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# Developing a Model of Tendency Toward Risky Behavior Based on Self-Differentiation and Cognitive Flexibility with the Mediating Role of Self-Control in Adolescents

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A B S T R A C T

**Objective:** The objective of this study was to develop a structural model of the tendency toward risky behavior in adolescents based on self-differentiation and cognitive flexibility, with the mediating role of self-control.

**Methods and Materials:** This descriptive-correlational research was conducted using structural equation modeling (SEM). The statistical population included adolescents aged 13 to 16 in Jahrom City during the 2023–2024 academic year. A total of 312 adolescents (158 girls and 154 boys) were selected through multistage cluster sampling. The research instruments included the Risk-Taking Scale, the Self-Control Scale (Tangney et al.), the Self-Differentiation Questionnaire (Skowron & Dendy), and the Cognitive Flexibility Inventory (Martin & Rubin). Data analysis was carried out using AMOS software to evaluate model fit and estimate path coefficients.

**Findings:** The structural model demonstrated acceptable fit indices ($\chi^2/df = 2.39$, CFI = 0.965, TLI = 0.960, RMSEA = 0.067). Cognitive flexibility showed the strongest total negative effect on risky behavior ($\beta = -0.85$), including a direct effect of $\beta = -0.65$ and an indirect effect of $\beta = -0.20$ through self-control. Self-differentiation had a significant total negative effect ($\beta = -0.65$), with a direct effect of $\beta = -0.44$ and an indirect effect of $\beta = -0.21$ via self-control. Self-control itself had a direct negative effect on risky behavior ($\beta = -0.34$). All path coefficients were statistically significant at $p < 0.01$, confirming both direct and mediated relationships among the constructs.

**Conclusion:** The findings indicate that adolescents with higher levels of self-differentiation and cognitive flexibility are less likely to engage in risky behaviors, partly due to increased self-control. These insights emphasize the importance of designing prevention programs that enhance self-regulation, flexible thinking, and identity coherence to reduce adolescent risk-taking tendencies.

***Keywords:*** *Self-differentiation; Cognitive flexibility; Self-control; Risky behavior; Adolescents*

## 1. Introduction

Adolescence is a critical developmental period characterized by significant biological, emotional, and social transitions, during which individuals become increasingly prone to high-risk behaviors (HRBs) such as substance use, aggression, unsafe sexual conduct, and reckless driving (Johnson & Smith, 2020; Kumar, 2021). These behaviors not only endanger adolescents' physical and mental well-being but also undermine long-term life prospects, making them a persistent concern in public health and psychological research (Li et al., 2020; Peterson et al., 2019; Zinn, 2019). The growing global trend in the prevalence of HRBs among youth necessitates identifying psychological mechanisms that can serve as protective or risk-enhancing factors in this context.

Among the most studied constructs in this domain is self-control, a core component of executive functioning that involves the capacity to inhibit impulses, regulate emotions, and align behavior with long-term goals (Baumeister & Vohs, 2020; Tangney et al., 2021). The strength model of self-control posits that it functions like a muscle that can be depleted but also strengthened through practice (Baumeister & Vohs, 2020). Empirical research supports its critical role in reducing the likelihood of engaging in HRBs (Duckworth et al., 2020; Willems et al., 2022). For example, adolescents with higher levels of self-control have demonstrated lower tendencies toward substance use, risky sexual activities, and physical aggression (Abbasnejad-Bandari, 2022; Ahmadi & colleagues, 2022; Mohammadi & colleagues, 2024). This construct has also been linked to psychological resilience, better academic outcomes, and social adjustment (Duckworth et al., 2019; Tangney et al., 2021).

Self-control is not an isolated trait but is shaped and influenced by various psychological variables. One such variable is self-differentiation, a construct rooted in Bowen's family systems theory. It refers to an individual's ability to maintain a clear sense of self while managing emotional reactivity, especially in interpersonal relationships (Torkman & Lotfi-Kashani, 2022). Adolescents with high self-differentiation demonstrate greater emotional regulation and decision-making skills, which may reduce their susceptibility to impulsive and risky behaviors (Darvishi et al., 2023; Poursaeed Isfahani et al., 2021). In contrast, those with low differentiation often struggle to balance their thoughts and feelings, making them more vulnerable to peer influence, emotional outbursts, and maladaptive behaviors (Dezhkam et al., 2023; Mofrad et al., 2023).

Evidence also suggests a significant relationship between self-differentiation and self-control. Individuals who can separate their own emotional states from external stimuli are better positioned to exert behavioral control in stressful or tempting situations (Moghanloo & Koliwand, 2018; Nikrosh, 2021). This interaction may be particularly relevant during adolescence, when emotional volatility and identity formation intersect, leading to heightened reactivity and decreased behavioral regulation. In studies conducted on adolescents from divorced families, interventions aimed at increasing self-differentiation resulted in improved self-control and lower engagement in HRBs (Darvishi et al., 2023).

Another psychological variable that plays a critical role in behavioral regulation and HRB prevention is cognitive flexibility. Defined as the ability to adapt one's thinking and behavior in response to changing environments and situational demands, cognitive flexibility enables individuals to generate alternative strategies, reassess their assumptions, and avoid rigid behavioral patterns (Hanife, 2018; Hohl & Dolcos, 2024). It involves three key aspects: the perception of controllability in stressful situations, the ability to reinterpret events from multiple perspectives, and the capacity to generate diverse solutions to problems (Hanife, 2018). Adolescents with high cognitive flexibility are more likely to reframe high-risk situations, delay gratification, and adopt proactive coping strategies, thus reducing the likelihood of engaging in HRBs (Lindner et al., 2016; Rezai et al., 2020).

Research has consistently shown that low cognitive flexibility is associated with various forms of maladaptive behaviors, including substance abuse, gambling, and risky driving (Aloi et al., 2022; Rezai et al., 2020; Zsido et al., 2021). For instance, adolescents who demonstrate rigid thought patterns often persist with maladaptive responses even when they are clearly detrimental (Mischel et al., 2023; Prado et al., 2017). Furthermore, cognitive flexibility appears to interact with self-control: flexibility may enhance self-regulatory capacity by allowing individuals to switch from impulsive to goal-directed behavior in response to situational cues (Hosein-Sarani, 2021). In studies among high school students, cognitive flexibility was shown to predict emotional regulation and behavior adjustment in stressful situations (Ghasemi & colleagues, 2023; Ghorbani et al., 2016).

In this light, the current study proposes a comprehensive model in which self-differentiation and cognitive flexibility serve as independent variables influencing adolescents'



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tendency toward HRBs, both directly and indirectly through the mediating role of self-control. While each of these variables has been individually linked to behavioral outcomes, few empirical investigations have examined their interactive and mediating mechanisms within a structural framework (Mischel et al., 2023; Mohammadi-Hosseini-Asl et al., 2022). The inclusion of self-control as a mediator is grounded in the understanding that both cognitive and emotional processes feed into self-regulatory abilities, which in turn predict behavioral tendencies (Duckworth et al., 2020; Tangney et al., 2021).

This model also addresses an important gap in adolescent mental health research in Iran. While HRBs such as substance use and risky sexual behavior are rising among Iranian youth, culturally sensitive, multidimensional frameworks for explaining and mitigating these behaviors remain underdeveloped (Gorji, 2023; Kazemi et al., 2023). Moreover, social and familial dynamics, including authoritarian parenting styles and restricted emotional expression, may influence both differentiation and self-control capacities (Ahmadi & colleagues, 2022; Ghasemi & colleagues, 2023). Thus, exploring these constructs in the Iranian context is both timely and essential.

From a theoretical standpoint, this research is informed by Baumeister's strength model of self-control (Baumeister & Vohs, 2020), Bowen's theory of family systems and differentiation (Torkman & Lotfi-Kashani, 2022), and cognitive flexibility frameworks from both developmental and clinical psychology (Hohl & Dolcos, 2024; Prado et al., 2017). It also integrates the risk-resilience model, which posits that cognitive and emotional strengths (e.g., flexibility, differentiation, self-control) serve as buffers against environmental and social risks (Abbasnejad-Bandari, 2022; Willems et al., 2022).

In sum, adolescence is a time of increased vulnerability to HRBs, and this vulnerability can be mitigated through the development of intrapersonal resources such as self-control, supported by underlying cognitive and emotional capacities. This study aims to empirically test a causal model in which self-differentiation and cognitive flexibility predict adolescents' tendency toward risky behaviors, both directly and indirectly via self-control.

## 2. Methods and Materials

### *2.1. Study Design and Participants*

The statistical population of this study included all students enrolled in lower and upper secondary schools in Jahrom County during the 2023–2024 academic year. To conduct this research, the necessary approvals were first obtained from the Jahrom County Department of Education following the approval of the intended questionnaires, enabling access to schools and students.

The sampling method used in this study was multistage cluster sampling. First, a list of all boys' and girls' lower and upper secondary schools in Jahrom County was compiled. In the first stage, three girls' schools (Alaviyeh, Pouyandeh, and Hejab) and three boys' schools (Imam Khomeini, Safir, and Shahed) were randomly selected. In the second stage, based on the number of students, one or two small-sized classes were randomly selected from each school, and all students in the selected classes were included in the study. Subsequently, 157 questionnaire packets were randomly distributed in boys' schools and 158 in girls' schools. After accounting for 3 cases of dropout among male students, a total of 312 completed questionnaires (158 girls and 154 boys) were returned and included in the statistical analysis.

### *2.2. Measures*

#### *2.2.1. Risk-Taking*

The Iranian Adolescent Risk-Taking Scale was developed by Zadehmohammadi et al. (2011). It consists of 38 items and measures adolescents' risk-taking behavior across multiple dimensions, including tendencies toward drug use, alcohol consumption, smoking, violence, sexual behavior, relationships with the opposite sex, and dangerous driving. Scores for each dimension are obtained by summing the relevant items. Higher scores on each dimension indicate a greater tendency toward that specific behavior. The total score ranges from 38 to 190, with higher scores reflecting greater overall risk-taking. In the study by Zadehmohammadi et al. (2011), the scale's construct validity was confirmed using exploratory factor analysis and principal component analysis. The KMO index was 0.949, indicating excellent sampling adequacy, and Bartlett's test of sphericity was statistically significant. Cronbach's alpha coefficients were reported as 0.938 for the full scale, 0.931 for smoking, 0.906 for drug use, 0.907 for alcohol use, 0.856 for sexual behavior, and 0.809 for opposite-sex relationships.

#### *2.2.2. Self-Control*

The Self-Control Scale was developed by Tangney et al. (2004) and contains 36 items scored on a Likert scale. It



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assesses various aspects of self-control, including self-discipline, deliberate versus impulsive action, healthy habits, work ethics, and reliability. Items 2, 3, 4, 6, 8–12, 14, 16–17, 19–21, 23, 25, 28–29, and 31–35 are reverse scored. The total score is the sum of all subscales, ranging from 0 (lowest self-control) to 180 (highest self-control), with cutoff scores of 0–60 for low, 61–120 for moderate, and above 120 for high self-control. In Tangney et al.'s (2004) study, the scale showed concurrent validity with academic achievement, adjustment, positive relationships, and interpersonal skills. The test-retest reliability over two weeks was reported as 0.89, and the correlation with social desirability ranged from 0.54 to 0.60. Cronbach's alpha for the total scale was 0.89. In Iran, Mousavi-Moghadam et al. (2015) reported an alpha of 0.82, and Mafi and Havasi-Somar reported an alpha of 0.75. In the current study, confirmatory factor analysis (CFA) was conducted using AMOS software to examine construct validity. All factor loadings were above 0.30, and t-values exceeded 1.96, indicating statistical significance. Model fit indices included $X^2/df = 2.319$, TLI = 0.95, CFI = 0.92, GFI = 0.91, AGFI = 0.91, RMSEA = 0.065, and PCLOSE = 0.16, indicating acceptable model fit according to Kline's (2016) criteria. Cronbach's alpha coefficients were 0.74 (self-discipline), 0.75 (deliberate/impulsive action), 0.81 (healthy habits), 0.84 (work ethics), 0.69 (reliability), and 0.73 (total scale), confirming acceptable reliability for this instrument in the current study.

### 2.2.3. *Differentiation of Self Inventory*

The Differentiation of Self Inventory was initially developed by Skowron and Friedlander (1998) with 43 items and revised in 2003 to include 45 items. It assesses individuals' levels of differentiation by focusing on relationships with significant others and family of origin across the dimensions of emotional reactivity, emotional cutoff, fusion with others, and the "I-position." Total scores range from 45 to 270. Scores between 45–90 indicate low differentiation, 91–158 moderate differentiation, and above 158 high differentiation. In Skowron and Smith's (2003) study, the total reliability coefficient was reported as 0.92. In Iran, Younesi (2006) standardized the scale and reported Cronbach's alpha coefficients of 0.85 (total), 0.77 (emotional reactivity), 0.60 (I-position), 0.65 (emotional cutoff), and 0.70 (fusion with others). Factor analysis revealed four factors with eigenvalues greater than 1, explaining 57.67% of the variance. In a study by Abdol-Abadi et al. (2022), Cronbach's alpha was reported at 0.89. For the current study, CFA conducted in AMOS showed strong standardized factor loadings (above 0.30) and statistically significant paths (t-values above 1.96). Model fit indices were $X^2/df = 2.584$, TLI = 0.94, CFI = 0.91, GFI = 0.93, AGFI = 0.92, RMSEA = 0.071, and PCLOSE = 0.15, indicating good fit based on Kline's (2016) standards. Cronbach's alpha coefficients were 0.76 (emotional reactivity), 0.62 (I-position), 0.61 (emotional cutoff), 0.76 (fusion with others), and 0.64 (total scale), confirming the instrument's acceptable reliability and validity.

### 2.2.4. *Cognitive Flexibility*

The Cognitive Flexibility Inventory was developed by Dennis and Vander Wal in 2010. This inventory consists of 20 items and measures three dimensions: alternatives, control, and alternatives for human behavior. The total score is calculated by summing all items, ranging from 20 to 140, with higher scores indicating greater cognitive flexibility and scores closer to 20 reflecting lower cognitive flexibility. In Dennis and Vander Wal's (2010) study, concurrent validity with the Beck Depression Inventory-II (BDI-II) was r = -0.39, and convergent validity with the Martin and Rubin Cognitive Flexibility Scale was r = 0.75. In Iran, Shareh et al. (2013) reported test-retest reliability of 0.71 and Cronbach's alpha of 0.90. Fazeli et al. (2014) reported an alpha of 0.75. In this study, CFA results using AMOS showed standardized factor loadings above 0.30 and statistically significant paths ($t > 1.96$). Model fit indices were $X^2/df = 2.688$, TLI = 0.95, CFI = 0.92, GFI = 0.95, AGFI = 0.91, RMSEA = 0.074, and PCLOSE = 0.18, indicating an acceptable model fit (Kline, 2016). Cronbach's alpha values were 0.82 (alternatives), 0.83 (control), 0.78 (alternatives for behavior), and 0.77 (total scale), suggesting the inventory is a valid and reliable tool for data collection in this research.

## 2.3. *Data Analysis*

Data analysis was conducted using SPSS version 22. Initially, the assumptions of normality, homogeneity of variance, and homogeneity of regression slopes were examined using the Shapiro–Wilk test, Levene's test, and the interaction term between group condition and pretest scores, respectively. To test the effectiveness of the intervention on the total score of communication skills, univariate analysis of covariance (ANCOVA) was performed, controlling for pretest scores. Additionally, multivariate analysis of covariance (MANCOVA) was used to examine differences



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between groups across the components of communication skills, with the Box's M test and Bartlett's test applied to assess the equality of covariance matrices and sphericity, respectively. Descriptive statistics including means and standard deviations were calculated for all variables. Effect sizes ($\eta^2$) and statistical power were also reported to interpret the magnitude and reliability of the observed effects. All statistical tests were conducted with a significance level of $\alpha < .05$.

## 3. Findings and Results

Initially, the descriptive statistics for the study variables are presented in Table 1.

**Table 1**

*Descriptive Statistics of Study Variables*

| Variable | Min | Max | Mean | SD | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| Emotional Reactivity | 18 | 48 | 40.34 | 6.75 | -1.68 | 1.89 |
| I-Position | 37 | 93 | 81.01 | 12.62 | -1.67 | 1.59 |
| Emotional Cutoff | 22 | 53 | 45.96 | 6.84 | -1.76 | 1.98 |
| Fusion with Others | 32 | 71 | 60.83 | 9.04 | -1.68 | 1.61 |
| Self-Differentiation | 132 | 258 | 228.14 | 33.83 | -1.61 | 1.08 |
| Alternatives | 27 | 69 | 59.34 | 9.35 | -1.51 | 1.41 |
| Control | 21 | 55 | 47.15 | 8.01 | -1.45 | 1.06 |
| Alternatives for Human Behavior | 2 | 14 | 11.68 | 2.45 | -1.72 | 1.76 |
| Cognitive Flexibility | 61 | 135 | 118.19 | 18.74 | -1.37 | 0.69 |
| Self-Regulation | 24 | 54 | 44.61 | 6.77 | -0.84 | -0.51 |
| Deliberate/Impulsive Acts | 20 | 49 | 40.30 | 6.54 | -0.98 | -0.17 |
| Healthy Habits | 10 | 25 | 20.28 | 3.39 | -0.92 | 0.09 |
| Work Ethics | 11 | 25 | 20.42 | 3.19 | -0.91 | 0.02 |
| Reliability | 9 | 25 | 20.38 | 3.23 | -0.88 | 0.21 |
| Self-Control | 98 | 169 | 146.01 | 21.57 | -0.76 | -1.06 |
| Drug Use Tendency | 12 | 31 | 20.66 | 4.84 | 0.83 | 1.63 |
| Alcohol Use Tendency | 9 | 26 | 15.35 | 4.45 | 1.18 | 1.96 |
| Smoking Tendency | 6 | 19 | 12.77 | 2.99 | 0.52 | 1.38 |
| Violence Tendency | 6 | 19 | 12.90 | 2.81 | 0.33 | 1.77 |
| Sexual Behavior Tendency | 5 | 18 | 10.08 | 2.75 | 0.81 | 1.94 |
| Opposite-Sex Relationship | 4 | 19 | 10.18 | 2.01 | 0.64 | 1.24 |
| Risky Driving Tendency | 10 | 26 | 15.38 | 4.31 | 0.93 | 1.86 |
| Risky Behavior Tendency | 78 | 137 | 97.34 | 14.24 | 1.60 | 1.75 |

To conduct structural equation modeling, certain assumptions had to be tested and confirmed. These assumptions are discussed below.

To assess the normality of the data, the Shapiro–Wilk test was used. The test statistics for all variables were above the conventional threshold ($p > .05$), indicating that the null hypothesis of no difference between the sample distribution and a normal distribution was accepted. Thus, the assumption of univariate normality was confirmed for all variables.

Multivariate normality was assessed using Mardia's coefficient. This test is conducted prior to complex analyses in covariance-based software like AMOS. According to Westfall and Henning (2013), a skewness value greater than 3 may indicate non-normality. The critical value of this test is 1.96 at the .05 significance level. For this study, the multivariate skewness was 2.197, and the T-value was 7.986. Since skewness was less than 3 and the T-value was above 1.96, the assumption of multivariate normality was confirmed.

One assumption in structural equation modeling is the identification and removal of outliers. In this analysis, Mahalanobis distances were used for this purpose. The Mahalanobis distance for all data points was calculated and compared against the chi-square distribution. At a 95% confidence level with 2 degrees of freedom (n-1 variables in Mahalanobis), the critical chi-square value was 5.991. The highest Mahalanobis distance in this study was 4.771, which is below the critical value. Therefore, no outliers were detected, confirming this assumption.

The correlation coefficients among the study variables ranged between 0.30 and 0.90, all at acceptable significance levels, indicating satisfactory inter-variable relationships and confirming this assumption.

Does the causal model of adolescents' tendency toward risky behavior, based on self-differentiation and cognitive



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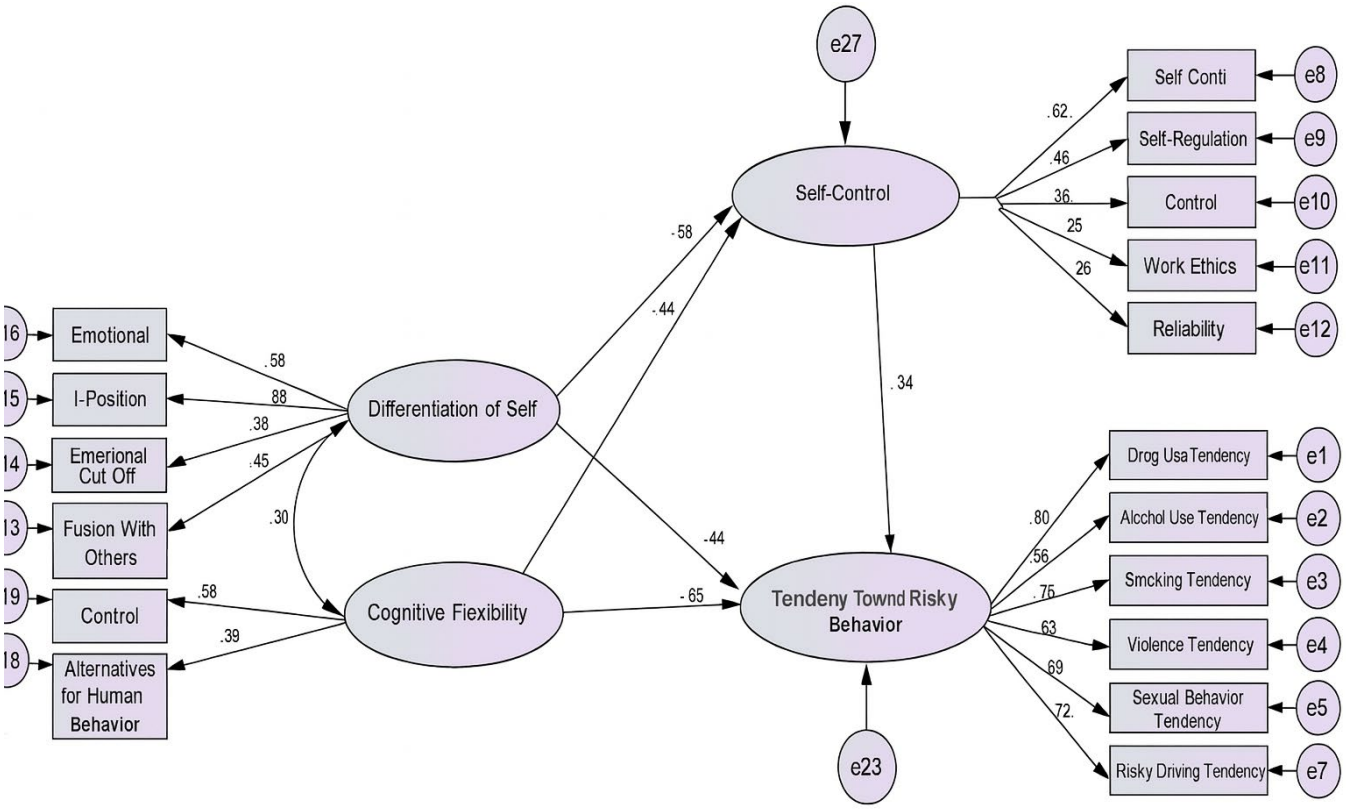
flexibility with the mediating role of self-control, exhibit acceptable model fit?

To answer this question, the general research model was developed and executed in AMOS software. The software output, which retained all significant paths, is illustrated in the figure below.

**Figure 1**

*Final Model of the Study*




Using the bootstrap method, the standardized regression weights for direct and indirect paths, as well as their significance levels, were calculated. Table 2 presents the standardized direct, indirect, and total effects for the paths in the model.

**Table 2**

*Standardized Direct, Indirect, and Total Effects in the Model*

| Predictor Variable | Outcome Variable | Direct Effect | Indirect Effect | Total Effect |
|---|---|---|---|---|
| Self-Differentiation | Risky Behavior Tendency | -0.44 | -0.21 | -0.65 |
| Cognitive Flexibility | Risky Behavior Tendency | -0.65 | -0.20 | -0.85 |
| Self-Control | Risky Behavior Tendency | -0.34 | — | -0.34 |

As shown in Table 2, cognitive flexibility was the strongest predictor of risky behavior tendency, with a total effect of -0.85. Self-differentiation followed with a total effect of -0.65. All direct, indirect, and total effects were statistically significant.

To assess the model fit in the target population, model fit indices were calculated using AMOS software. Table 3 displays the fit indices alongside the recommended values according to Kline (2016).



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**Table 3**

*Model Fit Indices*

| Fit Index | $X^2$/df | GFI | AGFI | TLI | CFI | RMSEA | PCLOSE |
|---|---|---|---|---|---|---|---|
| Obtained | 2.399 | 0.896 | 0.865 | 0.960 | 0.965 | 0.067 | 0.061 |
| Desired | < 3 | > 0.90 | > 0.90 | > 0.90 | > 0.90 | < 0.08 | > 0.05 |

As shown in Table 3, the ratio of chi-square to degrees of freedom was 2.399. The goodness-of-fit index (GFI) and adjusted goodness-of-fit index (AGFI), which reflect the proportion of variance and covariance explained by the model, were 0.896 and 0.865, respectively. The comparative fit index (CFI), comparing the proposed model to a null model, was 0.965. The Tucker–Lewis index (TLI), a non-normed fit index, was estimated at 0.960. The root mean square error of approximation (RMSEA) and its associated PCLOSE were 0.067 and 0.061, respectively. All model fit indices were within acceptable ranges, indicating that the model had a satisfactory fit.

## 4. Discussion and Conclusion

The present study aimed to develop and validate a structural model for the tendency toward risky behavior in adolescents based on self-differentiation and cognitive flexibility, with self-control as a mediating variable. Structural equation modeling results confirmed that the proposed model demonstrated an acceptable fit, and the findings revealed that self-differentiation, cognitive flexibility, and self-control each had significant and negative direct effects on risky behavior. Furthermore, self-differentiation and cognitive flexibility also affected risky behavior indirectly through the mediating role of self-control. These results align with the theoretical framework and previous empirical findings and offer meaningful implications for understanding the psychological pathways that contribute to risky behavior in adolescence.

The negative and significant relationship between self-control and risky behavior found in this study is consistent with a large body of research highlighting self-control as a critical buffer against maladaptive behaviors in adolescence. According to the strength model of self-control, individuals with higher self-regulation capabilities are more able to delay gratification, inhibit impulsive reactions, and persist in goal-directed behaviors, reducing the likelihood of engaging in risky activities (Baumeister & Vohs, 2020; Tangney et al., 2021). Empirical studies have also demonstrated that adolescents with higher levels of self-control are less likely to engage in behaviors such as substance use, unsafe sex, and aggressive conduct (Ahmadi & colleagues, 2022; Bi-Ahmadi & colleagues, 2021; Duckworth et al., 2019; Liu et al., 2019; Mohammadi & colleagues, 2024). These findings are further supported by meta-analytic evidence indicating that self-control significantly predicts adolescent risk-taking across different contexts and cultures (Willems et al., 2022).

The significant and negative direct effect of self-differentiation on risky behavior suggests that adolescents who possess greater capacity to balance emotional reactivity with rational cognition are less likely to engage in harmful actions. This is in line with Bowen's theory of family systems, which posits that individuals with higher levels of self-differentiation can maintain autonomy in emotional contexts and are more resistant to dysfunctional interpersonal dynamics that often lead to risky choices (Torkman & Lotfi-Kashani, 2022). Previous studies have supported this assertion, showing that low self-differentiation is associated with emotional dysregulation, interpersonal dependence, and a heightened likelihood of maladaptive coping behaviors (Darvishi et al., 2023; Moghanloo & Koliwand, 2018; Poursaeed Isfahani et al., 2021). Furthermore, adolescents with poor self-differentiation are often more susceptible to peer pressure and emotionally driven decisions, both of which are strong predictors of risky behavior (Shahi et al., 2020).

Similarly, the study confirmed the significant negative relationship between cognitive flexibility and risky behavior, indicating that the ability to adapt one's thinking and response strategies to changing demands plays a crucial role in behavioral regulation. Adolescents with cognitive flexibility are more likely to analyze consequences, consider alternative perspectives, and modify impulsive tendencies, thereby reducing engagement in high-risk behaviors (Hanife, 2018; Hohl & Dolcos, 2024; Rezai et al., 2020). Prior research supports this claim, noting that deficits in cognitive flexibility are linked to rigid behavioral patterns, increased impulsivity, and susceptibility to addiction and other maladaptive behaviors (Aloi et al., 2022; Zsido et al., 2021). Studies among clinical and non-clinical adolescent populations have found that enhancing cognitive flexibility



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improves problem-solving and emotional control, both of which are essential for avoiding risky actions (Lindner et al., 2016; Prado et al., 2017).

Importantly, the mediating role of self-control in the relationship between both self-differentiation and cognitive flexibility with risky behavior highlights the integrative nature of self-regulation processes. In other words, self-differentiation and cognitive flexibility may not influence behavior solely through direct pathways, but rather exert a portion of their protective effects via enhancing adolescents' capacity for self-control. This finding is supported by theoretical and empirical studies suggesting that cognitive and emotional competencies shape self-regulatory strength, which in turn governs behavior (Dabiri, 2022; Duckworth et al., 2020; Mofrad et al., 2023). For example, adolescents with flexible cognition and differentiated emotional systems may be more adept at identifying internal cues, modifying responses, and resisting situational temptations—capacities central to self-control (Ghasemi & colleagues, 2023; Nikrosh, 2021).

The results of this study are also consistent with integrative models of adolescent risk behavior that emphasize the interaction between cognitive, emotional, and self-regulatory domains (Johnson & Smith, 2020; Kumar, 2021; Li et al., 2020). These findings further support the role of self-control as a central pathway through which broader psychological constructs influence externalizing behaviors. Indeed, both family-based studies and individual difference research have documented that enhancing self-control reduces the impact of risk factors such as emotional dysregulation, peer pressure, and cognitive impulsivity on adolescent outcomes (Duckworth et al., 2019; Hosseini & colleagues, 2021; Mohammadi-Hosseini-Asl et al., 2022).

The present findings are not only theoretically meaningful but also carry significant practical implications. From an intervention standpoint, they suggest that enhancing adolescents' self-control capacities could be an effective strategy for reducing engagement in risky behaviors. However, targeting self-control alone may be insufficient unless the foundational traits of cognitive flexibility and self-differentiation are also cultivated. Interventions that incorporate skills such as mindfulness, emotional regulation, problem-solving, and perspective-taking may help adolescents improve their self-differentiation and flexibility, thereby boosting self-control as a mediating mechanism (Abbasnejad-Bandari, 2022; Ayano et al., 2020; Ghorbani et al., 2016). Moreover, school-based prevention programs can benefit from multicomponent approaches that address cognitive, emotional, and behavioral domains simultaneously.

In summary, the current study provides empirical validation for a conceptual model in which self-differentiation and cognitive flexibility reduce adolescents' tendency toward risky behavior directly and indirectly through the mediating role of self-control. This model contributes to the growing literature on integrative and multidimensional predictors of adolescent behavior and highlights critical entry points for preventive interventions and psychoeducational programming.

## 5. Limitations & Suggestions

Despite the valuable contributions of this study, several limitations must be acknowledged. First, the cross-sectional design precludes any causal inference between variables. Although the structural model implies directionality, the associations observed may be bidirectional or influenced by unmeasured third variables. Longitudinal and experimental designs are necessary to determine the temporal precedence and causal mechanisms involved. Second, the self-report nature of data collection may have introduced social desirability bias or inaccuracies due to participants' subjective perceptions. Adolescents may underreport risky behaviors or overestimate self-control, especially in school-based settings. Third, although the sample was drawn using multistage cluster sampling, it was limited to one geographical area (Jahrom City), which may limit generalizability to broader Iranian or international adolescent populations. Finally, while the study used psychometrically validated instruments, cultural nuances in constructs such as self-differentiation and risk perception may require further localization or qualitative validation.

Future research should consider longitudinal and prospective studies to explore how self-differentiation and cognitive flexibility develop over time and how they interact dynamically with self-control and risky behaviors across different developmental stages. Researchers are also encouraged to incorporate multi-informant data collection methods, such as parental or teacher reports, to triangulate findings and minimize potential biases inherent in adolescent self-report. Experimental studies that test the effects of interventions targeting self-differentiation and cognitive flexibility—such as dialectical behavior therapy (DBT), cognitive-behavioral therapy (CBT), or mindfulness-based programs—could help clarify causal relationships and practical effectiveness. Moreover, future



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studies could explore potential moderators, such as gender, socio-economic status, parental attachment, or exposure to trauma, to identify for whom and under what conditions these protective factors are most effective.

Practitioners working with adolescents—whether in school, clinical, or community settings—should design interventions that simultaneously address emotional, cognitive, and behavioral self-regulation. Programs that teach youth to identify and manage emotional responses (enhancing self-differentiation), adopt alternative perspectives (enhancing cognitive flexibility), and delay gratification (enhancing self-control) are likely to have the most significant impact on reducing risky behavior. Schools should integrate psychoeducation on these components into life skills curricula, while counselors and psychologists can assess for deficits in these domains to tailor personalized intervention plans. Parents and caregivers can also play a pivotal role by fostering autonomy, encouraging open communication, and modeling flexible thinking to strengthen their children's developmental trajectories toward safe and adaptive behavior.

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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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