

Developing a Structural Model of Family Characteristics, Cyber Addiction, and Body Image Concern: The Mediating Role of Negative Affect in Female Upper Secondary School Students

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ABSTRACT

Purpose: The present study aimed to examine a structural model explaining the relationships between family characteristics, cyber addiction, and body image concern, considering the mediating role of negative affect among female high school students.

Methodology: This research was applied in purpose and employed a descriptive–correlational design. The statistical population consisted of female upper secondary school students in Shabestar during the 2025–2026 academic year. Using cluster random sampling, 400 students were selected as the study sample. Data were collected through standardized questionnaires measuring family characteristics, cyber addiction, body image concern, and negative affect. The data were analyzed using Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM), with the significance level set at 0.05.

Findings: The results indicated that family characteristics were significantly associated with both cyber addiction and body image concern. In addition, negative affect demonstrated a significant positive relationship with these outcome variables. The analysis further showed that negative affect played a significant mediating role in the relationships between family characteristics and the dependent variables. The proposed structural model exhibited acceptable goodness-of-fit indices.

Conclusion: The findings highlight the importance of family functioning as a protective factor in reducing cyber addiction and concerns related to body image among adolescent girls. This influence appears to operate partly through the reduction of negative affect. Strengthening family relationships and implementing interventions focused on emotional regulation may therefore contribute to preventing maladaptive online behaviors and body image disturbances in adolescents.

Keywords: Body Image Concern, Cyber Addiction, Family Characteristics, Female Students, Negative Affect, Structural Equation Modeling

1. Introduction

Adolescence is a critical developmental period in which biological maturation, emotional reactivity,

identity formation, peer sensitivity, and social comparison processes become increasingly salient. During this period, adolescents gradually move toward autonomy while

remaining deeply dependent on the emotional, relational, and regulatory resources provided by the family environment. For female adolescents, this developmental transition is often accompanied by heightened sensitivity to appearance evaluation, interpersonal acceptance, and social validation, making this period especially important for understanding body image concern and problematic engagement with digital environments. From a bioecological perspective, adolescent adjustment is shaped by the interaction between individual characteristics and nested environmental systems, among which the family remains the most immediate and influential microsystem (Bronfenbrenner & Morris, 2006). Therefore, the emotional quality of family relationships, patterns of communication, cohesion, adaptability, and parental responsiveness may influence not only adolescents' psychological well-being but also their behavioral tendencies in online spaces.

In recent years, the rapid expansion of digital technologies has transformed the developmental context of adolescence. Social networking platforms, smartphones, online games, visual media, and interactive communication tools have become central components of adolescents' daily lives. Although digital media can provide opportunities for education, social connection, identity exploration, and emotional support, excessive or poorly regulated use may become maladaptive when it interferes with functioning, emotional stability, sleep, academic engagement, or interpersonal relationships. The concept of cyber addiction, often discussed alongside problematic internet use or problematic smartphone use, refers to a pattern of compulsive or uncontrolled engagement with digital technologies despite negative consequences. Clinical and behavioral research has shown that problematic internet use is associated with psychological distress, impaired self-regulation, and functional difficulties among adolescents (Chen et al., 2023; Kuss & Lopez-Fernandez, 2016). The Interaction of Person–Affect–Cognition–Execution model further explains problematic technology-related behaviors as outcomes of interactions among personal vulnerability, affective states, cognitive biases, executive control, and reinforcing digital experiences (Brand et al., 2019).

The adolescent digital environment must be interpreted with caution because evidence does not support simplistic claims that screen use uniformly harms all adolescents. Contemporary reviews emphasize that associations between digital technology use and adolescent mental health are complex, heterogeneous, and shaped by content, context, intensity, motivation, and individual vulnerability (Odgers

& Jensen, 2020; Orben, 2020). This means that the psychological meaning of online behavior may differ across adolescents. For some, digital engagement may be recreational and socially adaptive, while for others it may become a compensatory strategy for loneliness, emotional distress, family conflict, or low self-worth. Accordingly, cyber addiction should not be understood merely as frequent technology use, but rather as a dysregulated behavioral pattern embedded in emotional and relational contexts. In this regard, identifying the family and affective mechanisms that increase vulnerability to problematic digital behavior is essential for developing more precise explanatory models.

Family characteristics constitute one of the most important contextual determinants of adolescent psychological adjustment. Attachment-based perspectives indicate that secure, responsive, and emotionally available family relationships contribute to the development of self-regulation, interpersonal trust, and adaptive coping, whereas inconsistent, conflictual, or emotionally distant relationships may intensify vulnerability to distress and maladaptive behavior (Allen & Tan, 2016). Empirical findings similarly show that family functioning is linked to adolescents' problematic internet use, partly because family climates influence emotional coping and behavioral regulation. For example, problematic internet use among parents may relate to adolescents' problematic use, particularly under conditions of stress, suggesting that family processes and emotional climates shape adolescents' digital behaviors (Lam & Wong, 2020). Likewise, emotional distress has been identified as a mechanism through which family functioning may affect problematic internet use, indicating that weaker family functioning may increase adolescents' reliance on online environments for affective compensation (Li et al., 2022).

Negative affect is a particularly important mechanism in this context. Negative affect includes emotional states such as sadness, anxiety, anger, fear, irritability, and general psychological distress. Adolescents with high negative affect may be more likely to use digital media as a means of distraction, avoidance, mood modification, or social reassurance. The literature on fear of missing out further suggests that anxiety about exclusion from rewarding social experiences may intensify compulsive checking, problematic smartphone use, and maladaptive online engagement (Elhai et al., 2020). Recent research has also shown that negative affect is associated with problematic smartphone use through emotion regulation difficulties, suggesting that adolescents who struggle to manage

unpleasant emotions may turn to digital technologies as readily available but potentially maladaptive regulatory tools (Li et al., 2023). Therefore, negative affect may serve as a bridge between family characteristics and cyber addiction: less supportive family environments may increase emotional distress, and this distress may increase reliance on cyberspace for temporary relief or validation.

At the same time, digital environments are closely connected with body image concern, especially among adolescent girls. Body image is not limited to satisfaction or dissatisfaction with physical appearance; it involves perceptions, emotions, beliefs, and behaviors related to the body. Positive body image includes appreciation, respect, acceptance, and protective filtering of unrealistic appearance ideals, whereas body image concern involves dissatisfaction, preoccupation, distress, and functional interference related to appearance (Tylka & Wood-Barcalow, 2015). Adolescence is a vulnerable period for body image disturbance because pubertal development, peer evaluation, identity concerns, and comparison with cultural appearance ideals become more pronounced. The biopsychosocial model of body image concern emphasizes that biological changes, psychological vulnerabilities, interpersonal experiences, and sociocultural pressures interact to shape adolescents' body-related self-evaluations (Rodgers et al., 2020).

Social media intensifies many of these processes by exposing adolescents to idealized bodies, edited images, appearance-based feedback, influencer culture, and constant opportunities for comparison. Reviews of the literature indicate that social networking site use is associated with body dissatisfaction and disordered eating outcomes, particularly when use involves appearance-focused comparison, internalization of thin or muscular ideals, and engagement with image-centered content (Fardouly & Vartanian, 2022; Holland & Tiggemann, 2023). A systematic review focusing on adolescents further indicates that social media may contribute to body dissatisfaction, eating disorder symptoms, and related appearance-oriented behaviors, although the strength and nature of these associations depend on user characteristics and platform practices (Griffiths et al., 2022). These findings suggest that body image concern among adolescent girls should be examined in relation to digital behaviors, emotional states, and family environments rather than as an isolated psychological problem.

Recent studies have expanded this literature by showing that contemporary social media environments produce

complex and sometimes contradictory effects on body image. Some evidence indicates that body-positive content may improve aspects of body image perception by challenging narrow beauty ideals and increasing acceptance of bodily diversity (Jiménez-García et al., 2025). However, other studies suggest that digital aesthetic capital, influencer visibility, and platform-based ideals of social success may intensify appearance pressure and body surveillance among adolescents (Feijoo, 2025). Cross-gender reviews indicate that social media effects on body image may vary by gender, platform type, content exposure, and sociocultural expectations (Xu, 2025). Daily diary evidence has also raised important methodological caution by finding no consistent between- and within-person associations between objective social media screen time and body image dissatisfaction, suggesting that the content and psychological meaning of social media use may be more important than duration alone (Goh et al., 2025).

Body image concerns are also shaped by peer comparison and cultural context. Research on adolescent and young populations has shown that social media use and peer comparison can predict body image dissatisfaction, indicating that appearance evaluation in digital and peer contexts may reinforce dissatisfaction with the self (Sharma & Mehta, 2024). Qualitative findings on Instagram use among young women similarly show that social media may influence self-perception and body satisfaction through comparison, exposure to idealized images, and perceived pressure to conform to appearance norms (Sattarpanahi et al., 2024). Research on young adults in Pakistan further highlights that body image issues in the age of social media must be understood in relation to cultural norms, gendered expectations, and social approval processes (Yousafzai & Fatima, 2025). These findings are especially relevant for adolescent girls, who may face simultaneous pressures from family, school, peers, and online visual culture.

The relationship between body image concern and cyber addiction may also be intensified by negative affect. Adolescents who experience anxiety, sadness, shame, or irritability may become more vulnerable to negative appearance evaluations and more likely to engage in upward social comparison. When negative affect is high, exposure to idealized images may be interpreted through a more self-critical lens, increasing dissatisfaction and preoccupation with appearance. Recent discussions of social media, eating disorders, and body image in young adolescents indicate that online appearance ideals can contribute to body dissatisfaction and eating-related concerns, especially when

adolescents lack critical media awareness or emotional support (Suhag & Rauniyar, 2024). Similarly, findings on internet addiction, mental health, and body image suggest that problematic online engagement may co-occur with poorer mental health and more negative body-related perceptions (Rezvanian & Rahimzadeh, 2024). Therefore, negative affect may represent a shared emotional pathway linking family characteristics to both cyber addiction and body image concern.

The family may protect against these risks through several mechanisms. Supportive family environments can provide emotional security, reduce distress, promote adaptive coping, and help adolescents interpret online appearance ideals more critically. Family cohesion and open communication may enable adolescents to discuss online experiences, peer comparison, body-related worries, and emotional difficulties without fear of judgment. Conversely, family conflict, low emotional responsiveness, poor communication, and weak involvement may increase emotional vulnerability and reduce adolescents' capacity to resist maladaptive online pressures. In such circumstances, cyberspace may become a substitute source of belonging, validation, distraction, or identity affirmation. At the same time, adolescents who do not receive adequate acceptance and emotional support within the family may become more sensitive to appearance-based validation from peers and social media audiences.

Despite the growing literature on digital media, family functioning, negative affect, and body image, important gaps remain. Many studies examine problematic internet use and body image concern separately, even though these outcomes may share common emotional and relational mechanisms. Other studies focus on screen time or social media frequency without sufficiently examining family dynamics or affective processes. Moreover, adolescent girls represent a particularly important population because they are developmentally vulnerable to both appearance-related concerns and internalizing symptoms. A structural model that simultaneously examines family characteristics, negative affect, cyber addiction, and body image concern can therefore provide a more integrated understanding of how these factors operate together. Structural equation modeling is especially appropriate for this purpose because it allows researchers to test direct and indirect pathways among latent constructs, evaluate mediation, and examine the adequacy of a theoretically specified model (Hair et al., 2022; Henseler et al., 2022; Kline, 2023).

Accordingly, the present study aimed to develop and test a structural model of the relationships among family characteristics, cyber addiction, and body image concern with the mediating role of negative affect among female upper secondary school students.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed an applied, descriptive–correlational research design using structural equation modeling (SEM) to investigate the relationships among family characteristics, cyber addiction, body image concern, and negative affect among female high school students. Structural equation modeling is a powerful multivariate statistical technique that allows researchers to examine complex relationships among observed and latent variables simultaneously and to test theoretical models involving direct and indirect effects (Hair et al., 2022; Kline, 2023). SEM is particularly suitable for studies that examine mediation effects, as it enables the simultaneous estimation of measurement and structural models within a unified analytical framework. In the present research, SEM was used to evaluate the hypothesized structural relationships among family characteristics, cyber addiction, body image concern, and negative affect and to test the mediating role of negative affect in these relationships.

The statistical population of this study consisted of all female students enrolled in the second level of high school in the city of Shabestar during the 2024–2025 academic year. Cluster random sampling was used to select the participants. Initially, four high schools in Shabestar were randomly selected. Subsequently, six classes were randomly chosen from each selected school, and questionnaires were distributed among the students in those classes. Structural equation modeling typically requires relatively large sample sizes to ensure accurate parameter estimation and adequate statistical power. Methodological literature suggests that samples larger than 200 participants are generally acceptable for SEM analyses, while larger samples are recommended when more complex models are examined (Hair et al., 2022; Tabachnick & Fidell, 2019). Considering these recommendations and the structure of the proposed model, a sample of approximately 400 students was selected. After distributing the questionnaires and reviewing the collected responses, a total of 400 questionnaires were deemed suitable for analysis and constituted the final dataset used in the statistical analyses. Participants met several inclusion

criteria: being between 15 and 18 years of age, having typical intellectual functioning, and expressing willingness to participate in the study. Exclusion criteria included unwillingness to continue participation and having a medical condition that could interfere with participation in the research process.

Prior to data collection, permission was obtained from the Department of Education in Shabestar. After coordinating with school principals, vice principals, and teachers, the selected schools were visited and questionnaires were distributed among students in the selected classes. Participants were informed about the objectives and importance of the research before completing the questionnaires. They were asked to read the questions carefully and respond honestly. Participation in the study was voluntary, and students were assured that their responses would remain confidential and would be used only for research purposes. Students completed the questionnaires individually during class time. The completion of the questionnaires required approximately 15 to 20 minutes. Data collection was conducted from mid-November 2024 to early February 2025. Participants completed four instruments: the Body Image Concern Inventory (Littleton et al., 2005), the Family Adaptability and Cohesion Scale (Olson, 1985), the Negative Affect subscale of the Positive and Negative Affect Schedule (Watson et al., 1988), and the Cyber Addiction Questionnaire.

2.2. Measures

Body Image Concern Inventory :Body image concern was assessed using the Body Image Concern Inventory (BICI) developed by Littleton, Axsom, and Pury (2005). This questionnaire consists of 19 items designed to measure concerns related to body image and appearance. The instrument includes two main dimensions: dissatisfaction and embarrassment about appearance and interference in social functioning. Items are rated on a five-point Likert scale ranging from 1 (never) to 5 (always). Total scores range from 19 to 95, with higher scores indicating greater levels of body image concern. Previous research has reported strong psychometric properties for the BICI, including high internal consistency and satisfactory convergent validity (Littleton et al., 2005). In the present study, the content validity of the instrument was qualitatively confirmed by five faculty members specializing in psychology. Construct validity was evaluated

through confirmatory factor analysis. The results indicated that all items had factor loadings greater than 0.30 and statistically significant t-values. Reliability analysis yielded Cronbach's alpha coefficients of .80 for dissatisfaction and embarrassment, .84 for interference in functioning, and .72 for the total scale. Composite reliability values were .87 and .88, and average variance extracted (AVE) values were .63 and .80, indicating acceptable reliability and convergent validity.

Family Adaptability and Cohesion Scale :Family characteristics were assessed using the Family Adaptability and Cohesion Scale developed by Olson (1985). This instrument measures two major dimensions of family functioning: family cohesion and family adaptability. The questionnaire consists of 20 items rated on a five-point Likert scale ranging from 1 (almost never) to 5 (almost always). Higher scores on the cohesion dimension indicate stronger emotional bonding and support among family members, whereas adaptability reflects the family's ability to adjust its structure, roles, and rules in response to situational demands. The instrument has been widely used in family research and has demonstrated acceptable reliability and validity across different cultural contexts. In the present study, the content validity of the scale was confirmed by five psychology faculty members. Confirmatory factor analysis was conducted to examine construct validity, and the results showed acceptable factor loadings for all items. Reliability analysis indicated Cronbach's alpha coefficients of .73 for family cohesion and .66 for family adaptability. Composite reliability values were .80 and .81, while AVE values were .48 and .51 respectively, supporting acceptable internal consistency and convergent validity.

Negative Affect (PANAS): Negative affect was measured using the Negative Affect subscale of the Positive and Negative Affect Schedule (PANAS) developed by Watson, Clark, and Tellegen (1988). The PANAS consists of 20 items that measure emotional states on a five-point Likert scale ranging from very slightly or not at all to extremely. The negative affect dimension reflects subjective distress and unpleasant emotional experiences such as fear, guilt, hostility, and nervousness. The PANAS has been widely used in psychological research and has demonstrated strong reliability and validity across various populations. In the present study, the content validity of the scale was confirmed by five psychology faculty experts. Confirmatory factor analysis demonstrated acceptable factor loadings for all items. Reliability analysis yielded a Cronbach's alpha coefficient of .79, composite reliability of .87, and an AVE

of .63, indicating satisfactory reliability and convergent validity.

Cyber Addiction Questionnaire: Cyber addiction was measured using a self-report questionnaire designed to assess patterns of problematic internet and cyberspace use among adolescents. The instrument consists of 19 items measuring three dimensions: amount of use, type of use, and trust in online users. Items are rated on a five-point Likert scale ranging from 1 (very low) to 5 (very high). Total scores range from 19 to 95, with higher scores indicating higher levels of cyber addiction. In the present study, content validity of the instrument was evaluated qualitatively by five psychology faculty experts. Construct validity was examined using confirmatory factor analysis, which showed that all items had acceptable factor loadings greater than 0.30 and statistically significant t-values. Reliability analysis indicated a Cronbach's alpha coefficient of .74, composite reliability of .73, and an AVE value of .62, suggesting acceptable internal consistency.

2.3. Data Analysis

Data analysis was performed using descriptive and inferential statistical methods. Descriptive statistics were used to summarize the characteristics of the participants and the study variables. Confirmatory factor analysis (CFA) was conducted to examine the measurement models and evaluate the construct validity of the research instruments. Structural equation modeling (SEM) was subsequently used to test the hypothesized relationships among the variables and to

examine the mediating role of negative affect. The significance of factor loadings and path coefficients was assessed using t-values obtained through the bootstrapping procedure. Reliability and convergent validity were evaluated using Cronbach's alpha, composite reliability (CR), and average variance extracted (AVE). Statistical analyses were conducted using SPSS for descriptive statistics and AMOS and SmartPLS for confirmatory factor analysis and structural equation modeling, and statistical significance was considered at the 0.05 level.

3. Findings and Results

This section presents the findings of the present study based on the statistical analyses conducted to examine the proposed structural relationships among family characteristics, negative affect, cyber addiction, and body image concern in high school students. The results are organized in a logical sequence to provide a clear understanding of the data and the tested hypotheses. First, the demographic characteristics of the participants are described. Subsequently, descriptive statistics for the study variables are reported. In the next step, the statistical assumptions required for structural equation modeling are examined. Afterward, the relationships among the variables are explored through correlation analysis. Finally, the results of the structural model, including direct and indirect effects as well as model fit indices and mediation analysis, are presented.

Table 1

Frequency and Percentage Distribution of Participants by Age

Age (years)	n	%
16	117	29.25
17	125	31.25
18	158	39.50
Total	400	100

As presented in Table 1, the largest proportion of participants were 18 years old (39.50%), followed by 17-year-olds (31.25%) and 16-year-olds (29.25%). The distribution indicates a relatively balanced representation

across late adolescence, suggesting adequate variability in age within the female high school population. This age dispersion enhances the generalizability of findings within the targeted developmental stage.

Table 2

Descriptive Statistics for Study Variables



Variable	M	SD
Problem Solving	13.66	2.09
Communication	15.27	2.74
Roles	20.65	3.18
Affective Responsiveness	12.58	2.47
Affective Involvement	17.91	4.90
Behavioral Control	15.11	3.22
General Family Functioning	21.73	3.49
Total Family Functioning	127.31	14.05
Negative Affect	25.34	4.67
Appearance Dissatisfaction	30.98	3.73
Functional Interference	17.03	2.94
Total Body Image Concern	49.16	6.30
Cyber Addiction	70.89	5.38

As indicated in Table 2, total family functioning demonstrated a mean score of 127.31 ($SD = 14.05$), reflecting variability across participants. Among the family subscales, the highest mean was observed for general family functioning ($M = 21.73$), whereas affective responsiveness showed comparatively lower mean values ($M = 12.58$).

Negative affect yielded a mean of 25.34 ($SD = 4.67$). Regarding body image concern, dissatisfaction with appearance ($M = 30.98$) constituted a larger component of the total score ($M = 49.16$, $SD = 6.30$). The mean cyber addiction score was 70.89 ($SD = 5.38$), indicating moderate dispersion around the central tendency.

Table 3

Assessment of Statistical Assumptions

Variable	Skewness	Kurtosis
Family Subscales	-.10 to .94	-.32 to 3.19
Negative Affect	3.88	4.19
Body Image Variables	.25 to .78	-.51 to 2.41
Cyber Addiction	.41	.08

Indicator	Value
Tolerance	≈ 1.00
VIF	< Cutoff
Condition Index	23.55 / 17.23
Durbin-Watson (Family)	1.73
Durbin-Watson (Negative Affect)	1.72

As shown in Table 3, skewness and kurtosis values for most variables fell within the acceptable ± 2 range recommended for SEM analyses (Hair et al., 2022; Kline, 2023), except for negative affect, which showed elevated skewness (3.88) and kurtosis (4.19), indicating deviation from normality. Tolerance values approximating 1.00 and VIF values below recommended cutoffs indicated absence of multicollinearity among predictors. Condition index

values (23.55 and 17.23) were below critical thresholds. Durbin-Watson statistics (1.73 and 1.72) confirmed independence of residuals (Tabachnick & Fidell, 2019). Although PLS-SEM is generally robust to violations of normality, nonparametric Spearman correlation coefficients were additionally employed due to the observed deviation from normality in negative affect.

Table 4

Spearman Correlations Between Family Functioning Dimensions, Cyber Addiction, and Body Image Concern

Variables	Cyber Addiction	Body Image Concern
Problem Solving	-0.35**	-0.26**
Communication	-0.40**	-0.18*
Roles	-0.37**	-0.10
Affective Responsiveness	-0.35**	-0.29**
Affective Involvement	-0.39**	-0.33**
Behavioral Control	-0.41**	-0.13
General Family Functioning	-0.40**	-0.27**
Total Family Functioning	-0.44**	-0.35**
Negative Affect	0.39**	0.47**

* $p < .05$

** $p < .01$

The results of the Spearman correlation analysis indicated significant negative relationships between family functioning dimensions and cyber addiction. Specifically, problem solving ($r = -0.35$), communication ($r = -0.40$), roles ($r = -0.37$), affective responsiveness ($r = -0.35$), affective involvement ($r = -0.39$), behavioral control ($r = -0.41$), and general family functioning ($r = -0.40$) were all negatively and significantly associated with cyber addiction at the 0.01 level. In addition, the total family functioning score showed a significant negative correlation with cyber addiction ($r = -0.44$, $p < .01$). These findings suggest that better family functioning is associated with lower levels of cyber addiction among students. Furthermore, several dimensions of family functioning were significantly related to body image concern. The results showed that problem solving ($r = -0.26$, $p < .01$), affective responsiveness ($r = -0.29$, $p < .01$), affective involvement ($r = -0.33$, $p < .01$), general family functioning ($r = -0.27$, $p < .01$), and total

family functioning ($r = -0.35$, $p < .01$) had significant negative correlations with body image concern. Communication also showed a significant negative relationship with body image concern at the 0.05 level ($r = -0.18$, $p < .05$). However, the relationships of roles ($r = -0.10$) and behavioral control ($r = -0.13$) with body image concern were not statistically significant. In addition, negative affect was positively and significantly correlated with both cyber addiction ($r = 0.39$, $p < .01$) and body image concern ($r = 0.47$, $p < .01$). This indicates that higher levels of negative affect are associated with greater cyber addiction and higher levels of concern about body image. Overall, these findings suggest that effective family functioning may act as a protective factor against behavioral and emotional problems among adolescents.

The structural model results, including standardized direct and indirect effects, are presented in Table 5.

Table 5

Direct and Indirect Effects in the Structural Model

Path	β	t	p	95% CI
Family → Cyber Addiction	-.37	11.77	< .001	[-.45, -.29]
Family → Body Image Concern	-.25	6.15	< .001	[-.33, -.17]
Family → Negative Affect	-.40	13.90	< .001	[-.48, -.32]
Negative Affect → Cyber Addiction	.30	9.57	< .001	[.24, .36]
Negative Affect → Body Image Concern	.45	12.51	< .001	[.38, .52]
Family → Cyber Addiction (Indirect via Negative Affect)	-.10	2.43	< .01	[-.16, -.04]
Family → Body Image Concern (Indirect via Negative Affect)	-.07	2.25	< .01	[-.13, -.02]

The structural model results revealed several statistically significant relationships. First, family characteristics had

significant negative direct effects on cyber addiction ($\beta = -.37$, $p < .001$) and body image concern ($\beta = -.25$, $p < .001$).

These findings indicate that healthier family functioning is associated with lower levels of problematic internet use and reduced body image dissatisfaction among female adolescents. Family characteristics also showed a strong negative effect on negative affect ($\beta = -.40$, $p < .001$), suggesting that better family environments are associated with lower emotional distress. In turn, negative affect exerted significant positive effects on both cyber addiction ($\beta = .30$, $p < .001$) and body image concern ($\beta = .45$, $p <$

$.001$), indicating that higher levels of emotional distress increase vulnerability to maladaptive online behaviors and appearance-related concerns. Bootstrapping results further demonstrated significant indirect effects of family characteristics on cyber addiction ($\beta = -.10$, $p < .01$) and body image concern ($\beta = -.07$, $p < .01$) through negative affect. Because both the direct and indirect paths remained statistically significant, the findings support a complementary partial mediation model.

Table 6

Model Fit and Predictive Indices

Indicator	Value
R ² (Negative Affect)	.29
R ² (Cyber Addiction)	.18
R ² (Body Image Concern)	.24
Q ² (Negative Affect)	.16
Q ² (Cyber Addiction)	.18
Q ² (Body Image Concern)	.21
SRMR	.07
NFI	.76

As presented in Table 6, the model explained 29% of the variance in negative affect, 18% in cyber addiction, and 24% in body image concern. According to SEM guidelines (Hair et al., 2022; Henseler et al., 2022; Kline, 2023), the SRMR value of .07 indicates acceptable model fit. Q² values above zero demonstrate predictive relevance of the model.

Although the NFI value was below the conventional .90 threshold, recent literature indicates that SRMR is considered a more appropriate goodness-of-fit index in variance-based SEM models.

Bootstrapped mediation effects are reported in Table 7.

Table 7

Bootstrapped Mediation Effects of Negative Affect

Indirect Path	β	t	p	Result
Family → Negative Affect → Cyber Addiction	-.10	2.43	< .01	Significant
Family → Negative Affect → Body Image Concern	-.07	2.25	< .01	Significant

As shown in Table 7, negative affect significantly mediated the relationship between family characteristics and cyber addiction as well as between family characteristics and body image concern. The significant indirect paths indicate the presence of mediation within the structural framework.

4. Discussion and Conclusion

The present study aimed to develop and test a structural model explaining the relationships among family characteristics, cyber addiction, and body image concern with the mediating role of negative affect among female

upper secondary school students. The findings supported the proposed conceptual model and demonstrated that family characteristics were significantly and negatively associated with cyber addiction, body image concern, and negative affect. In addition, negative affect was positively associated with both cyber addiction and body image concern and significantly mediated the relationships between family characteristics and the two outcome variables. Overall, the findings indicate that the family environment functions as an important protective context for adolescent girls, while negative affect operates as a psychological mechanism

through which weaker family functioning may increase vulnerability to maladaptive online behavior and appearance-related concerns. The model explained meaningful proportions of variance in negative affect, cyber addiction, and body image concern, suggesting that the integration of family and affective variables provides a useful framework for understanding adolescent adjustment in contemporary digital contexts.

The first major finding showed that family characteristics had a significant negative direct effect on cyber addiction. This result indicates that adolescents who reported healthier family functioning were less likely to show problematic patterns of cyberspace or internet use. This finding is consistent with developmental and ecological theories emphasizing that the family is the most immediate microsystem shaping adolescent behavior, emotional security, and coping patterns (Bronfenbrenner & Morris, 2006). From an attachment perspective, supportive and emotionally responsive family relationships help adolescents develop internal security, self-regulation, and adaptive coping, thereby reducing the tendency to rely on external compensatory behaviors such as excessive digital engagement (Allen & Tan, 2016). The finding also aligns with prior empirical evidence showing that family functioning, parental monitoring, emotional support, and family communication are associated with lower levels of problematic internet use among adolescents (Lam & Wong, 2020; Li et al., 2022). In families characterized by cohesion, warmth, and effective communication, adolescents may be more likely to experience psychological support and less likely to use online environments as a substitute source of belonging, emotional escape, or validation.

This result can also be interpreted within behavioral addiction frameworks. The I-PACE model explains addictive behaviors as the result of interactions among personal vulnerabilities, affective responses, cognitive biases, and impaired executive control (Brand et al., 2019). Accordingly, adolescents from less supportive family contexts may be more likely to experience distress, loneliness, or poor emotion regulation, which can increase their susceptibility to compulsive online engagement. The broader literature on problematic internet use has shown that cyber addiction is not merely a matter of high frequency of use, but is often associated with psychological distress, impaired functioning, and maladaptive coping patterns (Chen et al., 2023; Kuss & Lopez-Fernandez, 2016). Therefore, the negative association between family characteristics and cyber addiction in the present study

suggests that family functioning may reduce risk by strengthening emotional regulation, behavioral control, and interpersonal security. This interpretation is also consistent with research indicating that fear of missing out and negative emotional states are closely related to problematic technology use (Elhai et al., 2020).

The second major finding demonstrated that family characteristics had a significant negative direct effect on body image concern. In other words, healthier family environments were associated with lower levels of dissatisfaction, preoccupation, and concern regarding physical appearance among female adolescents. This result supports the biopsychosocial model of adolescent body image, which emphasizes that body image concerns emerge from interactions among biological development, psychological vulnerability, interpersonal experiences, and sociocultural pressures (Rodgers et al., 2020). During adolescence, girls experience intensified sensitivity to appearance evaluation, peer comparison, and social acceptance. In this context, family support, emotional responsiveness, and acceptance may protect adolescents against internalizing unrealistic appearance ideals. Conversely, family conflict, criticism, lack of emotional involvement, or insufficient support may increase vulnerability to body dissatisfaction by weakening self-worth and increasing dependence on external approval.

This finding is consistent with body image research showing that positive body image is not simply the absence of dissatisfaction but involves body appreciation, acceptance, and psychological resilience against unrealistic appearance standards (Tylka & Wood-Barcalow, 2015). Families that promote acceptance, emotional safety, and balanced attitudes toward the body may help adolescents develop more stable and less appearance-dependent self-perceptions. The result also aligns with evidence showing that social media and peer comparison are important predictors of body dissatisfaction, particularly when adolescents internalize idealized beauty standards and compare themselves with curated online images (Fardouly & Vartanian, 2022; Holland & Tiggemann, 2023; Sharma & Mehta, 2024). In this regard, healthy family functioning may serve as a protective factor by reducing adolescents' dependence on appearance-based validation and helping them critically interpret social and media-based appearance pressures.

The third major finding showed that family characteristics had a significant negative effect on negative affect. This means that adolescents who perceived their

family environment as healthier experienced lower levels of unpleasant emotional states such as sadness, anxiety, irritability, and distress. This finding is theoretically expected because family functioning is central to the development of emotional security and emotion regulation during adolescence. Supportive family environments provide adolescents with opportunities to express emotions, receive validation, and learn adaptive strategies for managing distress. By contrast, family environments marked by conflict, poor communication, or low cohesion may contribute to emotional dysregulation and sustained negative mood. This result aligns with previous findings showing that emotional distress mediates the relationship between family functioning and problematic internet use among adolescents (Li et al., 2022). It also supports the view that adolescent mental health in the digital age should be understood not only through technology exposure but also through the emotional and relational conditions in which such exposure occurs (Odgers & Jensen, 2020; Orben, 2020).

The fourth major finding indicated that negative affect had a significant positive effect on cyber addiction. Adolescents with higher levels of negative affect were more likely to report problematic cyberspace use. This finding supports affect-regulation explanations of cyber addiction, according to which adolescents may use online environments to reduce distress, distract themselves from unpleasant emotions, or obtain immediate social reassurance. Prior research has shown that negative affect is associated with problematic smartphone use, particularly when adolescents have difficulty regulating emotions (Li et al., 2023). Similarly, fear of missing out has been linked to problematic technology use because adolescents experiencing anxiety or social insecurity may engage in repeated checking and compulsive online behavior to reduce discomfort (Elhai et al., 2020). Therefore, the present finding suggests that negative affect is not merely a correlate of cyber addiction but may function as an emotional driver that increases adolescents' reliance on digital environments for short-term emotional relief.

The fifth major finding showed that negative affect had a significant positive effect on body image concern. This path was stronger than the path from negative affect to cyber addiction, suggesting that emotional distress may be particularly important in shaping adolescent girls' appearance-related concerns. Adolescents who experience higher negative affect may interpret their bodies more critically, become more sensitive to perceived flaws, and engage more frequently in upward social comparison. This

finding is consistent with systematic reviews indicating that social media contributes to body dissatisfaction, disordered eating symptoms, and appearance-related concerns among adolescents, especially when content emphasizes idealized bodies, appearance feedback, and comparison (Griffiths et al., 2022; Suhag & Rauniyar, 2024). Research on Instagram and young women's self-perception similarly suggests that exposure to idealized images and appearance-centered feedback can intensify dissatisfaction, particularly among those already experiencing emotional vulnerability (Sattarpanahi et al., 2024). Thus, negative affect may increase the psychological impact of appearance-related social media content and make adolescents more vulnerable to body image concern.

The findings also correspond with recent evidence showing that the effect of social media on body image is complex and depends on the type of content, the user's psychological state, and the cultural meaning of appearance. For example, body-positive social media content may improve body image perception by promoting acceptance and diversity (Jiménez-García et al., 2025), whereas aesthetic capital, microinfluencer culture, and digital appearance norms may reinforce pressure to meet idealized standards of attractiveness (Feijoo, 2025). Furthermore, recent daily diary evidence has suggested that objective screen time alone is not consistently associated with body image dissatisfaction, indicating that exposure quality, emotional interpretation, and individual vulnerability may be more important than duration of use (Goh et al., 2025). This interpretation is important for the present study because it suggests that adolescents' emotional state, particularly negative affect, may determine whether digital environments become psychologically harmful in relation to body image. Research across gender and cultural contexts has similarly shown that social media effects on body image vary depending on sociocultural expectations, gender norms, and patterns of comparison (Xu, 2025; Yousafzai & Fatima, 2025).

The mediation results further demonstrated that negative affect significantly mediated the relationships between family characteristics and both cyber addiction and body image concern. This finding indicates that family characteristics influence adolescent outcomes not only directly but also indirectly through emotional processes. More specifically, weaker family functioning may increase negative affect, which in turn may increase cyber addiction and body image concern. This result is consistent with the idea that emotional distress is a central pathway through

which family environments affect adolescent adjustment (Li et al., 2022). It also aligns with recent evidence suggesting that internet addiction is associated with mental health problems and body image difficulties, indicating that problematic digital behavior and appearance-related concerns may share common affective foundations (Rezvanian & Rahimzadeh, 2024). In this sense, negative affect can be considered a transdiagnostic emotional vulnerability that connects family functioning with both behavioral and self-perceptual problems.

From a methodological standpoint, the use of structural equation modeling strengthened the study by allowing simultaneous examination of direct and indirect pathways among family characteristics, negative affect, cyber addiction, and body image concern. The reported model indices indicated acceptable fit and predictive relevance, supporting the adequacy of the proposed structural framework. Methodological literature emphasizes that SEM is appropriate when researchers aim to examine complex theoretical models, mediation pathways, and relationships among latent constructs (Hair et al., 2022; Henseler et al., 2022; Kline, 2023). Therefore, the present findings contribute not only to the substantive literature on adolescent digital behavior and body image but also to model-based research by demonstrating that family and affective variables can be meaningfully integrated into a coherent explanatory structure.

Overall, the results of the present study suggest that adolescent girls' cyber addiction and body image concern should be understood as interconnected outcomes shaped by family context and emotional vulnerability. Healthy family characteristics appear to reduce these risks directly by providing support, structure, communication, and acceptance, and indirectly by reducing negative affect. Conversely, weaker family functioning may increase emotional distress, which may lead adolescents to seek compensation in digital environments and become more vulnerable to appearance-related comparison and dissatisfaction. These findings emphasize the need for integrated prevention and intervention approaches that address family relationships, emotional regulation, healthy digital media use, and positive body image development simultaneously.

The present study had several limitations. First, the cross-sectional design limits causal interpretation of the relationships among family characteristics, negative affect, cyber addiction, and body image concern. Although the proposed model was theoretically grounded and statistically

supported, longitudinal and experimental designs are needed to determine the directionality and developmental sequence of these associations. Second, the study relied on self-report questionnaires, which may be affected by response bias, social desirability, or adolescents' subjective interpretation of items. Third, the sample was limited to female upper secondary school students from one geographic context, which may restrict the generalizability of findings to male students, younger adolescents, non-school populations, or adolescents from different cultural and socioeconomic backgrounds.

Future research should examine the proposed model using longitudinal designs to clarify whether family characteristics predict changes in negative affect, cyber addiction, and body image concern over time. Future studies may also compare female and male adolescents to determine whether the strength of the structural pathways differs by gender. In addition, researchers should consider including other mediating or moderating variables such as emotion regulation, self-esteem, peer comparison, parental monitoring, social media literacy, fear of missing out, and type of online activity. Multi-informant methods involving parents, teachers, and behavioral indicators of digital media use would also strengthen the validity of future findings and reduce dependence on self-report data.

In terms of practice, the findings suggest that prevention and intervention programs for adolescent girls should not focus only on limiting digital media use. Schools, counselors, and family practitioners should work together to strengthen family communication, emotional support, problem-solving, and parental awareness of adolescents' online experiences. Programs that teach adolescents emotional regulation skills, critical interpretation of social media content, and strategies for resisting appearance-based comparison may help reduce both cyber addiction and body image concern. Family-based psychoeducation can also help parents create supportive home environments in which adolescents feel emotionally secure, accepted, and able to discuss distressing online or appearance-related experiences.

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 study and participated in the research with informed consent.

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