

Structural Relationships Between Perceived Parenting Styles and Propensity for Addiction Among Upper Secondary School Students: The Mediating Roles of Mental Toughness and Self-Efficacy

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ABSTRACT

Objective: This study aimed to examine the structural relationships between perceived parenting styles and propensity for addiction among upper secondary school students, with mental toughness and self-efficacy as mediating variables.

Methodology: This fundamental, descriptive-correlational study used structural equation modeling. The statistical population consisted of approximately 46,000 upper secondary school students in Qazvin County. Using multistage cluster random sampling, 260 students were selected from public and non-public schools; after excluding four incomplete or invariant-response questionnaires, data from 256 students were analyzed. Data were collected using the Grolnick Perceived Parenting Questionnaire, Iranian Addiction Potential Scale, Sherer General Self-Efficacy Scale, and 48-item Mental Toughness Questionnaire. Descriptive statistics, Pearson correlation coefficients, and structural equation modeling were performed using SPSS version 27 and AMOS version 30.

Findings: All dimensions of perceived parenting had significant negative direct effects on addiction propensity ($\beta = -0.33$ to -0.36 , $p < .001$) and significant positive direct effects on mental toughness ($\beta = 0.31$ to 0.37 , $p < .001$) and self-efficacy ($\beta = 0.30$ to 0.35 , $p < .001$). Mental toughness ($\beta = -0.36$, $p < .001$) and self-efficacy ($\beta = -0.34$, $p < .001$) significantly and negatively predicted addiction propensity. Bootstrap analysis showed significant negative indirect effects of all parenting dimensions through mental toughness ($\beta = -0.11$ to -0.13 , $p < .001$) and self-efficacy ($\beta = -0.10$ to -0.12 , $p < .001$). The model demonstrated good fit: $\chi^2/df = 2.219$, RMSEA = 0.047, CFI = 0.951, TLI = 0.938, and IFI = 0.952.

Conclusion: Supportive parenting characterized by involvement, autonomy support, and warmth may reduce students' propensity for addiction both directly and indirectly by strengthening mental toughness and self-efficacy.

Keywords: Perceived parenting styles, addiction propensity, mental toughness, self-efficacy, adolescents, structural equation modeling

1. Introduction

Adolescence is a critical developmental period characterized by rapid biological maturation, expanding social roles, increasing autonomy, heightened sensitivity to peer influence, and substantial changes in emotional and cognitive regulation. These transitions create opportunities for growth, but they may also increase vulnerability to risky behaviors, including substance use. Substance abuse among adolescents has become an increasingly important public health and psychosocial concern because experimentation during this period can develop into persistent patterns of misuse, dependence, educational failure, family conflict, psychiatric comorbidity, and long-term impairment in social functioning (Bogdanovic et al., 2025; Jayaswal & Singh, 2025). Evidence from broad reviews of adolescent risk behavior indicates that substance use often co-occurs with other high-risk behaviors and is shaped by interacting personal, family, peer, school, and community factors (Chukwu et al., 2024). Recent epidemiological work has further demonstrated that drug-related mortality and behavioral disorders may vary across ethnic and cultural subgroups, emphasizing the importance of examining addiction risk within specific social and cultural contexts rather than treating adolescents as a homogeneous population (Zhu et al., 2025).

Addiction is not merely the result of exposure to a psychoactive substance. It is a multidimensional condition involving biological vulnerability, reinforcement processes, emotional dysregulation, maladaptive cognition, interpersonal difficulties, and environmental stressors. Neurobiological research has shown that repeated substance use can alter reward processing, inhibitory control, motivation, and stress-response systems, thereby increasing craving and reducing the ability to regulate behavior (Fang et al., 2022). Psychodynamic perspectives similarly emphasize that substance use may function as an attempt to regulate painful affect, manage inner conflict, compensate for relational insecurity, or avoid psychological distress (Costanzo et al., 2023). Moreover, addiction-related behavior is not limited to the consumption of alcohol or drugs; contemporary clinical and forensic literature also recognizes behavioral addictions that involve compulsive engagement without direct substance ingestion (Calderaro et al., 2025). Nevertheless, among school-aged adolescents, susceptibility to substance use remains a particularly serious concern because early onset is associated with stronger

reinforcement patterns and more difficult treatment trajectories.

The concept of propensity for addiction is especially useful in preventive research because it focuses on the psychological and behavioral readiness that may precede actual substance dependence. Addiction propensity refers to a constellation of attitudes, emotional tendencies, impaired self-regulation, risk-taking characteristics, and behavioral inclinations that increase the probability of future substance use. This construct permits identification of at-risk students before the development of a clinically established disorder. Early detection is important because treatment for substance-use disorders is often prolonged, discontinuous, and vulnerable to relapse. Long-term treatment studies have shown that individuals with opioid-use disorders may experience complex patterns of repeated treatment entry, interruption, and re-engagement over many years (Wilson et al., 2023). Research on relapse has likewise emphasized that recovery depends not only on abstinence-oriented interventions but also on psychological resources such as perceived support, self-efficacy, and quality of life (Jia et al., 2023). Laboratory and toxicological methods can identify patterns of drug consumption after use has occurred (Dali Braham et al., 2024), but school-based psychological screening may offer an earlier opportunity to identify vulnerability and strengthen protective factors before substance consumption becomes established.

The family is among the most influential developmental environments shaping adolescent behavior. Parenting practices affect emotional security, behavioral control, self-regulation, peer selection, academic adjustment, coping strategies, and attitudes toward risk. Parenting style generally refers to relatively stable patterns of parental warmth, involvement, control, responsiveness, and support for autonomy. Adolescents do not respond only to objective parental behavior; their perceptions of parental conduct may be equally or even more relevant because perceived parenting determines how parental messages are interpreted and internalized. Studies of school-going adolescents have shown that parenting styles are associated with multiple domains of adolescent adjustment, including mental health, emotional competence, stress, and behavioral functioning (Chikkapapanna & Moncy, 2024; Kalhor et al., 2024; Kandhari & Sharma, 2024). Perceived supportive parenting may foster security and adaptive regulation, whereas harsh, inconsistent, neglectful, or psychologically controlling parenting may increase emotional distress and maladaptive coping.

Parental warmth is one of the most consistently protective dimensions of parenting. Warm parenting communicates acceptance, affection, emotional availability, and responsiveness to the adolescent's needs. A recent meta-analysis demonstrated that parental warmth is generally associated with lower substance use among offspring, although the magnitude of the association may vary according to developmental stage, substance type, and measurement method (Pinquart & Gochaliyev, 2025). Warmth may reduce addiction propensity by strengthening attachment security, encouraging disclosure, lowering emotional distress, and increasing the adolescent's willingness to accept parental guidance. Conversely, emotionally distant or rejecting parenting may contribute to loneliness, anger, low self-worth, and affiliation with deviant peers. Research linking parenting, attachment patterns, parental addiction, and child abuse also suggests that dysfunctional family environments can accumulate multiple risks that undermine healthy development (Bahmani et al., 2023).

Parental involvement is another central dimension. Involved parents are attentive to their children's activities, provide guidance, participate in educational and daily life, and maintain awareness of peer relationships and behavioral changes. This involvement overlaps with, but is not identical to, parental monitoring. Contemporary conceptual analyses define parental monitoring as a multifaceted process involving parental knowledge, solicitation of information, behavioral supervision, rule-setting, and adolescent disclosure (Pelham et al., 2024). Longitudinal and causal research has suggested that higher parental knowledge and monitoring may be associated with reduced adolescent substance use, although the direction of influence can be reciprocal because adolescent behavior also affects parental supervision and disclosure (Pelham et al., 2023). Accordingly, constructive involvement is most effective when it is combined with warmth and communication rather than coercive surveillance.

Support for autonomy represents a further protective parenting dimension. Autonomy-supportive parents recognize the adolescent's perspective, provide meaningful choices, explain expectations, and encourage independent problem solving while maintaining appropriate boundaries. Such parenting may facilitate internalization of values and development of self-regulation. In contrast, excessive psychological control can weaken decision-making competence and increase secrecy or oppositional behavior. Parenting research has shown that parenting styles are

related not only to substance-related outcomes but also to adolescent depression, anxiety, stress, perfectionism, behavioral problems, and academic responsibility (Gupta et al., 2023; Houshang Shayan & Salarifar, 2023; Zheng, 2023). These findings indicate that parenting affects broad psychological processes that may, in turn, shape vulnerability to addiction.

The relationship between parenting and addiction risk has also been documented directly. A systematic review and meta-analysis conducted in Iran found meaningful associations between parenting styles and tendency toward addiction, confirming the importance of family processes in the Iranian sociocultural context (Fatemisough et al., 2024). Similarly, research among students has shown that parenting styles and cognitive emotion-regulation strategies can jointly predict addiction tendency (Torkamani et al., 2022). International research has also demonstrated that parenting styles are related to adolescent identification with drug-abusing behavior and that social support may mediate this association (Liu et al., 2022). Beyond substance use, parenting styles have been linked to internet and online gambling addiction, suggesting that family processes influence a broader tendency toward compulsive and poorly regulated behavior (Serna et al., 2023). Parent-child communication has likewise been associated with smartphone addiction through psychological mechanisms such as covert narcissism and peer attachment (Jeong & Cho, 2023). Taken together, these studies indicate that perceived parenting may influence addiction propensity both directly and through intermediate psychological resources.

Mental toughness may be one such resource. Mental toughness refers to a relatively stable but developable capacity to remain committed, confident, controlled, and adaptive under pressure. It commonly includes challenge, commitment, emotional control, life control, confidence in one's abilities, and interpersonal confidence. Adolescents with greater mental toughness may interpret stressors as manageable challenges, maintain goal-directed behavior despite setbacks, regulate emotional reactions, and resist immediate rewards that conflict with longer-term aims. These characteristics are highly relevant to addiction prevention because substance use may emerge as a maladaptive response to stress, emotional discomfort, social pressure, or perceived helplessness.

Evidence indicates that mental toughness is connected to both parenting and addictive behaviors. A study of adolescent athletes found that parenting style was associated with mental-illness stigma through a chain involving self-

esteem and mental toughness, highlighting the role of family relationships in the development of resilience-related psychological capacities (Xiang et al., 2024). Research on emotional regulation and cognitive reappraisal also supports the view that psychological control, adaptive appraisal, and emotional competence contribute to performance and well-being under demanding conditions (Li et al., 2024). Conversely, problematic behavioral patterns may be associated with reduced mental toughness; for example, game addiction among e-sport players has been examined in relation to physical discomfort and mental toughness (Kendal et al., 2022). Although such findings do not directly establish the role of mental toughness in adolescent substance-use propensity, they suggest that the construct may operate as a protective mechanism across different forms of potentially addictive behavior.

Self-efficacy is another plausible mediator between parenting and addiction propensity. Self-efficacy refers to individuals' beliefs in their ability to organize and execute actions required to manage challenges and achieve desired outcomes. Adolescents with high self-efficacy are more likely to persist, initiate adaptive coping, regulate impulses, resist peer pressure, and recover from failure. Low self-efficacy, by contrast, may increase avoidance, passivity, dependence on external reinforcement, and susceptibility to maladaptive coping behaviors. Studies across health contexts consistently show that self-efficacy is associated with healthier behavior, better psychological adjustment, and greater well-being (Alves et al., 2024; Zhang & Meng, 2023). Although some evidence comes from medical and university populations, the underlying mechanism is developmentally relevant: individuals who believe they can manage difficult situations are less likely to rely on harmful external strategies for relief.

Within addiction research, self-efficacy is frequently treated as a central mechanism of behavior change. Reviews of substance-use disorders have emphasized that self-efficacy is related to abstinence confidence, coping with high-risk situations, treatment engagement, and relapse prevention (Xu, 2023). Mindfulness-based relapse-prevention research has also identified self-efficacy as a potential mechanism through which interventions reduce harmful substance-use behavior (Moniz-Lewis et al., 2022). Likewise, the association between social support and relapse tendency has been shown to operate partly through exercise self-efficacy and health-related quality of life (Jia et al., 2023). These findings imply that self-efficacy may reduce addiction propensity by strengthening adolescents'

confidence in resisting peer pressure, managing distress, and sustaining goal-directed conduct.

Parenting may contribute directly to the formation of self-efficacy. Warm and involved parents provide encouragement, model effective coping, acknowledge competence, offer opportunities for mastery, and help adolescents interpret failure as temporary and manageable. Autonomy support allows adolescents to practice decision-making and experience personal agency. In contrast, intrusive, rejecting, or inconsistent parenting may communicate incompetence and undermine confidence. Research on perceived parenting, stress, and emotional competence supports the idea that parenting quality is connected to young people's internal psychological resources (Kandhari & Sharma, 2024). Similarly, studies of academic responsibility and parenting suggest that parental styles may influence students' beliefs about their ability to manage obligations and achieve outcomes (Houshang Shayan & Salarifar, 2023). Thus, self-efficacy may serve as a mechanism through which supportive parenting reduces addiction risk.

Mental toughness and self-efficacy are conceptually related but distinct. Self-efficacy concerns belief in one's capacity to perform effectively, whereas mental toughness encompasses a broader pattern of persistence, control, confidence, and response to challenge. A student may believe that a task can be completed but still struggle to regulate emotion under pressure; conversely, a mentally tough student may persist despite uncertainty about specific competence. Examining both constructs simultaneously can therefore provide a more complete account of how parenting becomes translated into lower addiction propensity. Supportive parenting may help adolescents develop confidence in their abilities while also cultivating emotional control, commitment, and resilience in stressful situations.

The relevance of these psychological mechanisms is especially pronounced in upper secondary school. Students at this level face academic competition, identity development, peer evaluation, future-career decisions, and increased exposure to social environments outside direct parental supervision. Diet, sleep, health behavior, and substance use are also interconnected during childhood and adolescence, indicating that risk behavior develops within a broader lifestyle pattern rather than in isolation (Seo, 2024). Severe psychiatric presentations can further complicate adolescent functioning and may coexist with substance-related vulnerability, underlining the importance of careful assessment and early psychological intervention in this age

group (Bolat et al., 2025). At the same time, stigma may prevent adolescents and families from seeking timely help for psychological or behavioral problems, as demonstrated in Iranian research on barriers to prevention and mental-health intervention (Masoomi et al., 2023).

Accordingly, the aim of the present study was to examine the structural relationships between perceived parenting styles and propensity for addiction among upper secondary school students, with mental toughness and self-efficacy tested as mediating variables.

2. Methods and Materials

2.1. Study Design and Participants

The present study was fundamental in purpose and employed a descriptive-correlational research design. More specifically, the hypothesized relationships among perceived parenting styles, mental toughness, self-efficacy, and propensity for addiction were investigated through structural equation modeling. In the proposed structural model, perceived parenting styles were considered the principal predictor variable, propensity for addiction was treated as the outcome variable, and mental toughness and self-efficacy were examined as mediating variables. This design was selected because it enabled the simultaneous examination of multiple direct and indirect relationships among the study variables without experimentally manipulating the participants' conditions.

The statistical population consisted of all male and female upper secondary school students studying in Qazvin County during the study period. According to information obtained from the Qazvin County Department of Education, this population included approximately 46,000 students. The sample size was determined according to recommendations for structural equation modeling. Based on the guideline that the sample should include approximately 15 to 30 participants for each observed variable, provided that the total sample is not fewer than 200 participants, a coefficient of 20 participants per observed variable was adopted (Hooman, 2014). The hypothesized model contained 13 observed variables, comprising six dimensions of perceived parenting styles, three observed indicators of self-efficacy, and four dimensions of mental toughness. Accordingly, the required sample size was estimated to be 260 students.

Participants were selected using a multistage cluster random sampling procedure. In the first stage, the sampling process was conducted across Educational Districts 1 and 2 of Qazvin County. In the subsequent stage, three public

schools and one non-public school were randomly selected from the eligible upper secondary schools. Three classes were then randomly selected from each school, with one class chosen from each upper secondary grade level. The selected classes were drawn from the humanities track. All students enrolled in the selected classes were invited to participate and complete the research questionnaires. This procedure ensured the inclusion of students from different upper secondary grade levels as well as public and non-public educational settings.

A total of 260 questionnaires were initially administered. After the returned questionnaires had been reviewed, four were excluded because of substantial missing responses or invariant response patterns, such as selecting the same response option for all questionnaire items. Therefore, the final statistical analyses were conducted using data obtained from 256 students. Participation was voluntary, and students were informed that they could decline participation or discontinue completing the questionnaires without any adverse educational consequences.

Data were collected through both library-based and field procedures. The library-based component involved reviewing relevant books, journal articles, theses, dissertations, and credible academic resources to develop the theoretical framework and examine previous findings related to parenting styles, addiction tendency, mental toughness, and self-efficacy. The field component involved administering the questionnaires directly to the selected students. Before the fieldwork began, ethical approval was obtained under the code IR.IAU.TON.REC.1403.158. Formal coordination was subsequently undertaken with the Qazvin Province Department of Education, and the necessary correspondence and administrative arrangements were completed to conduct the study in upper secondary schools.

Following coordination with school administrators, the conditions of eligible students and the appropriate times for questionnaire administration were determined. The researcher then met with the selected students and explained the general objectives, research procedures, importance of the study, voluntary nature of participation, and manner in which the collected information would be used. Written informed consent was obtained before questionnaire administration. The students were assured that their personal information and responses would remain confidential and that the findings would be reported only in aggregated form. The researcher also answered students' questions before and during questionnaire completion. The questionnaires

assessing perceived parenting styles, propensity for addiction, self-efficacy, and mental toughness were then distributed. Students were instructed to read each statement carefully, select the response that most accurately represented their experiences or beliefs, and request clarification whenever an item appeared unclear.

2.2. Measures

Perceived Parenting Questionnaire. Perceived parenting styles were assessed using the Perceived Parenting Questionnaire developed by Grolnick et al. (1997). The original instrument contains 42 items, of which 21 assess students' perceptions of their mothers' parenting behaviors and 21 assess their perceptions of their fathers' parenting behaviors. The questionnaire measures six dimensions comprising maternal involvement, maternal autonomy support, maternal warmth, paternal involvement, paternal autonomy support, and paternal warmth. Responses are recorded on a seven-point Likert scale ranging from 1 to 7, with higher scores indicating a higher perceived level of the corresponding parenting behavior. Evidence supporting the validity of the original questionnaire was provided by correlations between the overall perceived parenting construct and maternal involvement, maternal autonomy support, maternal warmth, paternal involvement, paternal autonomy support, and paternal warmth. The reported coefficients for these dimensions were .61, .64, .58, .54, .69, and .70, respectively, demonstrating satisfactory convergent validity. In the Persian adaptation, Cronbach's alpha coefficients for maternal involvement, maternal autonomy support, maternal warmth, paternal involvement, paternal autonomy support, and paternal warmth were reported as .87, .93, .82, .88, .84, and .93, respectively, while the reliability coefficient for the total questionnaire was .83. Exploratory factor analysis with varimax rotation indicated that 40 items were consistent with the original factor structure and loaded on the six intended factors, with factor loadings exceeding .41 (Miri et al., 2012). Houshang Shayan and Salarifar (2023) also reported Cronbach's alpha coefficients of .89, .83, .90, .91, .74, and .85 for the six dimensions and .90 for the total questionnaire. Furthermore, investigations conducted on large samples of adolescents supported the six-factor structure through both exploratory and confirmatory factor analyses. In another study, the internal consistency of the questionnaire was reported as .79, indicating acceptable reliability for research use among adolescent populations.

Iranian Addiction Potential Scale. Propensity for addiction was measured using the Iranian Addiction Potential Scale developed by Zargar. This instrument is designed to assess psychological and behavioral susceptibility to substance use and contains 36 items distributed across three dimensions: tendency toward substance use, self-control, and risk-taking. Each dimension contains 12 items. Responses are scored using a five-point Likert scale ranging from completely disagree, scored as 1, to completely agree, scored as 5. Scores are calculated separately for each subscale and may also be combined to obtain a total propensity-for-addiction score. The possible score for each subscale ranges from 12 to 60, while the total questionnaire score ranges from 36 to 180. Higher scores indicate a greater propensity for addiction and a higher level of psychological or behavioral vulnerability to substance use. The instrument has demonstrated satisfactory construct validity and reliability in previous studies. The test-retest reliability coefficient for the total scale has been reported as .88. Cronbach's alpha coefficients for the tendency toward substance use, self-control, and risk-taking dimensions have been reported as .85, .83, and .79, respectively. These coefficients indicate adequate temporal stability and internal consistency for assessing addiction propensity in research populations. Items related to self-control were scored according to the scoring key of the instrument so that the direction of the calculated scores remained consistent with the interpretation of the total addiction-propensity construct.

Sherer General Self-Efficacy Scale. Self-efficacy was evaluated using the Sherer General Self-Efficacy Scale, a widely used instrument developed to measure individuals' generalized beliefs about their ability to manage difficult situations, initiate and sustain goal-directed behavior, and cope effectively with everyday challenges. The scale contains 17 items rated on a five-point Likert scale. For positively worded items, responses range from completely disagree, scored as 1, to completely agree, scored as 5. Negatively worded items are reverse-scored, such that completely disagree receives a score of 5 and completely agree receives a score of 1. The item scores are summed to calculate the overall self-efficacy score. Total scores can range from 17 to 85, with higher scores reflecting stronger generalized self-efficacy beliefs and greater confidence in one's ability to cope with obstacles and complete intended tasks. Previous psychometric investigations have supported the content and construct validity of the instrument. An internal consistency coefficient of .85 and a split-half reliability coefficient of .79 have been reported for the total

scale, indicating satisfactory reliability (Mehr, 2020). In another psychometric investigation, a Cronbach's alpha coefficient of .93 was reported for a German-language version of a general self-efficacy measure, providing further evidence of the strong internal consistency of this construct's measurement (Freund, 2013).

Mental Toughness Questionnaire. Mental toughness was measured using the 48-item Mental Toughness Questionnaire developed by Clough et al. (2002). The MTQ-48 assesses four principal dimensions of mental toughness: challenge, commitment, control, and confidence. The challenge dimension reflects the extent to which individuals perceive difficulties, changes, and demanding situations as opportunities for development rather than as threats. Commitment represents persistence, goal orientation, and the capacity to continue working toward objectives despite obstacles. Control includes the two facets of life control and emotional control, reflecting perceived influence over personal circumstances and the ability to regulate emotional reactions. Confidence includes self-confidence and interpersonal confidence, indicating belief in one's abilities and confidence in social interactions. Items are answered on a five-point Likert scale ranging from completely disagree, scored as 1, to completely agree, scored as 5. The possible total score ranges from 48 to 240, with higher scores indicating greater mental toughness. The instrument's construct validity has been supported in previous studies, and the overall test-retest reliability coefficient has been reported as .90 (Clough et al., 2002). Cronbach's alpha coefficients of .77 for challenge, .80 for commitment, .78 for emotional control, .81 for life control, .81 for self-confidence, and .81 for interpersonal confidence have also been reported, demonstrating satisfactory internal consistency across the dimensions (Pourak & Mousavi, 2014). The psychometric properties of the questionnaire and its underlying factors were further examined in a large sample of 8,207 participants, with both exploratory and confirmatory factor analyses providing acceptable support for its multidimensional structure (Perry et al., 2012). In a study conducted by Pourfahimi et al. (2024) on a sample of 260 participants, the Cronbach's alpha coefficient for the questionnaire was calculated as .79, confirming its acceptable reliability for use in the target population.

2.3. Data Analysis

The collected data were analyzed using descriptive and inferential statistical procedures. Before conducting the

principal analyses, the questionnaires were screened for incomplete data, invariant response patterns, and other response irregularities. Descriptive statistics were then calculated to summarize the characteristics and distributions of the research variables. Measures of central tendency, including the mean and median, and a measure of dispersion, namely the standard deviation, were calculated for perceived parenting styles, propensity for addiction, self-efficacy, mental toughness, and their respective dimensions.

The normality of the distributions was initially examined using the Kolmogorov-Smirnov test. The data were also reviewed to determine their suitability for structural equation modeling. The hypothesized structural relationships among perceived parenting styles, mental toughness, self-efficacy, and propensity for addiction were subsequently evaluated through structural equation modeling. Within this analytical framework, the direct association between perceived parenting styles and propensity for addiction was estimated simultaneously with the indirect relationships transmitted through mental toughness and self-efficacy. The measurement and structural components of the proposed model were evaluated to determine whether the empirical data adequately represented the hypothesized relationships among the latent and observed variables.

IBM SPSS Statistics version 27 was used for data screening, descriptive analyses, and preliminary statistical examinations. IBM SPSS AMOS version 30 was used to estimate the structural equation model, evaluate the relationships among the study variables, and examine the mediating roles of mental toughness and self-efficacy in the relationship between perceived parenting styles and propensity for addiction.

3. Findings and Results

The final sample consisted of 256 upper secondary school students. Of these, 168 students (65.63%) attended public schools, including 89 boys (34.77% of the total sample) and 79 girls (30.86%), whereas 88 students (34.38%) attended non-public schools, including 52 boys (20.31%) and 36 girls (14.06%). Regarding age, 20 students (7.81%) were 15 years old, 98 (38.28%) were 16 years old, 98 (38.28%) were 17 years old, 34 (13.28%) were 18 years old, and 6 (2.34%) were 19 years old. Thus, the largest age groups were the 16- and 17-year-old students. In public schools, 57 students (22.27%) were in Grade 10, 53 (20.70%) were in Grade 11, and 58 (22.66%) were in Grade 12. In non-public schools, 29 students (11.33%) were in Grade 10, 28 (10.94%) were

in Grade 11, and 31 (12.11%) were in Grade 12. Overall, the sample included students from all three upper secondary

grade levels, although most participants attended public schools.

Table 1

Descriptive Statistics for the Study Variables

Construct	Dimension	Mean	Standard deviation	Minimum	Maximum
Perceived parenting	Maternal autonomy support	31.36	6.53	8	48
Perceived parenting	Maternal involvement	32.76	6.51	11	49
Perceived parenting	Maternal warmth	34.30	6.50	13	49
Perceived parenting	Paternal autonomy support	32.13	6.60	7	47
Perceived parenting	Paternal involvement	31.43	6.69	7	48
Perceived parenting	Paternal warmth	32.90	6.64	9	49
Mental toughness	Challenge	28.52	6.881	11	40
Mental toughness	Commitment	39.29	9.552	14	55
Mental toughness	Emotional control	24.26	6.209	8	35
Mental toughness	Life control	24.87	6.062	9	35
Mental toughness	Confidence in abilities	32.89	7.721	13	45
Mental toughness	Interpersonal confidence	21.35	5.203	8	30
Mental toughness	Total mental toughness	171.18	41.460	66	240
Self-efficacy	Initiative	21.17	5.260	6	30
Self-efficacy	Effort	17.71	4.432	5	25
Self-efficacy	Persistence	21.22	5.277	6	30
Self-efficacy	Total self-efficacy	60.10	14.904	17	85
Addiction propensity	Active propensity	34.34	22.330	0	81
Addiction propensity	Passive propensity	10.61	7.413	0	27
Addiction propensity	Total addiction propensity	44.95	29.707	0	108

As shown in Table 1, maternal warmth had the highest mean among the maternal parenting dimensions, with a mean of 34.30 and a standard deviation of 6.50, followed by maternal involvement and maternal autonomy support. Among the paternal dimensions, paternal warmth also had the highest mean, with a mean of 32.90 and a standard deviation of 6.64. The total mental toughness score was 171.18 ± 41.46 , with observed scores ranging from 66 to 240. Among its dimensions, commitment had the highest raw mean, whereas interpersonal confidence had the lowest; however, these raw means should be interpreted in relation to the different numbers of items included in each dimension. The mean total self-efficacy score was 60.10 ± 14.90 , and the initiative and persistence dimensions had similar mean values. The mean total addiction-propensity score was 44.95 ± 29.71 , with active and passive propensity means of 34.34 and 10.61, respectively. The relatively wide observed ranges and standard deviations, particularly for mental toughness and addiction propensity, indicated adequate variability in the participants' psychological and behavioral characteristics for the subsequent correlational and structural analyses.

Before testing the structural model, the assumptions underlying parametric analyses and structural equation

modeling were examined. The Kolmogorov–Smirnov tests were nonsignificant for all study variables, with reported significance levels of .200, indicating that the null hypothesis of normal distribution was not rejected. The skewness values ranged approximately from -0.282 to 0.421 , and the kurtosis values ranged from -0.763 to -0.280 , all of which were within the acceptable limits of ± 2 for skewness and ± 3 for kurtosis. The histogram of standardized residuals was approximately symmetrical and bell-shaped around zero, with a residual mean of approximately 0.02 and a standard deviation of 0.663. Visual examination of the scatterplots also indicated approximately linear relationships among perceived parenting, mental toughness, self-efficacy, and addiction propensity. The tolerance values ranged from 0.532 to 0.662 and were greater than the minimum acceptable value of 0.30, while the variance inflation factor values ranged from 1.743 to 1.806 and were substantially below 3. These results indicated that problematic multicollinearity was absent. The Durbin–Watson statistic was 1.977, which fell within the acceptable range of 1.50 to 2.50 and supported the independence of residuals. The Kaiser–Meyer–Olkin values for the study constructs and their dimensions were all greater than 0.60, supporting sample adequacy for factor analysis. Moreover, the

standardized confirmatory factor loadings ranged from 0.736 to 0.876 and were statistically significant at $p < .001$. Collectively, these results supported normality, linearity,

absence of severe multicollinearity, independence of errors, sample adequacy, and the suitability of the measurement indicators for structural equation modeling.

Table 2

Pearson Correlations Between Addiction Propensity and the Study Variables

Variable	Correlation with total addiction propensity, r	p
Maternal autonomy support	-0.612	< .001
Maternal involvement	-0.605	< .001
Maternal warmth	-0.598	< .001
Paternal autonomy support	-0.609	< .001
Paternal involvement	-0.602	< .001
Paternal warmth	-0.596	< .001
Challenge	-0.574	< .001
Commitment	-0.568	< .001
Emotional control	-0.582	< .001
Life control	-0.577	< .001
Confidence in abilities	-0.561	< .001
Interpersonal confidence	-0.553	< .001
Total mental toughness	-0.570	< .001
Initiative	-0.565	< .001
Effort	-0.559	< .001
Persistence	-0.571	< .001
Total self-efficacy	-0.562	< .001
Active addiction propensity	0.991	< .001

The results in Table 2 indicated that all dimensions of perceived parenting were significantly and negatively correlated with total addiction propensity. The strongest parenting-related correlation was observed for maternal autonomy support, $r = -.612$, followed by paternal autonomy support, $r = -.609$, maternal involvement, $r = -.605$, and paternal involvement, $r = -.602$. Maternal and paternal warmth were also negatively associated with addiction propensity, with coefficients of $-.598$ and $-.596$, respectively. All mental toughness dimensions demonstrated significant negative relationships with addiction propensity, with coefficients ranging from $-.553$ for interpersonal confidence to $-.582$ for emotional control. Total mental toughness was negatively correlated with addiction propensity, $r = -.570$, $p < .001$. Similarly, the self-efficacy dimensions of initiative, effort, and persistence were

negatively associated with addiction propensity, and total self-efficacy demonstrated a significant negative correlation of $r = -.562$, $p < .001$. These findings indicated that more favorable perceptions of parenting, greater mental toughness, and stronger self-efficacy were associated with lower addiction propensity. The very high positive correlation between active propensity and total addiction propensity, $r = .991$, was expected because the active-propensity score constitutes a major component of the total addiction-propensity score and should not be interpreted as a relationship between independent constructs.

The proposed structural model was estimated in AMOS version 30 using maximum likelihood estimation. Before interpreting the structural coefficients, the overall fit of the hypothesized model was evaluated using absolute, incremental, and parsimonious fit indices.

Table 3

Goodness-of-Fit Indices for the Final Structural Model

Fit index	Obtained value	Recommended criterion	Interpretation
Chi-square/df	2.219	< 3.00	Acceptable
RMSEA	0.047	< 0.05	Excellent
PNFI	0.734	> 0.50	Acceptable
GFI	0.892	> 0.80 acceptable; > 0.90 excellent	Acceptable
AGFI	0.905	> 0.80 acceptable; > 0.90 excellent	Excellent

NFI	0.914	> 0.90	Good
TLI	0.938	> 0.90	Good
CFI	0.951	> 0.90	Excellent
RFI	0.902	> 0.90	Good
IFI	0.952	> 0.90	Excellent

As presented in Table 3, the chi-square-to-degrees-of-freedom ratio was 2.219, which was below the recommended maximum of 3.00 and indicated an acceptable correspondence between the hypothesized model and the observed data. The RMSEA value was 0.047, demonstrating a close fit of the model. The PNFI value of 0.734 indicated that the model maintained acceptable fit after accounting for model complexity. The GFI value was 0.892 and therefore

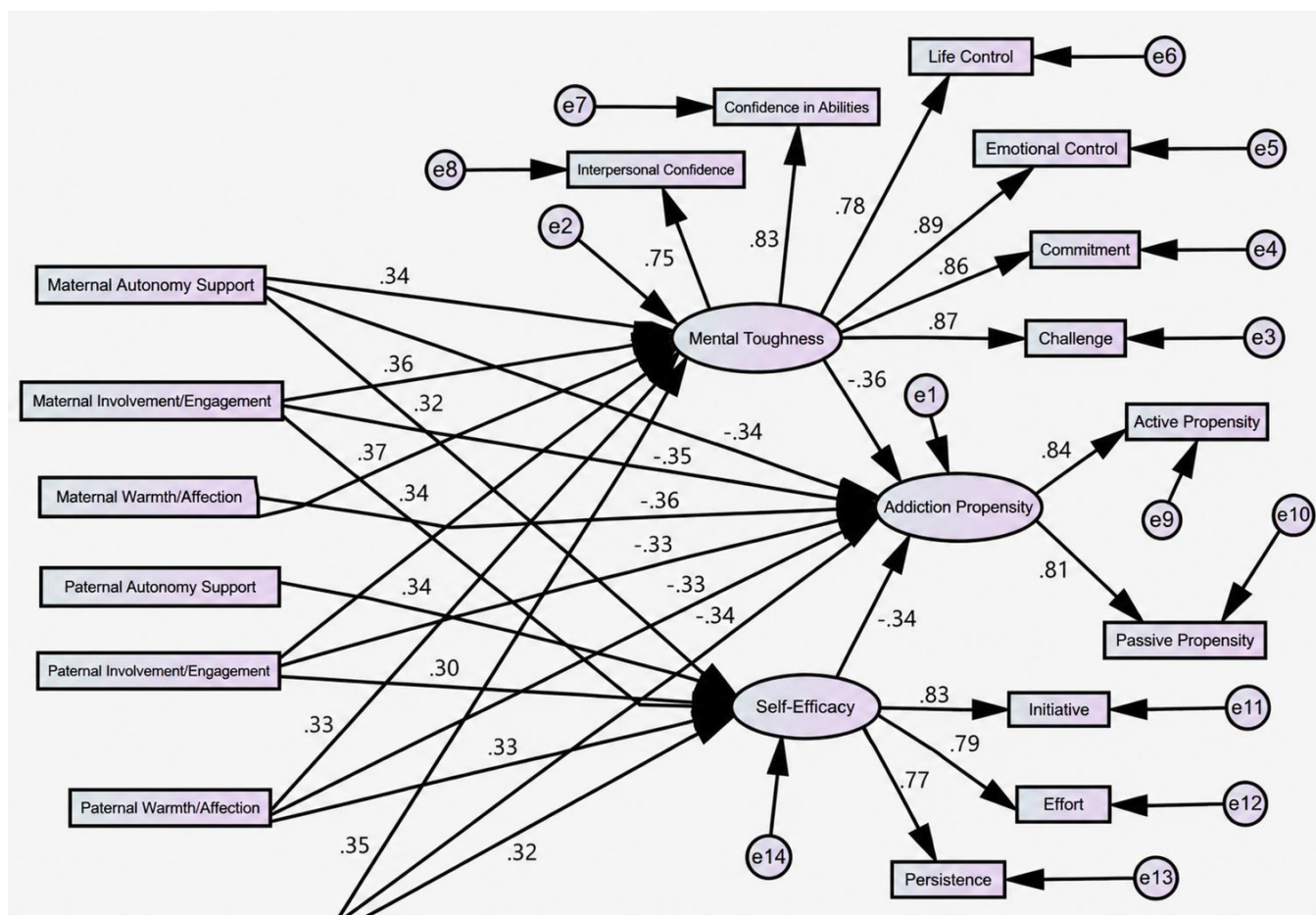
fell within the acceptable range, while the AGFI value of 0.905 exceeded the criterion for good fit. The incremental fit indices were also satisfactory, including NFI = 0.914, TLI = 0.938, CFI = 0.951, RFI = 0.902, and IFI = 0.952. Thus, the proposed structural model involving perceived parenting dimensions, mental toughness, self-efficacy, and addiction propensity demonstrated an overall good fit to the empirical data.

Table 4

Standardized Direct and Indirect Effects in the Structural Model

Effect type	Structural path	Standardized β	Critical ratio	p	Result
Direct	Maternal involvement $\rightarrow$ Mental toughness	0.36	6.80	< .001	Supported
Direct	Paternal involvement $\rightarrow$ Mental toughness	0.33	6.15	< .001	Supported
Direct	Maternal autonomy support $\rightarrow$ Mental toughness	0.34	5.95	< .001	Supported
Direct	Paternal autonomy support $\rightarrow$ Mental toughness	0.31	5.41	< .001	Supported
Direct	Maternal warmth $\rightarrow$ Mental toughness	0.37	7.10	< .001	Supported
Direct	Paternal warmth $\rightarrow$ Mental toughness	0.35	6.44	< .001	Supported
Direct	Maternal involvement $\rightarrow$ Self-efficacy	0.35	6.51	< .001	Supported
Direct	Paternal involvement $\rightarrow$ Self-efficacy	0.33	6.07	< .001	Supported
Direct	Maternal autonomy support $\rightarrow$ Self-efficacy	0.32	5.63	< .001	Supported
Direct	Paternal autonomy support $\rightarrow$ Self-efficacy	0.30	5.11	< .001	Supported
Direct	Maternal warmth $\rightarrow$ Self-efficacy	0.34	6.01	< .001	Supported
Direct	Paternal warmth $\rightarrow$ Self-efficacy	0.32	5.72	< .001	Supported
Direct	Mental toughness $\rightarrow$ Addiction propensity	-0.36	-7.05	< .001	Supported
Direct	Self-efficacy $\rightarrow$ Addiction propensity	-0.34	-6.50	< .001	Supported
Direct	Maternal involvement $\rightarrow$ Addiction propensity	-0.35	-3.58	< .001	Supported
Direct	Paternal involvement $\rightarrow$ Addiction propensity	-0.33	-3.02	< .001	Supported
Direct	Maternal autonomy support $\rightarrow$ Addiction propensity	-0.34	-2.98	< .001	Supported
Direct	Paternal autonomy support $\rightarrow$ Addiction propensity	-0.33	-2.76	< .001	Supported
Direct	Maternal warmth $\rightarrow$ Addiction propensity	-0.36	-3.12	< .001	Supported
Direct	Paternal warmth $\rightarrow$ Addiction propensity	-0.34	-2.99	< .001	Supported

Indirect through mental toughness	Maternal involvement → Mental toughness → Addiction propensity	-0.13	—	< .001	Supported
Indirect through mental toughness	Paternal involvement → Mental toughness → Addiction propensity	-0.12	—	< .001	Supported
Indirect through mental toughness	Maternal autonomy support → Mental toughness → Addiction propensity	-0.12	—	< .001	Supported
Indirect through mental toughness	Paternal autonomy support → Mental toughness → Addiction propensity	-0.11	—	< .001	Supported
Indirect through mental toughness	Maternal warmth → Mental toughness → Addiction propensity	-0.13	—	< .001	Supported
Indirect through mental toughness	Paternal warmth → Mental toughness → Addiction propensity	-0.13	—	< .001	Supported
Indirect through self-efficacy	Maternal involvement → Self-efficacy → Addiction propensity	-0.12	—	< .001	Supported
Indirect through self-efficacy	Paternal involvement → Self-efficacy → Addiction propensity	-0.11	—	< .001	Supported
Indirect through self-efficacy	Maternal autonomy support → Self-efficacy → Addiction propensity	-0.11	—	< .001	Supported
Indirect through self-efficacy	Paternal autonomy support → Self-efficacy → Addiction propensity	-0.10	—	< .001	Supported
Indirect through self-efficacy	Maternal warmth → Self-efficacy → Addiction propensity	-0.12	—	< .001	Supported
Indirect through self-efficacy	Paternal warmth → Self-efficacy → Addiction propensity	-0.11	—	< .001	Supported

Figure 1*Final Model of the Study*

As shown in Table 4, all six perceived parenting dimensions had positive and statistically significant direct effects on mental toughness. The standardized coefficients ranged from $\beta = .31$ for paternal autonomy support to $\beta = .37$ for maternal warmth. The same parenting dimensions also had positive direct effects on self-efficacy, with standardized coefficients ranging from $\beta = .30$ for paternal autonomy support to $\beta = .35$ for maternal involvement. Mental toughness and self-efficacy both had significant negative direct effects on addiction propensity, with $\beta = -.36$ and $\beta = -.34$, respectively. In addition, all perceived parenting dimensions retained significant negative direct effects on addiction propensity after the mediators had been entered into the model. These coefficients ranged from $\beta = -.33$ for paternal involvement and paternal autonomy support to $\beta = -.36$ for maternal warmth.

The bootstrap analyses further showed that all indirect effects through mental toughness were negative and statistically significant, ranging from $\beta = -.11$ to $\beta = -.13$. The indirect effects through self-efficacy were also negative and significant, ranging from $\beta = -.10$ to $\beta = -.12$. The mediated effects through mental toughness were slightly larger than the corresponding effects through self-efficacy, although both mediators contributed meaningfully to the model. Because the direct effects of the parenting dimensions on addiction propensity remained statistically significant after mental toughness and self-efficacy were included, the findings supported partial rather than complete mediation. Overall, favorable perceived parenting characterized by parental involvement, autonomy support, and emotional warmth was associated with lower addiction propensity both directly and indirectly through increased mental toughness and self-efficacy. Consequently, all hypothesized direct and indirect structural relationships were supported.

4. Discussion

The present study examined the structural relationships between perceived parenting styles and propensity for addiction among upper secondary school students, with mental toughness and self-efficacy considered as mediating variables. The findings showed that all dimensions of perceived parenting, including maternal involvement, paternal involvement, maternal autonomy support, paternal autonomy support, maternal warmth, and paternal warmth, had significant negative direct effects on addiction propensity. These dimensions also had significant positive

effects on both mental toughness and self-efficacy. In turn, mental toughness and self-efficacy exerted significant negative direct effects on addiction propensity. The indirect effects of all perceived parenting dimensions on addiction propensity through mental toughness and self-efficacy were also negative and statistically significant. Because the direct effects of parenting dimensions remained significant after the mediators were entered into the structural model, mental toughness and self-efficacy played partial mediating roles. Moreover, the model fit indices indicated that the proposed structural model was well supported by the empirical data.

The first major finding was that favorable perceived parenting was directly associated with lower addiction propensity. Students who perceived their parents as more involved, emotionally warm, and supportive of autonomy reported lower levels of susceptibility to addiction. This finding is consistent with evidence showing that parenting style is an important family-level determinant of adolescent substance-use risk. A systematic review and meta-analysis conducted in Iran found a significant relationship between parenting styles and tendency toward addiction, indicating that supportive and adaptive parenting practices generally function as protective factors, whereas dysfunctional parenting increases vulnerability (Fatemisough et al., 2024). Similarly, parenting styles and students' cognitive emotion-regulation strategies have been shown to predict addiction tendency, suggesting that the family climate contributes to the development of either adaptive or maladaptive responses to stress (Torkamani et al., 2022). Research examining social support as a mediator has also demonstrated that parenting style is associated with adolescent identification with drug abuse, partly because supportive parenting increases the social resources available to adolescents (Liu et al., 2022).

The negative effect of parental warmth on addiction propensity can be explained through emotional security and attachment processes. Warm parents communicate acceptance, affection, availability, and responsiveness. These experiences reduce emotional deprivation and strengthen adolescents' sense that distress can be managed within safe interpersonal relationships. A recent meta-analysis found that greater parental warmth was associated with lower substance use among offspring, supporting the protective role of affectionate and responsive family relationships (Pinquart & Gochaliyev, 2025). In contrast, emotional rejection or coldness may lead adolescents to seek relief, belonging, or emotional compensation through deviant peer groups or substance-related behavior. Psychodynamic accounts of addiction similarly propose that

substance use may function as an external means of regulating painful emotions, unmet attachment needs, inner conflict, and feelings of insecurity (Costanzo et al., 2023). Thus, the negative relationship between parental warmth and addiction propensity may reflect the reduced need for maladaptive emotional regulation when adolescents experience stable affection and support at home.

The findings regarding parental involvement are also consistent with the literature on monitoring and supervision. Constructive parental involvement includes awareness of adolescents' activities, interest in their academic and social lives, guidance, communication, and appropriate behavioral boundaries. Contemporary conceptualizations of parental monitoring emphasize that effective monitoring involves parental knowledge, rule-setting, solicitation of information, adolescent disclosure, and responsive communication rather than simple surveillance (Pelham et al., 2024). Evidence suggests that parental knowledge and monitoring are associated with lower adolescent substance use, although the relationship may be reciprocal because substance-using adolescents may also become less communicative and more difficult to supervise (Pelham et al., 2023). In the present study, both maternal and paternal involvement had significant protective effects, indicating that the active participation of both parents may reduce adolescents' exposure to risky contexts and increase opportunities for early recognition of behavioral changes.

The significant negative effect of autonomy support on addiction propensity is also theoretically meaningful. Autonomy-supportive parenting allows adolescents to express opinions, make age-appropriate choices, understand the reasons behind family expectations, and gradually assume responsibility for their behavior. This approach differs from permissiveness because it combines psychological freedom with structure and guidance. Such parenting may reduce addiction propensity by strengthening internalized values and autonomous self-regulation. Research has shown that perceived parenting style is related to stress and emotional competence among young people, indicating that supportive parenting can improve the psychological resources needed to cope with developmental demands (Kandhari & Sharma, 2024). Parenting styles have also been associated with depression, anxiety, stress, and perfectionistic tendencies, all of which may influence maladaptive coping and behavioral risk (Zheng, 2023). Therefore, adolescents who perceive greater autonomy support may be better able to make independent decisions and resist social pressure to engage in substance use.

The current findings also showed that all perceived parenting dimensions positively predicted mental toughness. Maternal warmth demonstrated the strongest direct effect, although all six dimensions made significant contributions. This result suggests that mental toughness develops not only from individual temperament or performance-based experiences but also from repeated interactions within the family. Parents who are warm, involved, and autonomy-supportive provide adolescents with opportunities to face manageable challenges while maintaining a secure base. Through such experiences, adolescents may learn to persist, regulate emotions, view difficulties as manageable, and maintain confidence under pressure. The finding is aligned with research showing that parenting style is associated with mental toughness in adolescents and that mental toughness may form part of a chain linking family experiences to psychological outcomes (Xiang et al., 2024). Studies of emotional regulation and cognitive reappraisal likewise support the view that adaptive control and interpretation of difficult experiences contribute to stronger psychological functioning (Li et al., 2024).

Mental toughness had a significant negative direct effect on addiction propensity and mediated the effects of all parenting dimensions. This means that supportive parenting was associated with stronger commitment, emotional control, life control, challenge orientation, confidence in abilities, and interpersonal confidence, which in turn were related to lower addiction propensity. Adolescents with greater mental toughness may be less likely to perceive temporary stress, academic difficulty, interpersonal conflict, or peer pressure as overwhelming. They may also be more capable of delaying gratification and persisting toward long-term goals. These qualities directly oppose several psychological processes associated with addiction, such as impulsive escape, low tolerance of distress, loss of control, and immediate reward seeking.

This interpretation is compatible with evidence connecting mental toughness to problematic and addictive behavior. Research among e-sport players has examined game addiction in relation to mental toughness, showing that diminished psychological endurance and control may accompany problematic engagement patterns (Kendal et al., 2022). Although behavioral addiction differs from substance-use propensity, both involve difficulty regulating behavior in the face of immediate reinforcement. The present findings extend this reasoning to school students by suggesting that mental toughness may serve as a generalized protective capacity against addiction-related vulnerability.

This is particularly important during adolescence, when emotional reactivity and peer influence may be high while executive control is still developing.

The study further found that all perceived parenting dimensions positively predicted self-efficacy. Maternal and paternal involvement, autonomy support, and warmth were each associated with stronger beliefs in personal competence, effort, initiative, and persistence. This result can be explained through the developmental sources of self-efficacy. Parents strengthen self-efficacy when they provide opportunities for successful performance, encourage effort, model coping strategies, acknowledge improvement, and allow adolescents to solve problems independently. Autonomy-supportive parenting provides direct experience of agency, whereas warmth reduces the fear of failure. Involved parenting also creates conditions for feedback and mastery. The relationship between parenting and academic responsibility reported in previous research supports the idea that family interactions shape students' confidence and willingness to manage obligations (Houshang Shayan & Salarifar, 2023). Likewise, studies of parenting and behavioral problems indicate that dysfunctional parental patterns may weaken children's adaptive regulation and perceived competence (Gupta et al., 2023).

Self-efficacy also had a significant negative direct effect on addiction propensity and mediated all relationships between parenting dimensions and the outcome. This finding indicates that students who believed they could initiate action, sustain effort, and persist in the face of obstacles were less likely to report addiction-related vulnerability. The result is consistent with the broader health literature, in which self-efficacy is considered a central determinant of adaptive behavior. Self-efficacy beliefs have been associated with health and well-being among students, particularly under stressful conditions (Alves et al., 2024). They have also been linked to health behavior in clinical populations, supporting the general proposition that individuals who feel capable of managing their circumstances are more likely to adopt constructive behavior (Zhang & Meng, 2023).

Within substance-use research, self-efficacy has a particularly important role in resisting use, coping with triggers, sustaining behavioral change, and preventing relapse. Reviews have identified self-efficacy as a relevant factor in substance-use disorders, especially in relation to confidence in managing high-risk situations (Xu, 2023). Self-efficacy has also been proposed as a mechanism through which mindfulness-based relapse-prevention

interventions produce behavioral improvement (Moniz-Lewis et al., 2022). In addition, the relationship between social support and relapse tendency has been shown to operate partly through exercise self-efficacy and health-related quality of life (Jia et al., 2023). These studies support the present finding that adolescents with stronger self-efficacy may be better able to refuse substances, manage social pressure, and use adaptive coping strategies when distressed.

The comparison of the two mediating pathways showed that the indirect effects through mental toughness were slightly stronger than those through self-efficacy. This pattern may be explained by the broader scope of mental toughness. Self-efficacy primarily concerns belief in one's capacity to perform and persist, whereas mental toughness additionally includes emotional control, life control, interpersonal confidence, commitment, and the tendency to interpret difficulties as challenges. Addiction propensity is influenced by multiple domains, including emotional dysregulation, stress sensitivity, interpersonal vulnerability, and low persistence. Therefore, mental toughness may capture a wider range of protective processes. Nevertheless, the effects of both mediators were significant, indicating that they should be regarded as complementary rather than competing mechanisms.

The partial nature of mediation is also important. Perceived parenting continued to predict addiction propensity after mental toughness and self-efficacy were included in the model. This suggests that parenting influences addiction vulnerability through additional pathways beyond the two psychological resources examined here. These pathways may include parental monitoring, peer-group selection, attachment security, communication quality, moral internalization, emotion regulation, perceived social support, and exposure to parental substance use. Family structure has also been associated with adolescent substance-use outcomes, indicating that the broader organization and stability of the family may contribute independently to risk (Cruise et al., 2022). Similarly, family environments involving parental addiction, child abuse, or insecure attachment may produce cumulative vulnerability (Bahmani et al., 2023). The persistence of direct effects in the present model is therefore consistent with a multidetermined view of addiction propensity.

The strong correlations between parenting dimensions and addiction propensity further reinforce the importance of the family context. However, the particularly high correlation between active addiction propensity and the total

score should be understood as a consequence of scoring overlap, because the active dimension forms a major component of the total construct. More substantively, all parenting, mental toughness, and self-efficacy variables showed moderate negative associations with addiction propensity. This pattern indicates that the observed structural relationships were not based on isolated coefficients but reflected a coherent network of protective associations.

The overall model fit supported the structural organization proposed in the study. The acceptable chi-square-to-degrees-of-freedom ratio, low RMSEA, and satisfactory incremental fit indices indicated that the relationships among perceived parenting, mental toughness, self-efficacy, and addiction propensity were compatible with the observed data. Structural equation modeling was particularly appropriate because it permitted simultaneous evaluation of several parenting dimensions and two mediators while accounting for the measurement structure of the constructs. The adequate factor loadings and psychometric performance of the parenting indicators were also consistent with evidence supporting the reliability and validity of the Grolnick parenting questionnaire among high-school students (Pourfahimi, 2024).

5. Conclusion

Taken together, the findings indicate that addiction propensity among adolescents should not be conceptualized solely as an individual behavioral problem. It emerges within a developmental system involving family relationships and personal psychological resources. Substance-related risk in adolescence is influenced by emotional, cognitive, social, and behavioral factors (Chukwu et al., 2024). The increasing concern regarding adolescent substance abuse further emphasizes the need for preventive models that identify modifiable family and psychological variables before actual dependence develops (Bogdanovic et al., 2025; Jayaswal & Singh, 2025). The present study contributes to this preventive perspective by showing that favorable parenting may reduce addiction propensity directly and by strengthening mental toughness and self-efficacy.

6. Limitations & Suggestions

The study had several limitations. Its cross-sectional and correlational design did not permit definitive causal conclusions, even though structural equation modeling was used to test theoretically directed paths. All variables were

assessed through student self-report questionnaires, which may have introduced shared-method variance, social desirability, inaccurate recall, or response bias. Perceived parenting reflects adolescents' interpretations and may not correspond fully with parents' actual behavior. The sample was limited to upper secondary school students in Qazvin County and was drawn from the humanities track in selected public and non-public schools, which may restrict generalizability to students in other academic tracks, regions, age groups, or cultural settings. The study also did not directly measure potentially relevant variables such as peer substance use, parental addiction, socioeconomic status, family conflict, academic stress, psychiatric symptoms, or actual substance-use history. In addition, the mediation model examined mental toughness and self-efficacy simultaneously but did not test possible reciprocal or longitudinal relationships between these constructs.

Future studies should employ longitudinal designs to examine whether perceived parenting predicts changes in mental toughness, self-efficacy, and addiction propensity across adolescence. Multi-informant assessment involving students, mothers, fathers, teachers, and school counselors would reduce dependence on a single source of data. Researchers should replicate the model in different provinces, educational tracks, age groups, and cultural contexts and compare the model across sex, school type, and socioeconomic status. Future models could incorporate peer influence, parental monitoring, attachment security, emotion regulation, perceived stress, family conflict, academic pressure, and parental substance use. It would also be valuable to distinguish between susceptibility to addiction, experimental substance use, recurrent use, and clinically significant substance-related problems. Intervention studies could test whether parenting programs and psychological training designed to increase mental toughness and self-efficacy produce measurable reductions in addiction propensity.

Schools should incorporate family-based addiction-prevention programs that help parents combine emotional warmth, constructive involvement, clear boundaries, and support for age-appropriate autonomy. School counselors can screen students for low self-efficacy, poor emotional control, weak persistence, and high addiction propensity before substance-use problems become established. Training programs can focus on coping with stress, resisting peer pressure, setting goals, solving problems, regulating emotions, and maintaining effort after failure. Parents should be encouraged to remain informed about their adolescents'

activities without relying on intrusive control, humiliation, or punitive surveillance. Collaboration among families, teachers, school psychologists, and community health services can create a coordinated preventive system in which vulnerable students are identified early and receive appropriate educational, psychological, and family support.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed to this article.

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