theory. Secure attachment contributes to emotional security, trust in interpersonal relationships, and effective emotion regulation strategies. Securely attached individuals therefore have less need for constant online reassurance and social monitoring. In contrast, insecure attachment styles may increase hypersensitivity to interpersonal rejection and intensify concerns regarding social exclusion. Social networking platforms can temporarily compensate for emotional insecurity by providing immediate social feedback, but excessive reliance

on such feedback may simultaneously reinforce FoMO and problematic online engagement. Therefore, attachment insecurity appears to function as an important psychological vulnerability factor in the development of FoMO among university students.

The findings of the present study also demonstrated that parenting styles were significantly associated with FoMO and behavioral brain systems. Authoritative parenting style showed negative relationships with FoMO and behavioral inhibition and positive relationships with behavioral activation, whereas authoritarian and permissive parenting styles positively predicted FoMO. Furthermore, behavioral brain systems mediated the relationships between parenting styles and FoMO. These findings suggest that adaptive parenting practices characterized by emotional warmth, responsiveness, and balanced control may reduce emotional insecurity and maladaptive online behaviors among students. Conversely, authoritarian and permissive parenting styles may contribute to emotional dysregulation, reduced self-control, and increased dependency on virtual social interactions.

These findings are consistent with previous studies highlighting the influence of parenting factors on FoMO and problematic internet use. Koca and Saatci found that FoMO mediated the relationship between parent-adolescent relationship quality and problematic internet use (Koca & Saatci, 2022). Schmuck also reported that supportive communication with parents reduced FoMO among adolescents following social media influencers (Schmuck, 2021). Iranian studies similarly demonstrated relationships between parenting stress, parenting styles, FoMO, and problematic social network use (Aref & Jalali Garmaroud, 2024; Heidari & Izadi, 2024; Salehi, 2025). These findings suggest that ineffective parenting practices may reduce adolescents' emotional security and increase their tendency to seek social affirmation and belonging through virtual environments.

The role of parenting styles may also be interpreted through developmental and social learning perspectives. Authoritative parenting fosters emotional competence, autonomy, and self-regulation, thereby reducing excessive dependence on external social approval. In contrast, authoritarian parenting may contribute to anxiety, fear of rejection, and emotional suppression, while permissive parenting may reduce behavioral regulation and increase impulsive online behaviors. Consequently, maladaptive parenting environments may indirectly contribute to FoMO

through impaired emotional regulation and increased sensitivity to social reinforcement mechanisms.

Another significant finding concerned the mediating role of behavioral brain systems in the relationships between identity styles, attachment styles, parenting styles, and FoMO. Behavioral inhibition was positively associated with FoMO, whereas behavioral activation demonstrated negative associations with FoMO in the proposed model. Additionally, behavioral brain systems significantly mediated many of the relationships between the predictor variables and FoMO. These findings highlight the importance of neuropsychological motivational systems in understanding problematic social networking behaviors.

The present findings are consistent with Reinforcement Sensitivity Theory, which proposes that behavioral inhibition is associated with anxiety sensitivity, threat perception, and avoidance motivation, while behavioral activation is associated with reward sensitivity and approach behavior (Anderson & Perone, 2023; Gomez et al., 2020). Students with heightened behavioral inhibition may experience greater anxiety regarding social exclusion, interpersonal rejection, and missed social opportunities, thereby intensifying FoMO-related cognitions. Simultaneously, disturbances in behavioral activation processes may influence reward-seeking tendencies and compulsive engagement with social networking platforms.

The findings are consistent with the study conducted by Lechner, who found significant relationships between BIS/BAS sensitivity and FoMO (Lechner, 2021). Similarly, Jiang and Zhao demonstrated that behavioral brain systems significantly predicted problematic mobile phone use (Jiang & Zhao, 2017). Bacon et al. also reported that reinforcement sensitivity mechanisms contributed to maladaptive behavioral tendencies among students (Bacon et al., 2020). Furthermore, neuropsychological evidence indicates that cortico-striatal-thalamic neural circuits associated with behavioral inhibition and activation systems play important roles in reward processing, emotional regulation, and compulsive behaviors (Fettes et al., 2017). The present findings therefore suggest that behavioral brain systems may function as important explanatory mechanisms connecting personality, attachment, and family variables to FoMO.

The significant mediating role of behavioral brain systems also supports the notion that FoMO is not solely a cognitive or social phenomenon but is additionally influenced by underlying motivational and neuropsychological processes. Students with heightened sensitivity to punishment, interpersonal threat, or social

exclusion may become excessively vigilant regarding online social information. At the same time, students with dysregulated reward systems may repeatedly engage with social networking platforms in search of rewarding social feedback. Such patterns may create a cycle of compulsive online monitoring, emotional dependency, and persistent FoMO experiences.

The findings of the present study additionally support broader evidence regarding the relationship between FoMO and psychological distress. Previous research has demonstrated that FoMO is associated with depression, anxiety, sleep disturbances, problematic smartphone use, and emotional maladjustment (Elhai et al., 2020; Keles et al., 2020; Wolniewicz et al., 2020; Yang et al., 2020). Similarly, studies among adolescents and young adults have shown that social networking dependency and FoMO contribute to impaired psychological well-being and emotional instability (Barry et al., 2017; Bloemen, 2020; Cha & Seo, 2018; Gezgin, 2018). The present findings extend this literature by demonstrating that identity-related, attachment-related, and parenting-related variables may contribute to FoMO both directly and indirectly through behavioral brain systems.

Another noteworthy aspect of the findings concerns the cultural and developmental context of the study. Female university students are often exposed to elevated levels of social comparison, interpersonal evaluation, and online social interaction. The extensive use of image-based social media platforms may intensify concerns regarding peer acceptance, attractiveness, and social belonging. Consequently, students with insecure attachment styles, maladaptive parenting experiences, or identity confusion may become particularly vulnerable to FoMO and problematic social networking behaviors. The findings of the present study therefore highlight the importance of considering developmental, familial, and neuropsychological variables simultaneously when examining FoMO among young adults.

One of the limitations of the present study was the use of a correlational research design, which limits causal interpretation of the findings. In addition, the data were collected using self-report questionnaires, which may have been influenced by response bias and social desirability effects. Another limitation was that the sample consisted exclusively of female students from a single university, thereby limiting the generalizability of the findings to other populations, age groups, and cultural contexts. Furthermore, variables such as personality traits, socioeconomic status,

and specific patterns of social media use were not examined in the present study.

Future research is recommended to employ longitudinal and experimental designs to clarify causal relationships among identity styles, attachment patterns, parenting styles, behavioral brain systems, and FoMO. It is also suggested that future studies include male students, adolescents, and individuals from diverse cultural and educational backgrounds to improve generalizability. Researchers are additionally encouraged to examine the role of other psychological variables such as self-esteem, emotional regulation, loneliness, perfectionism, and cognitive flexibility in relation to FoMO. The use of neuropsychological and neuroscientific assessment methods may also provide more comprehensive understanding of the role of behavioral brain systems in problematic social media engagement.

From a practical perspective, the findings suggest that interventions targeting FoMO among university students should focus on strengthening identity coherence, improving attachment security, and enhancing adaptive parenting practices. Psychological counseling programs may help students develop emotional regulation skills, self-esteem, and healthier interpersonal relationships, thereby reducing dependency on virtual social validation. Educational workshops for parents and university counselors may also improve awareness regarding the psychological consequences of excessive social networking use and maladaptive parenting practices. Furthermore, preventive programs designed to improve self-regulation and reduce compulsive online behaviors may contribute to better psychological well-being among students.

### Authors' Contributions

All authors significantly contributed to this study.

### Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

### Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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### Declaration of Interest

The authors report no conflict of interest.

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### Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent.

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