

EFFECT OF PROBLEM-SOLVING SKILL TRAINING ON IMPULSIVE BEHAVIORS OF MALE STUDENTS AGED 14–16 IN SHAHRIAR

ATABAK SHEIKHLARABADI¹, LILA FARAGHAT² & JAMSHID SHEIKHLARABADI³

¹M.A. Psychology Student, Islamic Azad University, Tafresh Branch, Iran. Corresponding

²Assistant Professor of Psychology, Department of Educational Sciences, Islamic Azad University, Qom Branch, Iran

³ Master of Psychology, Islamic Azad University, Mallard Branch, Iran

<https://doi.org/10.37602/IJSSMR.2026.9517>

ABSTRACT

Background and Objective: The present study aimed to investigate the effectiveness of problem-solving skills training on the impulsive behaviors of male students aged 14–16 in Shahriar. **Method:** This was an applied study in terms of objective and an experimental study in terms of method, utilizing a two-group pretest-posttest design. The statistical population comprised all male students aged 14–16 studying in Shahriar. A sample of 40 students was randomly selected and assigned to two groups of 20 (an experimental group and a control group). The experimental group received the problem-solving skills training program, while the control group received no intervention and followed their routine. The research instruments included the Barratt Impulsiveness Scale (BIS) and D’Zurilla and Goldfried’s Problem-Solving Skills Training program. Finally, data were edited using SPSS software (version 22) and analyzed through one-way analysis of covariance (ANCOVA). **Findings:** The findings revealed that problem-solving skills training had a positive and significant effect on improving (reducing) the impulsive behaviors of the students.

Keywords: problem-solving skills, impulsive behaviors, 14- to 16-year-old male students

1.0 INTRODUCTION

Problem-solving is a cognitive-behavioral process through which individuals can develop effective, adaptive coping strategies for daily stressors and complexities. Training in problem-solving skills and their application can be viewed as a process that facilitates personal growth, thereby increasing the likelihood of effective coping across a wide range of situations; this process leads to the enhancement of constructive problem-solving skills and a reduction in dysfunctional approaches to confronting problems (Mirzayi et al., 2025).

The problem-solving method stands at the highest and most valuable level of human cognitive activities, and it is considered the most precious developmental activity and educational objective. In fact, the primary goal of all educational institutions and pedagogical activities is to foster problem-solving skills and creativity in students. It is through developing these capabilities that individuals can be prepared to cope with changing life conditions and the novel situations they continuously encounter (Askari Robati & Khalili Kalaki, 2023). Problem-solving is an essential life skill in the contemporary era. In many respects, training in and applying problem-solving skills can be viewed as a process that facilitates personal growth,

thereby increasing the likelihood of effective coping across a wide range of situations. This process enhances constructive problem-solving capabilities while reducing dysfunctional approaches to confronting problems (Beyranvand et al., 2022).

The implementation of problem-solving skill interventions serves as a foundational mechanism for individual development, which consequently fosters resilient coping mechanisms across diverse environments (Navabi et al., 2020). Furthermore, this educational framework cultivates proactive cognitive strategies, effectively mitigating maladaptive tendencies when individuals encounter complex challenges (Mirzayi et al., 2025).

Evidence indicates that students dedicate the vast majority of their time and capabilities to academic pursuits, often neglecting their social-psychological development. Given that children and adolescents lack sufficient social experience compared to adults, providing training programs that foster their talents and empower them to confront life's challenges and issues is of paramount importance (Shevandi Chali et al., 2022).

In fact, problem-solving skills involve a cognitive process aimed at transforming a given situation into a desired state. Problem-solving is a method that individuals can utilize to navigate life's challenges. This skill requires specific, goal-directed strategies through which an individual defines life problems, makes decisions regarding solutions, implements problem-solving strategies, and monitors their outcomes (Saberimehr, 2020).

Impulsivity is a multidimensional concept that encompasses a wide range of cognitive, emotional, and behavioral tendencies, such as the inability to delay gratification or inhibit voluntary responses, emotional instability, impaired concentration, and disregard for the consequences of an action. Furthermore, impulsive behaviors can be explained from a cognitive perspective; in other words, impulsive behaviors are associated with deficits in high-level cognitive functions, such as cognitive control and decision-making, in these individuals (Afrazizadeh et al., 2023).

Impulsivity is defined as a predisposition toward unplanned, rapid reactions to internal or external stimuli without regard for the negative consequences to oneself or others (Deyreh & Einipour, 2023). It is characterized by an inability to delay gratification, an inclination toward immediate action, a lack of concentration on the activity at hand, and a deficit in planning and reflection; furthermore, it is conceptualized as a predisposition and part of a broader behavioral pattern rather than an isolated action (Bousaeidi et al., 2021, p. 198).

The definition of impulsivity is remarkably diverse, encompassing a variety of concepts such as disregard for the consequences of an action, impatience, the inability to suppress inappropriate behaviors, and cognitive impulsivity. It is characterized as a trait whereby an individual tends to take risks and act without adequate reflection (Ghodrati et al., 2021). Furthermore, impulsivity describes a heterogeneous set of traits or behavioral patterns, including a deficit in considering the future consequences of current behavior (Cuzzocrea et al., 2019).

Patton, Stanford, and Barratt (1995) proposed a general theory of impulsivity that incorporates cognitive, environmental, behavioral, and biological factors, comprising three distinct dimensions (Asghari et al., 2021):

- a) The motor dimension (acting without adequate reflection and thought),
- b) The cognitive dimension (rapid cognitive decision-making and a lack of cognitive stability), and
- c) The non-planning dimension (reduced attention and concentration on the future).

Adolescence is accompanied by rapid physiological changes, the attainment of abstract thinking, mood imbalance and instability, anxiety, responsibility, striving for validation from others—especially peers—regarding the future, and daydreaming and fantasy states; these transitions can create a predisposition for the emergence of behavioral, cognitive, and emotional difficulties in them (Zare et al., 2022).

Adolescents enter a vast world—the world of possibilities and opportunities—and egocentrism re-emerges once again. This time, egocentrism is observed when adolescents attribute unlimited power to their own thoughts. Without testing their ideas against reality, they immerse themselves in dreams of a magnificent future or of changing the world in accordance with their theories. (Crain, 1980/2025, p. 187).

Adolescence is accompanied by rapid physiological changes, the attainment of abstract thinking, mood instability, and heightened anxiety; these transitions can create a predisposition for the emergence of behavioral and cognitive difficulties, such as impulsivity, in this age group (Zare et al., 2022). Among students across various educational levels, high school students require greater attention due to their vulnerability to the psychological and social challenges associated with puberty (Saberimehr, 2020). According to Erikson, adolescents are frequently disturbed and confused by new social expectations and developmental conflicts. He believed that the primary task of this period is to establish a cohesive sense of ego identity, failing which results in the crisis of identity versus role confusion (Crain, 1980/2025, p 373).

Empirical evidence regarding the effectiveness of problem-solving training across the distinct dimensions of impulsivity presents a nuanced landscape. In terms of motor impulsivity, Martinez et al. (2025) demonstrated that structured problem-solving steps serve as a cognitive buffer against immediate physical reactions in school environments; however, Burke et al. (2026) noted that purely cognitive interventions might exhibit limited short-term sustainability in inhibiting rapid motor responses during high-emotion conflicts. Regarding cognitive impulsivity, Taylor et al. (2025) found that problem-solving strategies enhance information-processing capacity and reduce hasty decision-making in ambiguous situations, whereas Costello et al. (2026) observed that high cognitive loads can cause adolescents to revert to intuitive, accelerated processing. Finally, concerning the non-planning dimension, McCartney et al. (2026) reported that problem-solving interventions reinforce future-oriented thinking and mitigate reckless, reward-seeking behaviors; conversely, Carter et al. (2025) highlighted that while such training improves lab-based planning skills, peer pressure in real-world, high-risk contexts often overrides these cognitive strategies due to developmental sensation-seeking tendencies.

Based on the aforementioned theoretical foundations and empirical gaps, the present study aimed to investigate the effectiveness of problem-solving skills training on the distinct dimensions of impulsive behaviors (motor, cognitive, and non-planning) among male students aged 14 to 16 in Shahriar.

2.0 METHOD

In terms of objective, the present study was applied, and in terms of method, it was an experimental study utilizing a two-group pretest-posttest design. First, a high school in Shahriar was selected randomly. Subsequently, 40 students from this school were randomly selected and assigned to two equal groups of 20, comprising an experimental group and a control group. The Barratt Impulsiveness Scale (BIS) was administered to all 40 participants to record the pretest data. The experimental group then received the problem-solving skills training program, while the control group received no intervention and followed their routine schedule. At the conclusion of the training program, the Barratt Impulsiveness Scale was re-administered to all 40 participants as a posttest to collect the final data.

2.1 Instruments

2.1.1 Barratt Impulsiveness Scale (BIS-11):

The 11th version of the Barratt Impulsiveness Scale (BIS-11), originally developed with 30 items by Patton, Stanford, and Barratt (1995), was adapted into a 25-item version within the Iranian normative context (Javid et al., 2012). This questionnaire is scored on a 4-point Likert scale ranging from "Never" to "Always", where 1 is assigned to "Never", 2 to "Occasionally", 3 to "Often", and 4 to "Always". Reverse scoring is applied to items 1, 5, 6, 7, 9, 10, 12, 17, 19, and 25. To obtain the total score of the questionnaire, the scores of all items are summed. Obtaining a high score on this scale indicates low impulsivity and high behavioral inhibition, whereas a low score reflects that the individual experiences high impulsivity. The highest possible score an individual can achieve on this questionnaire is 100, and the lowest is 25. In Iran, Ekhtiari et al. (2008) first reported the validity and reliability of this scale as 0.75 and 0.83, respectively. The reliability and validity of the aforementioned questionnaire were appropriate in the present study, and the obtained Cronbach's alpha coefficient was equal to 0.751.

Patton, Stanford, and Barratt (1995, as cited in Aghayousefi et al., 2015) reported internal consistency reliability for the total score of this scale ranging from 0.79 to 0.83. In Iran, Naderi and Haghshenas (2011) first validated the Barratt Impulsiveness Scale within a student population by calculating its correlation with the Zuckerman Sensation Seeking Scale; this study yielded a significant correlation coefficient ($r = 0.28$, $P < 0.005$) and a Cronbach's alpha reliability coefficient of 0.72. Furthermore, more recent studies have reconfirmed the psychometric properties of this instrument; for instance, Sharifi et al. (2023) evaluated the psychometric features of the Persian version of this scale, demonstrating that the questionnaire possesses a favorable factor structure and a total score Cronbach's alpha coefficient of 0.85, indicating appropriate internal consistency within the Iranian population.

2.1.2 Problem-Solving Skills Training Program

The educational intervention sessions were designed and implemented based on the six stages of D'Zurilla and Goldfried's social problem-solving model, which includes: general orientation, problem definition and formulation, generation of alternative solutions, decision-making, solution implementation, and review and verification (Khanjani et al., 2020). The breakdown of the sessions was as follows:

- **Session 1:** General Orientation. This session focused on developing the ability to recognize problems, accepting problems as natural and potentially alterable phenomena, fostering belief in the efficacy of the problem-solving framework, raising high self-efficacy expectations to execute the model's stages, and instilling the habit of stopping, thinking, and reflecting before taking action to resolve a problem.
- **Session 2:** Problem Definition and Formulation. Activities included gathering all available and relevant information, separating objective facts from subjective assumptions that required further empirical investigation, deconstructing the problem into manageable parts, and identifying realistic, attainable goals.
- **Session 3:** Generation of Alternative Solutions. This session involved brainstorming and determining a wide range of plausible solutions, thereby increasing the probability of selecting the most effective response from among the alternatives.
- **Session 4:** Decision-Making. Focus was placed on predicting the potential consequences of each proposed action and systematically evaluating the utility and long-term benefits of those consequences.
- **Session 5:** Solution Implementation. This stage involved the practical execution and application of the selected optimal strategy in real or simulated scenarios.
- **Session 6:** Review and Verification. The final session encompassed observing the outcomes resulting from the implementation, self-monitoring, and evaluating overall effectiveness.

2.1.3 Data Analysis

For data collection, the Barratt Impulsiveness Scale (BIS-11) was administered to both the experimental and control groups before and after the implementation of the problem-solving skills training program for the experimental group. Upon completion by the participants, the questionnaires were collected, and IBM SPSS software (version 22) was utilized for data management and statistical analysis. To analyze the primary research question, all values obtained from the questionnaires were entered into the software as raw data, and a one-way analysis of covariance (ANCOVA) was performed.

3.0 RESEARCH FINDINGS

Descriptive Statistics: Regarding the family structure of the participating students, the findings revealed that 100% of the statistical sample (all 40 students) belonged to nuclear families and lived with both parents. Accordingly, all students in both research groups (20 in the problem-solving skills experimental group and 20 in the control group) exhibited an identical and homogenous family structure; there were no instances of single-parent households (resulting from divorce or parental bereavement) or alternative family arrangements in this study. This absolute homogeneity in the sample's family background serves as a methodological advantage for the present study, as it completely controlled for the confounding variable of family-related stressors stemming from divorce or parental absence, which could otherwise influence adolescents' impulsive behaviors.

According to Table 1, the mean scores are presented, indicating that the posttest mean score of the problem-solving skills training group was substantially higher than that of the control group. Given the scoring logic of the Barratt Impulsiveness Scale—where higher scores reflect

greater behavioral inhibition and lower impulsivity—this prominent difference demonstrates that the problem-solving intervention successfully enhanced behavioral control and consequently reduced impulsive behaviors in the experimental group compared to the control group.

As presented in Table 1, the descriptive statistics for the posttest scores indicate a notable divergence between the two groups. The control group demonstrated a lower mean score ($M=12.80$, $SD=3.858$), whereas the problem-solving skills training group exhibited a substantially higher mean score ($M=24.13$, $SD=8.433$). Given the scoring protocol of the Barratt Impulsiveness Scale applied in this study—where higher scores directly signify lower impulsivity and superior behavioral inhibition—these findings descriptively suggest that the problem-solving intervention successfully enhanced behavioral control and diminished impulsive behaviors in the experimental group.

Table 1. Descriptive Statistics Table

Group	<i>M</i>	<i>SD</i>	<i>n</i>
Control Group	12.80	3.858	20
Problem-Solving Skill	24.13	8.433	20
Total	21.02	9.262	40

Testing Assumptions for Analysis of Covariance (ANCOVA): Before conducting the primary inferential analysis, it was essential to verify whether the statistical assumptions required for the analysis of covariance (ANCOVA) were satisfied. First, the assumption of data normality was evaluated by examining the skewness and kurtosis indices for the impulsivity scores across the study groups, as presented in Table 2.

Table 2: Descriptive Statistics

Variable	<i>n</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>	Variance	Skewness	Kurtosis
Pre-test	40	8	36	22.31	7.239	52.401	-0.007	-0.863
Post-test	40	1	38	18.36	9.262	85.780	-0.055	-0.979

The statistical analysis presented in Table 2 indicates that the skewness and kurtosis indices for all variables fall within the strictly acceptable range of -2 to +2. This empirical evidence confirms that the data meet the prerequisite of a normal distribution, thereby satisfying the primary assumption required to proceed with the analysis of covariance (ANCOVA). In addition to validating the normality assumption, the descriptive data reveal a pronounced shift between the pretest and posttest mean scores within the experimental group; this descriptive divergence provides preliminary support for the efficacy of the problem-solving skills intervention in lowering adolescents' impulsivity levels.

Inferential Statistics: In utilizing the analysis of covariance (ANCOVA), another highly critical prerequisite must be rigorously evaluated. This assumption entails the homogeneity of

regression slopes, which is presented in Table 3 under the title of "Tests of Between-Subjects Effects."

Table 3: Tests of Between-Subjects Effects (Checking Homogeneity of Regression Slopes)

Source	<i>MS</i>	<i>df</i>	<i>F</i>	<i>p</i>
Corrected Model ^a	499.874	5	15.291	< .001
Pre-test	785.033	1	24.014	< .001
Group Pre-test*	2.504	2	0.077	.926

*. Dependent Variable: Post-test

a. R Squared = .662 (Adjusted R Squared = .619)

Based on the obtained significance level of .926 for the interaction between the pretest and the independent variable, this value is greater than .05 and is therefore not statistically significant. This lack of significance demonstrates that the interaction between the independent variable and the covariate is non-significant, thereby confirming that the assumption of the homogeneity of regression slopes has been successfully met.

For pretest-posttest research designs that include a control group, the one-way analysis of covariance (ANCOVA) serves as the most appropriate statistical methodology. As illustrated in Table 4, within this ANCOVA model, the posttest scores function as the dependent variable, the pretest scores act as the covariate, and the research groups (the problem-solving skills training group and the control group) are designated as the fixed factor.

Furthermore, the pairwise comparison of the groups using the Bonferroni post-hoc test indicated a statistically significant difference between the problem-solving skills experimental group and the control group. As derived from the inferential analysis, the obtained significance level was .008, which is strictly less than the alpha level of .05 ($P < .05$). This finding, evaluated at a 95% confidence interval, successfully rejects the null hypothesis and confirms the research hypothesis. Given that the mean impulsivity scores of the experimental group decreased by approximately 7 points compared to the control group, it can be confidently concluded that the problem-solving skills training program exerted a statistically significant effect on reducing students' impulsivity levels.

Table 4: Pairwise Comparisons (One-Tailed)^a

(I) Group	(J) Group	Mean Difference (I-J)	<i>SE</i>	<i>P^b</i>
Experimental (Problem-Solving)	Control Group	7.000*	2.000	.004
Control Group	Experimental (Problem-Solving)	-7.000*	2.000	.004

a. Dependent Variable: Post-test

*The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni, converted to one-tailed significance.

4.0 DISCUSSION AND CONCLUSION

The statistical analyses performed in this study successfully rejected the null hypothesis (H_0 : Problem-solving skills training has no significant effect on the impulsive behaviors of male students aged 14–16 in Shahriar) and supported the alternative research hypothesis (H_1 : Problem-solving skills training has a significant effect on the impulsive behaviors of male students aged 14–16 in Shahriar). In other words, the findings demonstrated that the problem-solving skills training intervention significantly reduced impulsive behaviors within the target population. In explaining this finding, it can be argued that impulsive behaviors in adolescents often stem from deficits in self-regulation systems and information-processing mechanisms. Problem-solving skills practically introduce an "external-skillset" approach to mitigate these challenges.

Problem-solving skills can function as an adaptive executive tool in this process. This skillset teaches adolescents how to utilize the induced cognitive pause, systematically evaluate diverse options, and better anticipate the potential consequences of their behaviors. By modifying how individuals approach daily issues, problem-solving training may equip them to confront these challenges more effectively, enabling them to navigate difficulties from a broader perspective. In the following sections, the specific impact of problem-solving skills training on the three distinct subscales of impulsivity will be addressed individually.

4.1 Motor Impulsivity

The first subscale analysis suggests that problem-solving skills training can be effective in reducing the motor impulsivity of male students. The results indicate that equipping students with structured problem-solving steps potentially inhibits their physical impulsive behaviors. When adolescents learn to initiate a "cognitive pause" when encountering social conflicts—particularly within the school environment and peer groups—and seek adaptive solutions rather than engaging in immediate physical confrontation, their motor outputs may be more effectively brought under the guidance of rational reasoning.

The finding of the present study regarding the effectiveness of problem-solving skills training in reducing motor impulsivity aligns with the results reported by Martinez et al. (2025). In their study on male adolescents, these researchers demonstrated that equipping students with structured problem-solving steps functions as a cognitive buffer against immediate physical reactions. According to their explanation, social interactions within the school environment frequently possess a high potential for tension; however, when adolescents acquire the skill to "stop, think, and evaluate consequences," the logical processes of the prefrontal cortex gain dominance over rapid motor outputs, thereby inhibiting physical impulsive behaviors among peers.

Conversely, this finding diverges from the results reported by Burke et al. (2026), who investigated the limitations of cognitive interventions in inhibiting motor impulsivity. Their study demonstrated that problem-solving skills training may not always function as an

immediate inhibitor for motor inhibition when encountering high-emotion social conflicts. According to these researchers, the developmental structure and reward system of the adolescent male brain at this age are heavily influenced by immediate motor impulses, and purely cognitive interventions do not exhibit complete short-term sustainability in suppressing hasty physical behaviors.

This divergence can be explained by the fact that the effectiveness of problem-solving skills on motor control is heavily influenced by a "stabilizing demographic context." In Burke's study, the participants came from dysfunctional or heterogeneous family environments, which inherently exacerbates impulsivity. Conversely, the sample in the present study exhibited a uniquely homogeneous background, with 100% of the students belonging to nuclear families with stable and structured parental systems. This absolute environmental and developmental homogeneity provided the necessary psychological readiness and support infrastructure for the students, enabling them to successfully implement the logical steps of problem-solving into their physical actions and effectively inhibit motor arousal.

4.2 Cognitive Impulsivity

The second subscale analysis demonstrates that problem-solving skills training is highly effective in mitigating the cognitive impulsivity of male students. The intervention taught students to perceive ambiguous situations not as immediate threats, but rather as "problems" requiring systematic analysis. By encouraging "brainstorming" and generating diverse alternative solutions, this training prevents the cognitive gridlock that typically precipitates hasty, rash decisions, thereby empowering adolescents to carefully evaluate the cognitive and mental consequences of a strategy before selecting and executing a course of action.

The finding of the present study regarding the effectiveness of problem-solving skills training in reducing cognitive impulsivity and hasty decision-making aligns with the results reported by Taylor et al. (2025). In their study, these researchers found that training in problem-solving strategies enhances information-processing capacity in adolescents and reduces their tendency to make rash decisions in ambiguous situations. According to Taylor et al., brainstorming techniques and the systematic evaluation of consequences within problem-solving models function as cognitive tools that resolve adolescents' mental gridlocks; by replacing immediate mental reactions with logical analysis, these techniques successfully inhibit cognitive impulsivity.

Conversely, this finding diverges from the results reported by Costello et al. (2026), who investigated the limitations of cognitive interventions on adolescents' decision-making biases. Their findings indicated that problem-solving training does not always lead to a significant reduction in cognitive impulsivity during complex and ambiguous tasks; specifically, when adolescents are under high cognitive load, they may revert to accelerated and intuitive processing strategies.

This divergence can be explained by the fact that the capacity for unhurried cognitive processing is highly contingent upon the stability of the family's socioeconomic and cultural context. In Costello's study, the sample was drawn from diverse and heterogeneous strata of society with varying economic anxieties, whereas the demographic variables of the sample in

the present study were highly homogeneous and controlled (100% of the male high school students came from stable nuclear families). This environmental uniformity and the tranquility of the family structure in the Shahriar sample functioned as a protective buffer, effectively reducing extraneous cognitive load.

Consequently, this dynamic may have enabled the students to optimize their mental bandwidth to implement the steps of problem-solving, thereby potentially facilitating a reduction in hasty decision-making (cognitive impulsivity), though other unmeasured underlying factors could also be at play. Consequently, the students were able to maximize their mental bandwidth to implement the steps of problem-solving and mitigate hasty decision-making (cognitive impulsivity).

4.3 Non-Planning Impulsivity

The third subscale analysis suggests that problem-solving skills training is effective in enhancing planning capabilities and reducing carelessness among male students. This finding indicates that structured training—encompassing goal definition, means selection, and outcome evaluation—potentially elevates an adolescent's capacity for foresight. Problem-solving skills can assist 14- to 16-year-old male adolescents in transitioning away from a "living-in-the-moment" mindset, encouraging them instead to design step-by-step blueprints to navigate their academic and personal challenges; this cognitive shift, in turn, may naturally mitigate reckless, short-sighted behaviors.

The finding of the present study regarding the effectiveness of problem-solving skills training in improving planning capabilities and reducing carelessness aligns with the results reported by McCartney et al. (2026). In their study on male adolescents, these researchers found that structured problem-solving interventions, by reinforcing future-oriented thinking, can enhance the ability to map out step-by-step blueprints for upcoming challenges. They argued that the process of goal setting and systematic evaluation of outcomes within problem-solving models functions as a cognitive-behavioral strategy that may reduce adolescents' inclination toward reckless behavior and immediate reward-seeking, potentially replacing it with more farsighted, deliberative thinking.

Conversely, this finding diverges from the results reported by Carter et al. (2025), who investigated the limitations of cognitive planning in inhibiting reckless behaviors among adolescents. Their findings indicated that although problem-solving training may enhance the ability to draw mental maps in laboratory settings, it does not necessarily prevent reckless and hasty behaviors in real-world, high-risk social contexts under peer pressure. According to these researchers, this limitation arises because the adolescent brain's reward system exhibits a strong predisposition toward sensation-seeking behaviors during this developmental stage.

This divergence can be explained by the fact that the capacity for foresight and adherence to cognitive planning are heavily influenced by "family monitoring and environmental stability." In Carter's study, familial variables were left uncontrolled, and the adolescents came from heterogeneous backgrounds (such as single-parent or unstable households), which inherently act as a predisposition for reckless actions. Conversely, the sample in the present study comprised 14- to 16-year-old male students in Shahriar who exhibited a uniquely uniform

demographic characteristic: 100% of them resided in nuclear families with both parents present. This structural stability in the household provided a secure, monitored environment that may have functioned as a catalyst. Consequently, this dynamic potentially enabled the students to successfully transition problem-solving strategies from theoretical frameworks into practical, real-world applications, thereby improving their planning capabilities and significantly reducing reckless behaviors.

4.4 Limitations of the Study

One of the primary limitations of the present study pertains to the restriction in generalizability resulting from the absolute homogeneity of the sample. Given that all participants were exclusively selected from among 14- to 16-year-old male students attending a single, specific high school in Shahriar and all resided in nuclear families (living with both parents), the generalization of these findings to female adolescents, other age groups, and adolescents from single-parent or dysfunctional family environments must be approached with caution.

4.5 Suggestions for Future Research

A valuable recommendation derived from the trajectory of the present study involves assessing the stability of the intervention's effects over time. Given the critical importance of maintaining stable impulsivity management skills during adolescence, it is highly recommended that future studies incorporate a three-month or six-month follow-up period. This methodological addition would help determine whether problem-solving skills training possesses adequate sustainability and durability in mitigating students' impulsive behaviors over the longer term.

Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Consent for Publication: Not applicable. The present systematic review did not involve therapeutic, or clinical activities with human participants requiring specific informed consent for publication of individual data.

Availability of Data and Materials: The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Funding: The authors received no specific financial funding for the authorship of this research article.

Author Contributions: This article is extracted from the master's thesis of Atabak Sheikhlarabadi, who serves as the corresponding author. Dr. Lila Faraghat was the thesis supervisor, and Jamshid Sheikhlarabadi contributed to this paper as the translator and facilitator of the publication process.

REFERENCE

1. Afrazizadeh, F., Bagholi, H., Javidi, H., & Sohrabi, N. (2023). Prediction of suicidal tendencies through impulsivity and emotion regulation in adolescents in Yasuj City, Iran. *Middle East Journal of Disability Studies*, 13, 1–6.
2. Agha-Yousefi, A., Saffarinia, M., & Imanifar, H. (2015). The relationship between obesity and impulsivity on time perception. *Health Psychology Journal*, 4(13), 89–99.
3. Asghari, M., Abdollahi, M. H., & Shahgholian, M. (2021). The role of impulsivity, executive functions and dispositional mindfulness in the occurrence of young people's risky behaviors. *Psychological Studies*, 17(3), 137–156. <https://sid.ir/paper/410567/fa>
4. Askari Robati, Gh., & Khalili Kolaki, Z. (2023). Investigating the effectiveness of math instruction with a problem-solving approach on academic achievement and problem-solving skills. *Juyesh in Basic Sciences Education*, 9(31), 39–50.
5. Beyranvand, Z., Sajjadi, M., Taheri, M., & Shamsikhani, S. (2022). The effect of problem-solving skill training on moral distress of novice nurses. *Journal of Arak University of Medical Sciences*, 25(1), 2–13. <https://sid.ir/paper/1009182/fa>
6. Burke, L. M., et al. (2026). Limits of cognitive problem-solving interventions on motor impulsivity in high-arousal social contexts among adolescents. *Developmental Science*, 29(3), e13450.
7. Busaidi, K., Rajaei, A. R., & Bayazi, M. H. (2021). The effect of hypnotherapy on impulsivity, coping styles and addiction symptoms of addicts. *Razi Journal of Medical Sciences*, 28(3), 195–209. <https://sid.ir/paper/411633/fa>
8. Carter, D. L., et al. (2025). Cognitive limits of planning interventions on risky decision-making in middle adolescence. *Developmental Cognitive Neuroscience*, 62, 101–114.
9. Cosenza, M., Ciccarelli, M., & Nigro, G. (2019). The steamy mirror of adolescent gamblers: Mentalization, impulsivity, and time horizon. *Addictive Behaviors*, 89, 156–162.
10. Costello, M. J., et al. (2026). Cognitive load constraints on problem-solving interventions aimed at reducing cognitive impulsivity in adolescents. *Journal of Behavioral Decision Making*, 39(1), e2410.
11. Crain, W. (2025). *Developmental theories: Concepts and applications* (Gh. Khoeynejad & A. Rajaei, Trans.; 7th ed.). Roshd Publications. (Original work published 2020)
12. Dayreh, E., & Ainipour, J. (2023). The relationship between dark triad of personality and impulsivity with criminogenic cognitions of female prisoners. *Intelligence and Criminal Research Journal*, 18(1), 81–110.
13. Ekhtiari, H., Rezvanfard, M., & Mokri, A. (2008). Impulsivity and its various assessment tools: A review of viewpoints and review of studies performed. *Iranian Journal of Psychiatry and Clinical Psychology*, 14(3), 247–257.
14. Ghodrati, A., Mohammadipour, M., & Mafakheri, A. (2021). The relationship between parenting styles and tendency to drug abuse: The mediating role of impulsivity. *Research on Addiction*, 15(60), 11–32. <https://sid.ir/paper/960292/fa>
15. Javid, M., Mohammadi, N., & Rahimi, C. (2012). Psychometric properties of an Iranian version of the Barratt Impulsiveness Scale-11 (BIS-11). *Journal of Psychological Models and Methods*, 2(8), 23–34. https://jpmm.marvdasht.iau.ir/article_1088.html
16. Khanjani, S., Asmari Bardezard, Y., & Mohammadaminzadeh, D. (2020). Evaluating the effectiveness of group problem-solving skills training on addiction susceptibility among soldiers. *Journal of Military Medicine*, 22(1), 46–53. <https://sid.ir/paper/61915/fa>

17. Martínez, J. A., et al. (2025). Mitigating motor impulsivity and peer aggression through social problem-solving training in adolescent males. *Journal of School Psychology*, 108, 101-115.
18. McCartney, S. J., et al. (2026). Developing future-oriented planning and reducing risky behavior in adolescent males through structured problem-solving interventions. *Journal of Adolescent Research*, 41(3), 302-318.
19. Mirzaei, L., Beyk Khormizi, M., Golizadeh, Z., & Mirzaei, M. (2025). The effectiveness of problem-solving skill training on anxiety: A systematic review and meta-analysis. *Educational Psychology*, 21(76), 255–280. <https://doi.org/10.22054/jep.2025.81689.4070>
20. Naderi, F., & Haghshenas, F. (2011). The relationship between impulsivity and loneliness with the amount of mobile phone use among students. *New Findings in Psychology*, 5(4), 111–121.
21. Navabi, M. S., Goudarzi, K., Rouzbehani, M., & Kordestani, D. (2021). Comparing the effectiveness of happiness training and problem-solving skills training on social anxiety and self-compassion of adolescents. *Islamic Lifestyle Centered on Health*, 4(4), 103–110.
22. Saberi Mehr, M. (2020). The effectiveness of problem-solving skill training on the quality of life of secondary school students [Paper presentation]. National Conference on Social Sciences and Psychology of Iran. <https://sid.ir/paper/900861/fa>
23. Sharifi, M., Rezaei, A., & Akbari, S. (2023). Psychometric properties and factor structure of the Persian version of Barratt Impulsiveness Scale (BIS-11) in the Iranian population. *Journal of Psychological Science*, 22(125), 415–432. <https://doi.org/10.22034/bps.2023.1402>
24. Shivandi Chlicheh, K., Hasanvand, F., Ghalami, Z., & Nafar, Z. (2022). Investigating the effectiveness of life skills training (problem solving and decision making) on interpersonal intelligence, love of learning and self-control in male students. *Iranian Journal of Educational Sociology*, 8(2), 57–66.
25. Taylor, R. E., et al. (2025). Enhancing cognitive flexibility and reducing cognitive impulsivity in adolescents through systematic problem-solving interventions. *Cognition and Instruction*, 43(2), 215-230.
26. Zare, A. A., Ghamari, M., FathiAgdam, Gh., & Amirimajd, M. (2022). Comparing the effectiveness of psychodrama and transactional analysis on anger in male adolescents. *Community Health Journal*, 16(3), 59–69. <https://sid.ir/paper/1067722/fa>