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Original Article

The Relationship between Self-Regulation and Mobile Internet Addiction with the Mediating Role of Social Support among High School Students in Kerman: A Structural Equation Modeling Approach

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ABSTRACT

Background: Mobile Internet addiction in adolescents has become a growing social and educational concern, associated with substantial personal, academic, and psychological risks. This study investigated the direct and indirect effects of self-regulation on mobile Internet addiction among high school students, with perceived social support serving as a mediating factor.

Methods: A correlational design was employed, using Covariance-Based Structural Equation Modeling (CB-SEM) to analyze both direct and indirect relationships among the study variables. The target population included all high school students in Kerman City, Iran, during the 2024–2025 academic year, from which 1,021 participants were selected through multistage cluster sampling. Data were collected between early May and late June 2025 using three standardized instruments: the Short Self-Regulation Questionnaire (SSRQ(, the Social Support Appraisals (SS-A) Scale, and the Chen Internet Addiction Scale (CIAS). Descriptive and correlational analyses were performed in SPSS V. 26, and structural modeling was conducted using LISREL V. 8.80.

Results: Self-regulation had a significant positive effect on social support (β=0.34, SE=0.034, 95% CI [0.273, 0.407], P<0.001). In contrast, higher levels of social support were linked to lower levels of mobile Internet addiction (β=−0.23, SE=0.109, 95% CI [−0.444, −0.016], P<0.001). Additionally, self-regulation had a significant direct negative effect on mobile Internet addiction (β=-0.23, SE=0.153, 95% CI [-0.529, 0.069], P<0.001). Overall, the model demonstrated acceptable fit to the data (χ^2/df=3.78, RMSEA=0.052, CFI=0.92, TLI=0.90, GFI=0.97).

Conclusion: The findings indicate that self-regulation mitigates mobile Internet addiction both directly and indirectly through enhanced perceived social support. Therefore, educational and counseling initiatives within schools should prioritize enhancing students' self-regulation abilities and expanding their social support networks to effectively prevent mobile Internet addiction.

Keywords: Self-Regulation, Self-Control, Social Support, Internet Addiction Disorder, Adolescent, Latent Class Analysis, SEM

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Introduction

Mobile Internet addiction is increasingly recognized as an emerging global mental health challenge, with far-reaching consequences for adolescents' academic performance, social relationships, and psychological well-being (1, 2). The growing accessibility of smartphones and high-speed Internet has placed adolescents at greater risk of excessive and uncontrolled Internet use than ever before (3, 4). Global research has shown an increasing rate of Internet addiction in adolescents, commonly linked to poorer academic performance, anxiety, depression, sleep disturbances, and diminished social connections (5, 6). In Iran, research evidence similarly suggests that excessive mobile Internet use among students is on the rise, posing significant individual and social risks (7, 8). However, despite growing attention to this issue, there remains a lack of comprehensive understanding of the psychological and social mechanisms that underlie problematic Internet use (9).

Within Internet addiction prevention, theoretical frameworks and empirical evidence emphasize the contributions of individual elements (e.g., self-regulation (10-16)) alongside interpersonal factors (e.g., social support (17-23)). Self-regulation refers to an individual's ability to control behavior, manage emotions, and delay impulses in pursuit of long-term goals (24). Studies indicate that adolescents who demonstrate higher levels of self-regulation are more effective at controlling the amount of time they spend online and are less likely to develop problematic or addictive Internet use patterns (25). Conversely, weak self-regulation is linked to impulsivity, excessive engagement in online spaces, and various psychological problems (26-29). In longitudinal research, lower Internet self-control (30) predicts higher problematic Internet use over time, and vice versa, indicating bidirectional effects (25).

Perceived social support, on the other hand, refers to the individual's perception of emotional, informational, and instrumental support received from family, friends, and the broader social environment (31). Evidence suggests that adolescents with higher levels of social support are more resilient to stress and psychological pressures and are less likely to engage in excessive Internet use (32, 33). Furthermore, some studies indicate that social support can act as a mediating or moderating factor in the association between individual characteristics (such as self-regulation) and behavioral outcomes (33). For instance, research indicates that social support is inversely associated with Internet addiction among adolescents, both through a direct effect and indirectly by enhancing resilience and reducing symptoms of Post-Traumatic Stress Disorder (PTSD) (32, 34).

While global research has explored links among self-regulation, social support, and Internet addiction, studies in Iran—especially those targeting high school students in culturally distinct areas like Kerman—are scarce. Most prior investigations have emphasized direct impacts of personal factors, neglecting the contributions of social and environmental influences. Consequently, it is uncertain if social support meaningfully mediates the impact of self-regulation in mitigating mobile Internet addiction among Iranian youth. Additionally, cultural elements of family and peer interactions in Iran could shape the mechanisms of social support in these relationships (32, 34, 35).

Considering the impact of cultural and social factors—including family structures, peer networks, and available educational and recreational opportunities—investigating these relationships among high school students can provide context-specific and practical insights for designing school-based educational and counseling interventions.

Accordingly, the present study aimed to investigate the direct and indirect effects of self-regulation on mobile Internet addiction among high school students in Kerman, Iran, with perceived social support serving as a mediating variable. This refined formulation reflects the analytical depth of the research and aligns with the Structural Equation Modeling (SEM) approach used in the study.

The findings may provide a scientific basis for developing educational and psychological programs in schools and families to prevent and reduce mobile Internet addiction.

Methods

Study Design and Setting

The present study employed a correlational design using Covariance-Based Structural Equation Modeling (CB-SEM) to examine the direct and indirect relationships among the study variables and to test the mediating role of perceived social support. Given the confirmatory and theory-driven nature of the hypothesized model, a covariance-based approach was preferred over the variance-based Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. The research was conducted in Kerman City, Iran, throughout the 2024–2025 academic year, with data collection taking place from early May to late June 2025.

Participants and Sampling

The statistical population consisted of all high school students (grades 10–12) in Kerman City, Iran, during the 2024–2025 academic year. To determine the sample size, the Yamane formula was employed instead of the more commonly used Cochran formula, as Yamane's approach provides a straightforward and precise estimation when population size (N) is known and the desired sampling error (e) is explicitly defined. This method is widely used in social and educational studies where researchers aim to balance precision and feasibility, particularly in large-scale SEM studies. The formula was implemented in the following manner:

$n=N / (1 + N \times e^2)$

where 'N' represents the total population and 'e' denotes the acceptable margin of error (36). Given a total population of 21,186 students, a 95% confidence level, and a sampling error of 0.03, the required sample size was estimated at 1,056 participants, which was deemed sufficient for ensuring model stability and representativeness in covariance-based SEM.

A multi-stage cluster sampling procedure was used. In the first stage, Kerman City was divided into two educational districts. From each district, six schools (three girls' and three boys' schools) were randomly selected to achieve gender stratification and ensure proportional representation. The random selection process was carried out using the random number generation function in Microsoft Excel. A fixed random seed was used to enable reproducibility and verification of the sampling process.

In the second stage, a single class from each grade (10th, 11th, and 12th) within the selected schools was randomly chosen, and all students in those classes were invited to participate. This cluster-based approach minimized selection bias while improving representation across various grade levels.

Following data collection, questionnaires underwent checks for completeness; any with over 10% unanswered items or showing patterned/inconsistent answers were discarded. The Expectation-Maximization (EM) algorithm was applied to impute missing data for cases with less than 10% missing responses, ensuring data integrity and analytical accuracy. The final valid dataset comprised 1,021 completed questionnaires.

Tools/Instruments

In this study, three standardized and validated questionnaires were utilized to rigorously evaluate the primary outcomes of interest:

Chen Internet Addiction Scale (CIAS)

The CIAS, developed by Chen and colleagues (2003), consists of 26 items assessing five dimensions of Internet addiction: Compulsive Use, Withdrawal Symptoms, Tolerance, Interpersonal and Health Problems, and Time Management Difficulties. The items are rated on a 4-point Likert scale ranging from 1 (rarely) to 4 (always), yielding a total score between 26 and 104. Scores of 26–63 indicate normal use, 64–67 indicate being at risk, and 68–104 indicate Internet addiction.

Validity and Reliability - The original study reported Cronbach's alpha coefficients ranging from 0.79 to 0.93, while Iranian studies have reported values between 0.67 and 0.85. Convergent validity with Young's Internet Addiction Test (IAT) was confirmed (r=0.85) (37, 38). Neither the original English version nor the Iranian validation studies reported the Content Validity Index (CVI) or the Content Validity Ratio (CVR). In the current study, only internal consistency was assessed, yielding a Cronbach's alpha of 0.91 for the entire scale, which reflects acceptable reliability. The CVI and CVR were not reported in either the original English version or the Iranian validation studies. In this study, only internal consistency was assessed, yielding a Cronbach's alpha of 0.91 for the overall scale, which reflects satisfactory reliability. This instrument was chosen instead of other available tools, such as the IAT, due to its multidimensional nature, comprehensive assessment of behavioral and psychological symptoms, and its frequent application in studies involving Iranian adolescents—factors that strengthen its cultural and conceptual relevance. Although Confirmatory Factor Analysis (CFA) was not conducted separately in the present research, previous studies, both original and Iranian, have provided strong evidence of the CIAS's construct validity, supporting its suitability for inclusion in the structural model.

Social Support Apprasials (SS-A) Scale

The SS-A is a 23-item self-report instrument originally developed by Vaux and colleagues (1986) to assess individuals' perceptions that they are loved, respected, and valued by family, friends, and significant others (39). The scale evaluates three main dimensions of perceived social support: Family Support, Friend Support, and Support from Others. Responses are rated on a 5-point Likert scale ranging from very low (1) to very high (5), with items 3, 10, 21, and 22 reverse-scored. The total score ranges from 23 to 115, where higher scores indicate greater perceived social support.

Validity and Reliability - Construct validation studies, including those conducted by O'Reilly (1995) among psychiatric inpatients, have confirmed the scale's good reliability, internal consistency, and construct validity, as evidenced by significant correlations with other social support measures and psychological well-being indicators (40). Reported Cronbach's alpha coefficients range from 0.81 (original study) to 0.88 (Iranian validation) (39-41). In the present study, Cronbach's alpha was 0.88, indicating excellent internal consistency. It should be noted that content validity indices were not reported in either the original or subsequent validation studies; therefore, they were not calculated in the current research.

All scoring procedures, including reverse-coded items, were consistently applied during data analysis to ensure measurement accuracy. The validated Persian version of this instrument was employed, incorporating minor linguistic modifications assessed by bilingual experts to ensure both cultural appropriateness and conceptual consistency. As the primary aim of the study was to examine the structural model rather than validate individual scales, separate calculations of construct reliability and Average Variance Extracted (AVE) were deemed unnecessary; instead, reliability indices and existing validation evidence were utilized to confirm the adequacy of the constructs.

Short Self-Regulation Questionnaire (SSRQ):

The SSRQ developed by Chen and Lin (2018) consists of 22 items rated on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). It measures five key dimensions of self-regulation: Goal Achievement (6 items), Mindfulness (6 items), Adaptability (3 items), Perseverance (3 items), and Goal Setting (4 items). The total score ranges from 22 to 110, with higher scores reflecting higher levels of self-regulation (42).

Validity and Reliability - The original validation study conducted among Taiwanese college students confirmed strong psychometric properties, including high

internal consistency (Cronbach's α=0.91), and construct validity verified through exploratory and confirmatory factor analyses (42). In Iran, Mosalanejad and colleagues (2023) validated an online version of the self-regulation questionnaire among medical students. The construct validity was confirmed using exploratory and confirmatory factor analysis, yielding five dimensions similar to the original structure. Convergent validity was also supported through significant correlations with aligned measures of learning self-regulation. The Cronbach's alpha for the total scale was reported as 0.97, indicating excellent internal consistency (43). In the present study, Cronbach's alpha was 0.93. It should be noted that content validity indices (CVI and CVR) were not reported in either the original or Iranian validation studies; therefore, these indices were not calculated in this research.

The SSRQ was selected for its theoretical alignment with the construct of self-regulation as a central psychological factor in behavioral control and its strong prior psychometric support in Iranian populations. Although the present study did not perform a separate CFA for this scale, its factorial validity has been established in multiple prior Iranian studies, which supports its adequacy for inclusion in the structural equation model.

All instruments collectively demonstrated acceptable internal consistency and theoretical coherence, fulfilling the requirements for use in a confirmatory SEM framework.

Data Collection

Data were collected through in-person administration of paper-based questionnaires. Participants completed a combined set of three instruments—the Chen Internet Addiction Scale, the Perceived Social Support Scale, and the Self-Regulation Questionnaire—presented as a single package to reduce fatigue and minimize potential response bias. The data collection period extended from early May to late June 2025, aligning with the second semester of the 2024–2025 academic year.

In each educational district, the researcher coordinated with school principals and counselors to attend scheduled sessions. During these sessions, the study's purpose, confidentiality measures, and detailed guidelines for completing the questionnaires were thoroughly explained. Once informed consent was obtained, participants filled out and submitted the questionnaires on the same occasion.

To prevent sample attrition and enhance the response rate, a follow-up session was organized the following week for students who missed the initial administration. These measures effectively minimized data loss, and ultimately, 1,021 fully completed and valid questionnaires were included in the final analysis.

Data Analysis

Descriptive statistics, including the mean, standard deviation, skewness, and kurtosis, were generated using SPSS version 26 to describe the data distribution and evaluate assumptions of normality. Pearson correlation coefficients (r) were computed to examine the associations among the study variables prior to SEM analysis, ensuring theoretical and empirical justification for the hypothesized model. To test the hypothesized structural relationships and the mediating role of perceived social support, CB-SEM was conducted in LISREL V. 8.80 using the Maximum Likelihood Estimation (MLE) method. The choice of LISREL was theoretically and methodologically justified, as it provides robust estimation methods and comprehensive fit indices suitable for confirmatory models with complex covariance structures. This approach allowed for the simultaneous evaluation of both measurement and structural models, ensuring the reliability, validity, and overall adequacy of the model.

Prior to the SEM analysis, the normality of variables was assessed using the Kolmogorov–Smirnov test, and all skewness and kurtosis values fell within the acceptable ±2 range, confirming univariate normality.

Moreover, Mardia's coefficient (3.47<5.00) indicated compliance with multivariate normality assumptions, supporting the use of covariance-based SEM. Missing data were treated using the Expectation–Maximization (EM) algorithm to ensure analytical accuracy and minimize bias.

Model fit was assessed using multiple indices, including Chi-square to degrees of freedom ratio (χ^2/df), Root Mean Square Error of Approximation (RMSEA), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Comparative Fit Index (CFI), Incremental Fit Index (IFI), Normed Fit Index (NFI), Non-Normed Fit Index (NNFI, also known as Tucker-Lewis Index [TLI]), Parsimonious Normed Fit Index (PNFI), and Parsimonious Goodness of Fit Index (PGFI), following the acceptable thresholds suggested by Kline (44).

Ethics - Participants were fully informed about the study objectives, confidentiality safeguards, and detailed instructions for completing the questionnaires. After providing informed consent, participants completed and submitted the questionnaires. They were assured that all data would be used exclusively for research purposes and would have no personal or academic implications. The study was conducted in compliance with ethical guidelines and received approval from the Research Ethics Committee of Kerman University of Medical Sciences, Kerman, Iran.

Results

Demographic Characteristics

A total of 1,011 students participated in the study, of whom 488 (48.3%) were male and 523 (51.7%) were female. In terms of age, participants were categorized into two main groups: under 17 years (45.3%) and 17 years or older (54.7%), representing the adolescent population targeted in this research. This simplified categorization was used to highlight the developmental stage most relevant to the study's objectives.

Regarding family size, most families consisted of five members (37.9%), followed by four-member families (37.3%). In terms of fathers' employment status, 72.8% were employed, 14.2% retired, 6.7% unemployed, and 6.2% deceased. Fathers' education level was most frequently at the high school diploma level (45.1%), followed by middle school (10.8%), while only 1.3% were illiterate or had basic literacy.

As for mothers' education, the majority held a high school diploma (40.9%), followed by a bachelor's degree (13.0%), and only 1.1% were reported as illiterate. Regarding housing status, 70.4% lived in owned homes, 23.4% in rented homes, 5.6% in other types of housing, and 0.5% had no permanent residence.

It should be noted that demographic variables such as age, parental education, and housing status were not used as control variables or subgroup factors in the SEM model; they were reported descriptively to provide contextual understanding of the sample characteristics.

Descriptive Statistics

Descriptive statistics including means, standard deviations, skewness, and kurtosis for all study variables are presented in Table 1. All skewness and kurtosis values were within the acceptable range of ±2, confirming univariate normality of the data. To ensure that the assumptions of covariance-based SEM were met, multivariate normality was further assessed using Mardia's coefficient. The normalized Mardia's estimate (3.47) was below the critical threshold of 5.00, indicating that the data satisfied multivariate normality assumptions. Therefore, the use of the CB-SEM approach with LISREL 8.80 was appropriate for the current study.

Main Findings

Correlation Analysis: Pearson correlation analysis revealed a significant negative correlation between self-regulation and Internet addiction (r=-0.319, P<0.01), which represents a moderate negative association. Moreover, there was a significant positive relationship between self-regulation and perceived social support (r=0.718, P<0.01), indicating a strong positive correlation.

Table 1: Descriptive statistics of study variables among participants

Variable	Min	Max	Mean	SD	Skewness	Kurtosis
Lack of Control	8	32	20.71	3.92	-0.13	1.54
Withdrawal	5	20	12.95	2.90	-0.27	0.45
Tolerance	4	16	10.34	2.30	-0.25	-0.01
Interpersonal & Health Problems	7	39	22.44	7.31	0.00	-1.21
Time Management Problems	3	12	7.51	1.97	-0.07	-0.44
Internet Addiction (Total)	33	107	70.18	8.92	-0.23	1.95
Goal Achievement	6	30	17.91	4.82	-0.14	0.68
Mindfulness	6	30	18.07	4.70	0.03	0.73
Adaptability	3	15	8.98	2.84	0.04	-0.32
Progress	3	15	9.19	2.85	-0.14	-0.31
Goal Setting	4	20	11.92	3.58	-0.06	0.00
Self-Regulation (Total)	22	110	66.07	10.40	-0.52	5.15
Family Support	8	40	23.96	5.98	0.02	1.31
Friends' Support	6	30	18.11	4.73	0.03	0.79
Others' Support	8	40	23.96	5.81	0.01	1.43
Social Support (Total)	22	110	66.04	10.91	-0.32	4.78

*N=1,011; SD: Standard Deviation

Similarly, a significant negative correlation was found between Internet addiction and perceived social support ($r=-0.301$, $P<0.01$), representing a moderate association. These results indicate that higher levels of self-regulation and perceived social support are associated with lower levels of Internet addiction among adolescents. However, given the cross-sectional design of this study, these findings should be interpreted as associative rather than causal. Although the findings suggest associations among self-regulation, perceived social support, and Internet addiction, the cross-sectional design precludes any conclusions about causality.

SEM: To further examine these relationships, SEM was employed. In the model, self-regulation, perceived social support, and Internet addiction were treated as latent variables, each represented by a set of observed indicators. Prior to testing the structural paths, the measurement model was validated by assessing factor loadings, AVE, and construct reliability. All factor loadings exceeded 0.60, AVE values were above 0.50, and construct reliability values surpassed 0.70, confirming convergent validity and internal consistency of the latent constructs.

The estimated standardized path coefficients indicated that self-regulation had a significant positive effect on perceived social support ($\beta=0.34$, SE=0.034, 95% CI [0.273, 0.407], $P<0.001$). In turn, perceived social support had a significant negative effect on Internet addiction ($\beta=-0.23$, SE=0.109, 95% CI [-0.444, -0.016], $P<0.001$). Additionally, self-regulation had a significant direct negative effect on Internet addiction ($\beta=-0.23$, SE=0.153, 95% CI [-0.529, 0.069], $P<0.001$). The indirect (mediating) effect of social support was confirmed using the nonparametric bootstrapping method with 5,000 resamples, which yielded a significant indirect path ($\beta=-0.078$, 95% CI [-0.132, -0.042], $P<0.001$). The Sobel test also supported this finding ($Z=4.27$, $P<0.001$), indicating partial mediation (Table 2). The structural model is illustrated in Figure 1, which depicts the standardized path coefficients among self-regulation, perceived social support, and Internet addiction.

Figure 2 presents the statistically significant coefficients of the structural paths, further supporting the mediating role of perceived social support.

Model Fit Indices: The proposed model demonstrated an overall acceptable and theoretically consistent goodness of fit. The chi-square value was $\chi^2/df=234.77$,

Table **2**: Standardized and unstandardized regression coefficients of the structural model

Path	Standardized Coefficient (β)	SE	t-value	P value	95% Confidence Interval
Self-Regulation → Social Support	0.34	0.034	16.62	<0.001	[0.273, 0.407]
Social Support → Internet Addiction	-0.23	0.109	-5.90	<0.001	[-0.444, -0.016]
Self-Regulation → Internet Addiction	-0.23	0.153	-5.41	<0.001	[-0.529, 0.069]

*N=1,011; SE: Standard Error

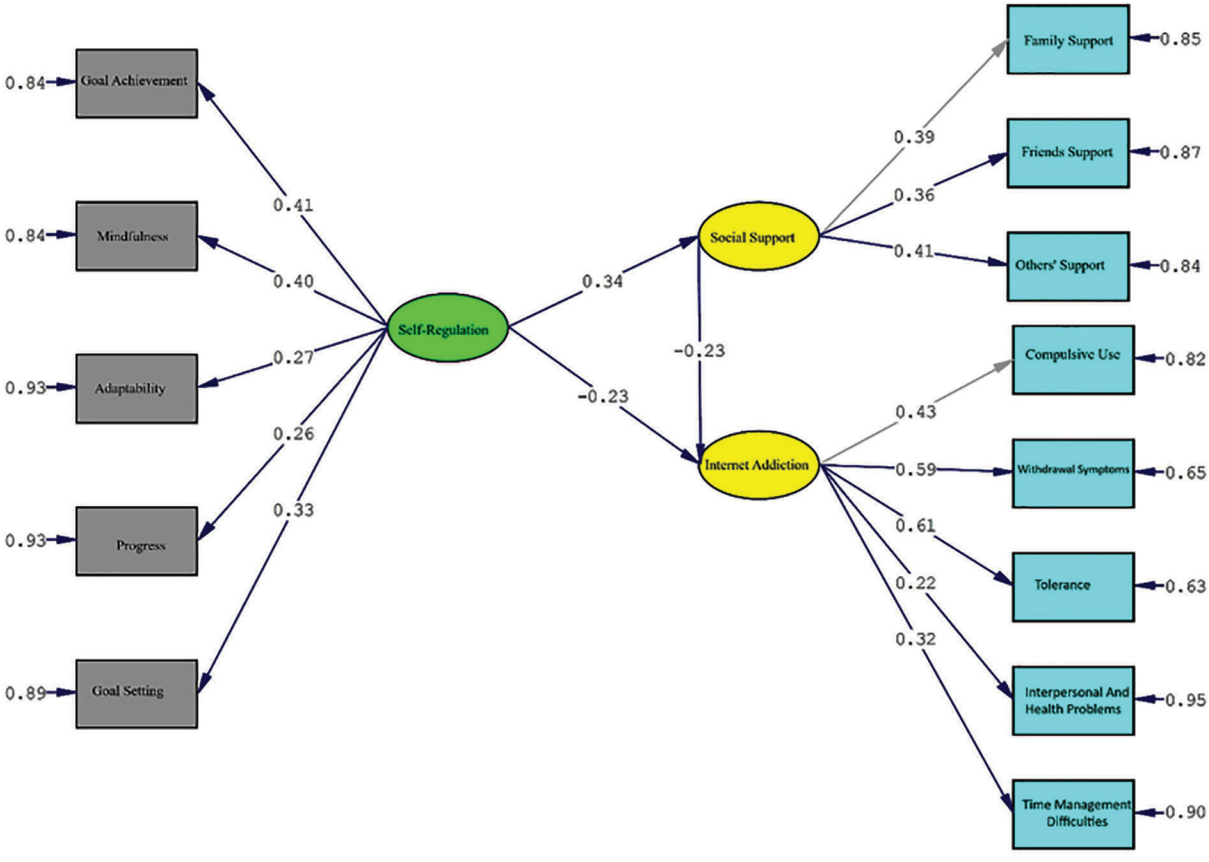

Figure 1: Standardized path coefficients for the relationship between self-regulation and Internet addiction mediated by social support among participants (n=1,011)

P<0.001, which, although significant due to the large sample size, yielded a χ^2/df ratio of 3.78, indicating a satisfactory model fit (acceptable if ≤5). For clarity, the fit indices were categorized as follows: absolute fit indices—RMSEA=0.052 (90% CI: 0.045–0.059), GFI=0.97, AGFI=0.95; incremental fit indices—CFI=0.92, IFI=0.92, NFI=0.90, NNFI (TLI)=0.90; and parsimonious fit indices—PNFI=0.71, PGFI=0.66. Given the sensitivity of the chi-square statistic to large samples, greater emphasis was placed on RMSEA and CFI as more robust and sample-size–independent indicators of model adequacy. The RMSEA value below 0.06 and CFI value above 0.90 both suggested a satisfactory and theoretically meaningful model fit. Overall, these indices confirmed that the proposed structural model fits the empirical data well and provides strong support for the hypothesized theoretical framework (Table 3). Mediation analysis was further validated using bootstrapping with 5,000 resamples and the Sobel test, both of which confirmed the partial mediating role of perceived social support.

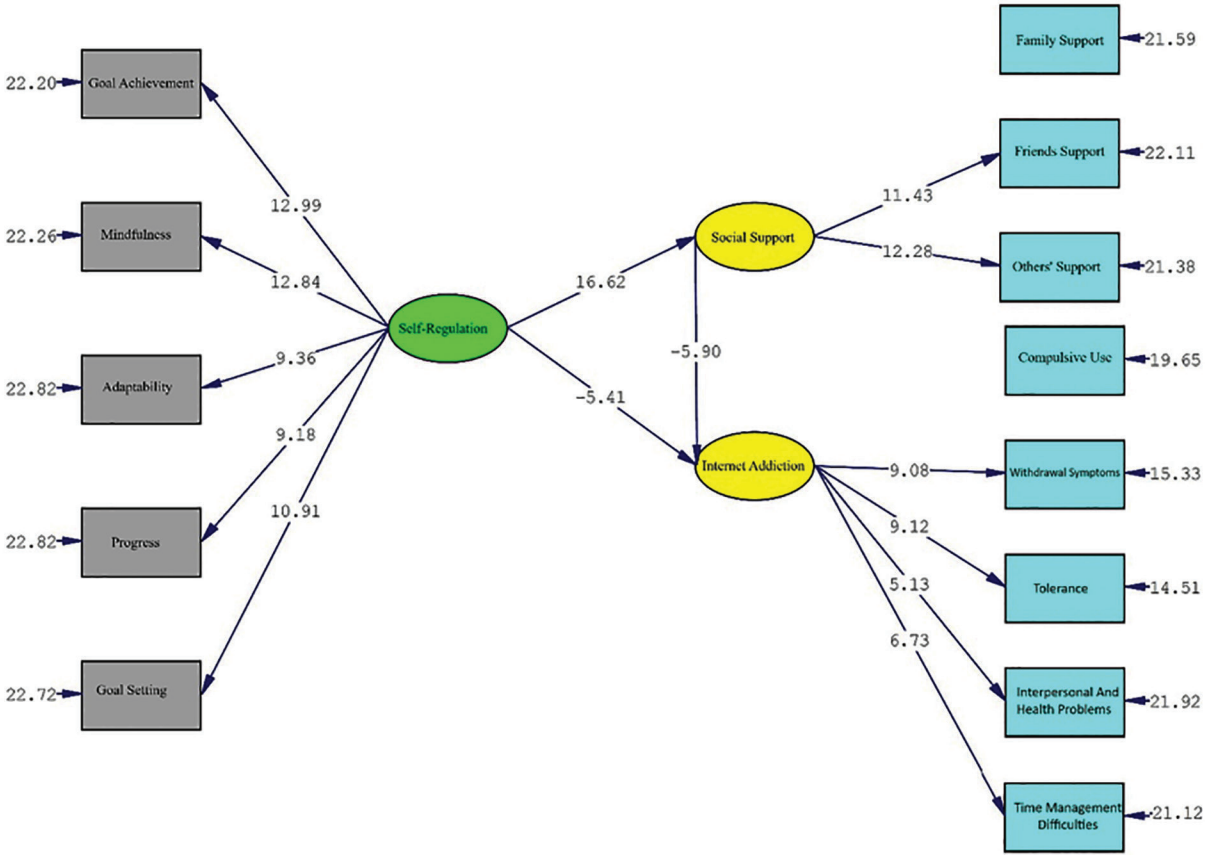

Figure 2: Statistically significant coefficients illustrating the relationship between self-regulation and Internet addiction, with social support as a mediator (n=1,011)

Table 3: Fit indices for the proposed model

Fit Index	Expected Threshold	Obtained Value
χ^2/df (Chi-square / Degrees of Freedom)	<5.00 acceptable; <3.00 desirable	3.78
RMSEA (Root Mean Square Error of Approximation)	<0.08 acceptable; <0.05 good	0.052 (90% CI: 0.045–0.059)
GFI (Goodness of Fit Index)	≥0.90 acceptable	0.97
AGFI (Adjusted Goodness of Fit Index)	≥0.90 acceptable	0.95
CFI (Comparative Fit Index)	≥0.90 acceptable; ≥0.95 excellent	0.92
IFI (Incremental Fit Index)	≥0.90 acceptable	0.92
NFI (Normed Fit Index)	≥0.90 acceptable	0.90
NNFI (Non-Normed Fit Index / TLI)	≥0.90 acceptable	0.90
PNFI (Parsimony Normed Fit Index)	≥0.50 acceptable	0.71
PGFI (Parsimony Goodness of Fit Index)	≥0.50 acceptable	0.66

Discussion

The main objective of this study was to examine the relationship between self-regulation and Internet addiction, with the mediating role of social support, among high school students in Kerman City, Iran. The results indicated that self-regulation had a significant and negative direct effect on Internet addiction and, at the same time, indirectly reduced Internet addiction through the enhancement of social support. In other words, social support functioned as a partial mediating variable in this relationship.

The findings revealed a significant negative relationship between self-regulation and Internet addiction, indicating that students with

greater ability to manage emotions, control impulses, and make rational decisions are less likely to engage in excessive or addictive Internet use. This result aligns with numerous studies emphasizing the protective role of self-regulation in preventing problematic online behaviors (11, 13, 16, 25, 26). Similarly, research by Li and colleagues (25) and Sun and colleagues (11) demonstrated that students with higher self-control and emotional management capabilities exhibited lower tendencies toward Internet overuse and addiction. In addition, longitudinal findings suggest that self-regulation and problematic Internet use have a reciprocal relationship, where improvement in self-regulatory abilities predicts a decline in addiction behaviors over time (30). However, some studies have argued that the relationship between self-regulation and Internet addiction is context-dependent, varying with factors such as social environment and cultural values (14, 26).

Compared with these studies, the present research provides complementary evidence from an Iranian adolescent sample, suggesting that even within a collectivist cultural context, self-regulation remains a key predictor of Internet addiction. This partially contrasts with Li and colleagues (25), who found that environmental control had a stronger influence than personal control in East Asian contexts. Such a difference may be due to variations in digital access, parenting styles, or cultural attitudes toward Internet use among Iranian students.

The results also showed a significant positive relationship between self-regulation and social support. This implies that students who can better regulate their emotions, thoughts, and behaviors tend to be more successful in forming and maintaining interpersonal relationships and, consequently, receive greater emotional and social support. This finding is consistent with previous studies indicating that emotionally intelligent and self-regulated adolescents report higher perceived support from their families and peers (17-20). According to Bağatarhan (20), self-regulation and resilience are interrelated mechanisms that enhance the perception of social support and overall well-being among adolescents. In comparison with Kamran and colleagues (21), who highlighted the moderating role of personality, our results emphasize that, in this sample, self-regulation exerted a more stable effect on perceived support regardless of introverted or extroverted tendencies. This contrast may be explained by the stronger role of family cohesion and school-based peer groups in Kerman, which could buffer the influence of personality traits.

Another important finding of the present study was the significant inverse association between social support and Internet addiction. This result indicates that adolescents who benefit from emotional, instrumental, and informational support within their social contexts are less prone to problematic Internet use. These findings align with earlier studies suggesting that social support mitigates stress and loneliness, thereby decreasing the risk of online dependency (17, 18, 22, 23, 32). In particular, Cui and Chi (32) demonstrated that perceived social support indirectly reduces Internet addiction through enhancing resilience and reducing post-traumatic stress symptoms. However, Agbaria and Bdier (22) observed that in certain cultural groups, social support had a weaker predictive role for Internet addiction, potentially due to differences in family structure and peer norms.

The comparison between the present results and those of Agbaria and Bdier (22) shows that cultural variations strongly influence the protective power of social support. While their study in an Arab sample found a limited effect, the current findings suggest that within Iranian adolescents, social ties—especially family and peer relationships—play a more consistent buffering role against Internet addiction. This may be due to the stronger emphasis on collective identity and emotional interdependence in Iranian culture.

Moreover, the findings confirmed that social support mediates the relationship between self-regulation and Internet addiction. This means that part of the influence of self-regulation on reducing Internet addiction

occurs through an increase in perceived social support. The current findings are supported by prior research suggesting that self-regulation facilitates the development of social ties, which in turn reduce the risk of maladaptive behaviors (19, 20, 32, 33). In the study by Çelikkaleli and Ata (33), it was found that emotional self-efficacy—closely linked to self-regulation—acts as a mechanism through which social support decreases problematic Internet use.

When compared with Çelikkaleli and Ata (33), who reported full mediation, the current study revealed only partial mediation. This difference may arise from cultural, developmental, or methodological factors—particularly the inclusion of both family and peer support dimensions in our model. Thus, while self-regulation indirectly reduces Internet addiction via social support, it also maintains a direct protective role that operates independently of external support systems.

From a theoretical standpoint, these findings can be interpreted in light of social development and self-determination theories, which posit that self-regulation and supportive social relationships interact to shape adolescents' adaptive behaviors. While self-regulation equips individuals with cognitive and emotional resources to control impulses, social support provides the motivational and contextual environment necessary for maintaining balanced Internet use. Therefore, adolescents with strong self-regulation but insufficient social support may still be vulnerable to online dependency. Overall, the pattern of results suggests that the combination of personal (self-regulation) and environmental (social support) resources provides the most comprehensive protection against Internet addiction, aligning with the integrative frameworks of both Bandura's social-cognitive theory (45) and Deci and Ryan's self-determination theory (46).

From an applied perspective, these results highlight the importance of designing preventive and interventional programs in schools and community counseling centers. Such programs should target both intrapersonal factors (strengthening self-regulation, emotional management, and impulse control) and interpersonal factors (enhancing family, peer, and teacher support networks). Integrating group counseling sessions, parental workshops, and peer mentoring activities could significantly reduce mobile Internet addiction among adolescents (11, 12, 17, 20, 33). In summary, by comparing the current findings with both supportive and contrasting studies, the results demonstrate that the proposed conceptual model holds robust empirical support while acknowledging contextual nuances. This comparative discussion provides a deeper understanding of how self-regulation and social support jointly shape adolescents' digital behaviors in Iranian society.

Limitatioms and Suggestions

Despite the careful methodological design, this study faced several limitations. First, data were collected through students' self-reports, which may be subject to response bias and social desirability effects. Second, the research population was limited to high school students in Kerman, which restricts the generalizability of the findings to other age groups, geographic regions, or cultural contexts. Third, although the findings suggest associations among self-regulation, perceived social support, and Internet addiction, the cross-sectional design precludes any conclusions about causality.

To address these limitations, future studies are encouraged to employ mixed-methods approaches (qualitative–quantitative**)** and multi-source assessments (e.g., reports from parents and teachers) to improve measurement accuracy and reduce potential bias. Future longitudinal or experimental studies are needed to establish causal relationships among these variables, thereby clarifying the directionality of effects over time. Moreover, conducting studies across different provinces and diverse age groups may enhance the external validity and cross-cultural applicability of the findings. Finally, future research should focus on designing and

evaluating intervention programs aimed at enhancing self-regulation and social support, to examine their effectiveness in reducing Internet addiction in real educational contexts.

Conclusion

The results of this study demonstrated that self-regulation plays a decisive role in reducing Internet addiction among adolescents, exerting both direct and indirect effects through the enhancement of social support. Adolescents with stronger abilities in emotional control, impulse management, and goal-oriented planning tend to maintain healthier social relationships and show greater resistance to excessive Internet use. The effective combination of personal self-regulatory skills and supportive social environments provides a comprehensive framework for preventing addictive online behaviors, indicating that balanced psychological and social development occurs when self-regulation training is accompanied by the strengthening of family, peer, and school connections. Therefore, educational policymakers and school counselors are encouraged to design preventive programs that simultaneously focus on enhancing adolescents' internal competencies and reinforcing their external support systems. Overall, the findings present a rich and integrated picture of how individual and social factors interact to promote mental and behavioral well-being among adolescents in the digital era.

Abbreviations

AGFI: Adjusted Goodness of Fit Index
CB-SEM: Covariance-Based Structural Equation Modeling
CFA: Confirmatory Factor Analysis
CFI: Comparative Fit Index
CIAS: Chen Internet Addiction Scale
CVI: Content Validity Index
CVR: Content Validity Ratio
EFA: Exploratory Factor Analysis
GFI: Goodness of Fit Index
IFI: Incremental Fit Index
NFI: Normed Fit Index
NNFI: Non-Normed Fit Index
PNFI: Parsimony Normed Fit Index
PGFI: Parsimony Goodness of Fit Index
RMSEA: Root Mean Square Error of Approximation
SEM: Structural Equation Modeling
SS-A: Social Support Appraisals Scale
SSRQ: Short Self-Regulation Questionnaire
TLI: Tucker-Lewis Index

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Authors' Contribution

LBM, ShS, MRMS designed and drafted the manuscript. MRMS and LBM performed the statistical analysis and validation. ZGhZ, SS and GhP contributed to data interpretation. All authors reviewed and approved the final article.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this study.

Ethical Considerations

This research was conducted in accordance with ethical standards and approved by the Research Ethics Committee of Kerman University of Medical Sciences (IR.KMU.REC.1404.315), Kerman, Iran. All stages of the study were conducted in accordance with the ethical principles of the Declaration of Helsinki. Informed consent was obtained from all participating students, and they were assured of the confidentiality and anonymity of their responses.

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Availability of Data and Materials

The datasets generated and analyzed during the current study are available from the

corresponding author upon reasonable request. Due to ethical and privacy considerations, some data may be restricted or anonymized to protect participant confidentiality.

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