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The Mediating Role of Self-Regulated Learning Strategies in the Relationship Between Academic Dishonesty and Critical Thinking Among High School Students in Hamadan

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A B S T R A C T

The present study aimed to examine the mediating role of self-regulated learning strategies in the relationship between academic dishonesty and critical thinking among high school students in Hamadan. The research employed a descriptive-correlational design using structural equation modeling (SEM). The statistical population consisted of high school students in Hamadan during the 2026–2027 academic year. A final sample of 324 students was selected through a multistage cluster random sampling method. Data were collected using the California Critical Thinking Skills Questionnaire (Facione & Facione, 1994), the Academic Dishonesty Questionnaire (Farnese et al., 2011), and the Self-Regulated Learning Strategies Questionnaire (Pintrich & De Groot, 1990). Data analysis was conducted using structural equation modeling. The proposed model demonstrated a satisfactory fit to the data. Furthermore, the findings indicated that academic dishonesty had a significant negative direct effect on critical thinking, whereas cognitive strategies, metacognitive strategies, and motivational beliefs had significant positive direct effects on critical thinking ($p < .01$). The results of the bootstrap test revealed that self-regulated learning strategies played a mediating role in the relationship between academic dishonesty and critical thinking ($p < .01$). Overall, the findings showed that academic dishonesty affected critical thinking among high school students in Hamadan both directly and indirectly through the mediating role of self-regulated learning strategies.

Keywords: *Critical thinking, self-regulated learning strategies, academic dishonesty*

1. Introduction

Critical thinking is widely recognized as one of the most essential competencies for success in contemporary educational systems and knowledge-based societies. The increasing complexity of information environments, the rapid expansion of digital media, and the

growing demand for evidence-based decision-making have elevated critical thinking from a desirable educational outcome to a fundamental necessity for students at all levels of education. Critical thinking enables learners to analyze information, evaluate evidence, identify assumptions, draw logical conclusions, and make reasoned judgments in academic and everyday contexts (Facione & Facione, 2013). As educational systems increasingly emphasize higher-order cognitive skills, researchers and educators have devoted considerable attention to identifying the factors that facilitate or hinder the development of critical thinking among students.

Facione and Facione conceptualized critical thinking as a purposeful, self-regulatory process involving interpretation, analysis, evaluation, inference, explanation, and self-monitoring (Facione & Facione, 2013). From this perspective, critical thinking extends beyond the acquisition of knowledge and encompasses the ability to engage in reflective and analytical reasoning when confronted with complex problems. Contemporary educational approaches similarly emphasize the importance of cultivating students' critical thinking abilities to prepare them for academic, professional, and social challenges. Research has shown that students who possess stronger critical thinking skills demonstrate better problem-solving abilities, improved academic performance, greater adaptability, and more effective decision-making processes (Pagán-Castaño et al., 2025; Saepuloh et al., 2021).

The growing importance of critical thinking has been reinforced by changes in modern information ecosystems. Digital technologies and social media platforms have dramatically increased the volume of information available to students, making it increasingly difficult to distinguish accurate information from misinformation. Consequently, educational researchers have argued that critical thinking represents a crucial mechanism for evaluating information credibility and navigating complex media environments (Mesquita-Romero et al., 2022; Pierre, 2024). Similarly, recent investigations have demonstrated that strengthening critical thinking skills contributes significantly to media literacy, information evaluation, and responsible participation in digital learning environments (Pagán-Castaño et al., 2025).

A substantial body of research has focused on identifying educational interventions that promote critical thinking development. For example, blended learning approaches have been shown to enhance critical thinking components among elementary school students by creating opportunities for active engagement and reflective learning (Asgari Majareh et al., 2021). Problem-based learning models have likewise been associated with improvements in critical thinking and self-efficacy through the promotion of higher-order thinking processes (Saepuloh et al., 2021). Furthermore, training programs specifically designed to strengthen critical thinking have demonstrated positive effects on self-regulation, problem-solving strategies, and cognitive functioning among adolescents (Fahami & Emami Zavareh, 2024). These findings suggest that critical thinking is not merely an innate cognitive capacity but rather a skill that can be systematically developed through appropriate educational experiences.

Among the factors associated with critical thinking, self-regulated learning strategies have attracted considerable scholarly attention. Self-regulated learning refers to the active process through which learners set goals, monitor their progress, regulate cognition and motivation, and manage learning resources to achieve desired academic outcomes (Pintrich & De Groot, 1990). According to Pintrich and De Groot, self-regulated learning encompasses cognitive strategies, metacognitive strategies, and motivational components that collectively enable students to take responsibility for their learning processes (Pintrich & De Groot, 1990). Students who effectively utilize self-regulated learning strategies tend to demonstrate greater persistence, deeper learning, improved academic achievement, and enhanced cognitive engagement.

The theoretical relationship between self-regulated learning and critical thinking is well established. Critical thinking requires individuals to engage in reflective judgment, evaluate alternative perspectives, and monitor their reasoning processes. These activities are closely aligned with the metacognitive and cognitive regulation processes that characterize self-regulated learning. Consequently, students who effectively regulate their learning are more likely to engage in critical analysis and reflective thinking. Empirical studies have consistently supported this proposition. Bakhshi and colleagues found significant relationships between critical thinking, self-regulation strategies, and achievement goals among nursing students (Bakhshi et al., 2012). Similarly, Ghadampour and colleagues reported that self-regulated learning strategies and critical thinking disposition jointly predicted students' readiness for participation in e-learning environments (Ghadampour et al., 2014). More recently, Kusmaryono demonstrated that critical thinking skills are positively

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associated with self-regulation and independent learning among students (Kusmaryono, 2023).

Additional evidence supports the reciprocal relationship between self-regulated learning and critical thinking. Research has shown that interventions aimed at improving self-regulated learning strategies simultaneously enhance critical thinking abilities and student well-being (Mohammadi et al., 2024). Likewise, studies examining motivational and metacognitive dimensions of learning indicate that students who actively monitor and regulate their cognitive processes exhibit higher levels of critical analysis and reflective reasoning (Kusmaryono, 2023; Pintrich & De Groot, 1990). These findings suggest that self-regulated learning strategies may serve as an important mechanism through which educational experiences influence the development of critical thinking.

In contrast to the positive role of self-regulated learning, academic dishonesty represents a significant challenge to educational quality and student development. Academic dishonesty encompasses a broad range of behaviors, including plagiarism, unauthorized assistance, examination cheating, fabrication, and other forms of deceptive academic conduct. Such behaviors undermine the integrity of educational systems and compromise the validity of academic assessment processes. Increasing concerns regarding academic dishonesty have prompted researchers to investigate its psychological, social, and educational determinants and consequences (Johnson-Clements et al., 2025; Yu et al., 2021).

Recent evidence suggests that academic dishonesty has become increasingly prevalent in digital learning environments. The expansion of online education and technological resources has created new opportunities for students to engage in dishonest academic practices, thereby intensifying concerns about academic integrity (Guruge et al., 2025; Vo et al., 2025). Researchers have argued that academic dishonesty reflects not only behavioral misconduct but also deficiencies in ethical reasoning, self-regulation, and academic responsibility. Consequently, understanding the factors associated with academic dishonesty is essential for promoting educational quality and fostering ethical learning environments.

Several studies have examined the antecedents and correlates of academic dishonesty. Yu and colleagues reported significant associations between students' attitudes and cheating behaviors, highlighting the importance of cognitive and motivational factors in explaining academic misconduct (Yu et al., 2021). Johnson-Clements and colleagues developed a psychological model demonstrating that post-pandemic academic cheating is influenced by multiple motivational, contextual, and psychological variables (Johnson-Clements et al., 2025). Similarly, Ocheni and colleagues found that interventions based on Rational Emotive Behavioral Therapy can effectively reduce examination cheating behaviors among students, suggesting that academic dishonesty is amenable to psychological intervention (Ocheni et al., 2025).

Educational researchers have also explored strategies for promoting academic integrity and reducing academic dishonesty. Guruge and colleagues evaluated a comprehensive framework designed to prevent contract cheating and found evidence supporting its effectiveness in strengthening academic integrity among students (Guruge et al., 2025). Likewise, innovative interdisciplinary teaching approaches and peer-assessment strategies have been shown to reduce academic cheating in digital educational contexts by increasing student engagement and accountability (Vo et al., 2025). These findings suggest that educational interventions targeting students' cognitive, motivational, and ethical capacities may play an important role in reducing dishonest academic behaviors.

The relationship between academic dishonesty and critical thinking has emerged as a particularly important area of investigation. From a theoretical perspective, students with stronger critical thinking skills may be less likely to engage in academic dishonesty because they possess greater capacity for ethical reasoning, reflective judgment, and evaluation of long-term consequences. Conversely, engagement in dishonest academic practices may impede the development of critical thinking by encouraging superficial learning and avoidance of cognitive effort. Recent discourse analyses of academic deception have highlighted the complex cognitive and social processes underlying dishonest academic behaviors and their potential implications for students' intellectual development (Azadi et al., 2024).

Research examining ethical and motivational determinants of academic dishonesty further supports this perspective. Azizian Kohan and colleagues found that academic ethics and academic help-seeking behaviors significantly predict academic deception among student athletes, suggesting that cognitive and motivational factors play an important role in academic integrity (Azizian Kohan et al., 2022). Because self-regulated learning strategies are closely associated with both ethical academic behavior and critical thinking development, they may represent an

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important mechanism linking academic dishonesty to critical thinking outcomes.

Despite growing scholarly interest in these constructs, several gaps remain in the literature. Although numerous studies have independently examined critical thinking, self-regulated learning, and academic dishonesty, relatively few investigations have explored their simultaneous relationships within a comprehensive structural framework. Existing research has primarily focused on direct associations between critical thinking and self-regulated learning or between academic dishonesty and related psychological variables (Bakhshi et al., 2012; Ghadampour et al., 2014; Yu et al., 2021). Consequently, limited empirical evidence is available regarding the potential mediating role of self-regulated learning strategies in explaining how academic dishonesty influences critical thinking among secondary school students.

Furthermore, adolescence represents a critical developmental period during which students establish learning habits, academic values, and cognitive strategies that may influence future educational trajectories. Investigating these relationships among upper-secondary school students is therefore particularly important because interventions implemented during this stage may have lasting implications for academic success, ethical behavior, and intellectual development. Understanding the mechanisms through which academic dishonesty affects critical thinking may help educators design more effective programs aimed at fostering academic integrity and higher-order thinking skills simultaneously.

Accordingly, the present study aimed to investigate the mediating role of self-regulated learning strategies in the relationship between academic dishonesty and critical thinking among upper-secondary school students in Hamadan.

2. Methods and Materials

2.1. Study Design and Participants

In terms of purpose, the present study was basic research, and in terms of data collection, it fell within the category of descriptive-correlational studies. The statistical population included all female and male upper-secondary school students in Hamadan during the 2025–2026 academic year, with an approximate population size of 44,000 students. The sample size was calculated using Cochran's formula, considering a 95% confidence level and a 5% margin of error. Taking into account the sample attrition rate and to increase statistical accuracy, 350 questionnaires were distributed. Finally, after data screening and the exclusion of incomplete questionnaires, data from 324 participants were used as the final sample for statistical analyses. The sampling method in this study was multistage cluster sampling; accordingly, in the first stage, nine upper-secondary schools in Hamadan were randomly selected, and in the next stage, 40 classrooms were selected from among the selected schools so that the questionnaires could be distributed among the students in those classes. In conducting the present study, ethical principles related to research involving human participants were fully observed. For this purpose, before conducting the study, the objectives of the research were clearly explained to the participants, and their written informed consent was obtained. Participants were assured that participation in the study was completely voluntary and that each individual had the right to withdraw from the study at any stage of the process without any negative consequences. Furthermore, to protect participants' rights, emphasis was placed on the confidentiality of personal information, privacy protection, and the prevention of any psychological, social, or physical harm. Finally, all stages of the study were carried out in accordance with cultural considerations and with respect for the human dignity of the participants.

2.2. Measures

The California Critical Thinking Skills Test (CCTST) was developed by Facione and Facione (1994). It contains 34 items and five components: evaluation (items 1, 2, 3, 4, 25, 26, 27, 29, 30, 31, 32, 33, and 34), inference (items 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, and 24), analysis (items 5, 6, 7, 8, 9, 10, 11, 12, and 13), deductive reasoning (items 3, 13, 20, 21, 24, 25, 26, 28, 29, 30, 21, 32, 33, and 34), and inductive reasoning (items 1, 2, 4, 5, 8, 9, 14, 15, 16, 17, 18, 19, 22, 23, and 27). In this questionnaire, each item has four or five response options, and because there is only one correct answer, the respondent receives a score of 0 or 1 for each item. The individual's total score ranges from 0 to 34. One point is assigned for response A or the first option in items 1, 2, 4, 9, 18, 19, 24, and 30; one point is assigned for response B or the second option in items 3, 6, 16, 22, 23, and 26; one point is assigned for response C or the third option in items 7, 14, 25, 32, 33, and 34; one point is assigned for response D or the fourth option in items 5, 15, 17, 21, 27, 28, 29, and 31; and one point is assigned for response E or the fifth option in items 10, 11, 12, 13, and 20. Khalili (1999)

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examined the validity and reliability of this questionnaire. Accordingly, test reliability was obtained as .62 using the Kuder–Richardson method, and the results of factor analysis for determining construct validity indicated that the test consisted of five factors: analysis, inference, evaluation, deductive reasoning, and inductive reasoning. All five factors had high positive correlations with the total test score. In addition, the test was able to distinguish differences in the level of critical thinking skills between nursing and philosophy students. Facione (1997) reported the reliability of the test using the Kuder–Richardson method as ranging from .68 to .70. Eslami (2003) also examined the reliability of the California Critical Thinking Skills Test using the test–retest method among student teachers at teacher training centers in Tehran and reported a reliability coefficient of .73. In the present study, the reliability of this questionnaire was also obtained as .74 using Cronbach's alpha coefficient.

The Academic Dishonesty Questionnaire was developed by Farnese et al. (2011). It contains eight items and two components: plagiarism, including items 1 and 3, and unauthorized help, including items 2, 4, 5, 6, 7, and 8. In Iran, this instrument was validated by Shokri and Abbaszadeh (2019) to measure academic dishonesty among university students. The scoring method of this questionnaire is based on a five-point Likert scale, ranging from never = 1 to always = 5. The score range of this questionnaire is from 8 to 40. Higher scores on this questionnaire indicate a higher level of academic dishonesty, and vice versa. The Cronbach's alpha coefficient calculated in the study by Shokri and Abbaszadeh (2019) for this questionnaire was estimated to be above .70. In the present study, the reliability of this questionnaire was also obtained as .74 using Cronbach's alpha coefficient.

The Motivated Strategies for Learning Questionnaire (MSLQ) was developed by Pintrich and De Groot (1990). It contains 47 items, and the self-regulated learning strategies subscale includes 22 statements and measures three aspects of academic self-regulation, namely cognitive strategies, metacognitive strategies, and resource management. The instrument consists of two sections: motivational beliefs, including self-efficacy components (items 22, 21, 19, 14, 12, 10, 9, 6, and 2), goal orientation (items 1, 4, 11, 16, and 24), intrinsic valuing (items 5, 8, 17, and 20), and test anxiety (items 3, 7, 13, 15, 18, 23, and 25); and self-regulated learning strategies, including cognitive strategies, which consist of rehearsal and review (items 29, 37, and 44), elaboration including note-taking (item 34), summarization (items 31 and 45), organization (items 26, 27, 39, 42, and 47), and comprehension (items 32 and 33), as well as metacognitive strategies, which consist of planning (items 38 and 46), monitoring and control (items 28, 35, 41, and 43), regulation, including effort and persistence (items 30 and 36), and regulatory activity (item 40). The questionnaire is scored on a five-point Likert scale, ranging from strongly disagree = 1 to strongly agree = 5. The minimum possible score is 47, and the maximum score is 235. Scores between 47 and 94 indicate a low level of use of self-regulated learning strategies. Scores between 94 and 141 indicate a moderate level of use of self-regulated learning strategies, and scores above 141 indicate a high level of use of self-regulated learning strategies. Pintrich and De Groot (1990) reported Cronbach's alpha reliability coefficients for the subscales of self-efficacy, intrinsic valuing, test anxiety, use of cognitive strategies, and use of metacognitive strategies as .89, .87, .75, .83, and .74, respectively. Mousavinejad (1997) used content validity and factor analysis to examine the validity of this questionnaire. To determine reliability, alpha coefficients of .98, .79, and .84 were obtained for lower-level cognitive strategies, higher-level cognitive strategies, and metacognitive self-regulation, respectively. In the present study, the reliability of this questionnaire was obtained using Cronbach's alpha coefficient as .71 for cognitive strategies, .72 for metacognitive strategies, and .73 for motivational beliefs.

2.3. Data Analysis

Data analysis was performed using structural equation modeling with SPSS Version 26 and AMOS 21.

3. Findings and Results

In the present study, 172 participants were female, equivalent to 53.1%, and 152 participants were male, equivalent to 46.9%. In addition, 108 participants were studying in the tenth grade, equivalent to 33.3%; 128 participants were studying in the eleventh grade, equivalent to 39.5%; and 55 participants were studying in the twelfth grade, equivalent to 27.2%.

Table 1

Mean and Standard Deviation of the Research Variables

Variable	Dimension	Component	Mean	Standard Deviation	Skewness	Kurtosis
Critical thinking	—	Evaluation	4.37	2.17	-0.12	-1.24
Critical thinking	—	Inference	2.77	1.27	0.13	0.37
Critical thinking	—	Analysis	1.50	0.99	0.78	0.70
Critical thinking	—	Deductive reasoning	3.63	1.55	-0.14	-0.11
Critical thinking	—	Inductive reasoning	4.32	1.74	-0.31	-0.76
Critical thinking	—	Total critical thinking score	16.60	5.64	-0.29	-0.76
Academic dishonesty	—	Plagiarism	4.17	1.71	0.41	-0.63
Academic dishonesty	—	Unauthorized help	12.34	4.93	0.46	-0.58
Academic dishonesty	—	Total academic dishonesty score	16.52	6.07	0.38	-0.54
Self-regulated learning strategies	Cognitive strategies	Rehearsal and review	10.66	2.11	-0.52	0.89
Self-regulated learning strategies	Cognitive strategies	Elaboration	3.57	1.19	-0.49	-0.70
Self-regulated learning strategies	Cognitive strategies	Summarization	7.49	1.73	-0.44	0.11
Self-regulated learning strategies	Cognitive strategies	Organization	18.98	3.56	-0.55	1.09
Self-regulated learning strategies	Cognitive strategies	Comprehension	7.91	1.60	-0.94	1.49
Self-regulated learning strategies	Cognitive strategies	Total cognitive strategies score	48.62	7.83	-0.52	1.84
Self-regulated learning strategies	Metacognitive strategies	Planning	7.45	1.77	-0.63	0.29
Self-regulated learning strategies	Metacognitive strategies	Monitoring and control	13.92	2.56	-0.34	1.38
Self-regulated learning strategies	Metacognitive strategies	Regulation	6.40	1.60	0.12	0.31
Self-regulated learning strategies	Metacognitive strategies	Regulatory activity	2.98	1.16	0.14	-0.88
Self-regulated learning strategies	Metacognitive strategies	Total metacognitive strategies score	30.76	5.06	-0.14	1.07
Self-regulated learning strategies	Motivational beliefs	Self-efficacy	33.43	6.78	-0.41	0.34
Self-regulated learning strategies	Motivational beliefs	Goal orientation	18.96	3.70	-0.35	0.29
Self-regulated learning strategies	Motivational beliefs	Intrinsic valuing	14.57	3.02	-0.31	0.29
Self-regulated learning strategies	Motivational beliefs	Test anxiety	22.06	6.66	0.12	-0.46
Self-regulated learning strategies	Motivational beliefs	Total motivational beliefs score	89.03	13.52	-0.10	1.59
Self-regulated learning strategies	—	Total self-regulated learning strategies score	168.42	23.87	-0.40	1.40

In Table 1, the mean and standard deviation of the research variables are presented. To examine the normality of data distribution for each variable, skewness and kurtosis indices were used. The results showed that all indices were within the acceptable range, indicating the normal distribution of the data. Hair et al. (2010) and Brown (2010) stated that if skewness is between -2 and +2 and kurtosis is between -7 and +7, the data distribution is normal. Before implementing the structural equation model for the mediating role of self-regulated learning strategies in the relationship between academic dishonesty and critical thinking, the two assumptions of independence of errors and absence of multicollinearity were examined. The results showed that both assumptions were satisfactory, and therefore structural equation modeling could be used. Figure 1 presents the structural equation model in the standardized coefficient state.

Table 2

Correlation Matrix of Academic Dishonesty, Self-Regulated Learning Strategies, and Critical Thinking

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Research Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Evaluation	1											
2. Inference	.31**	1										
3. Analysis	-.12*	.06	1									
4. Deductive reasoning	.71**	.42**	.10	1								
5. Inductive reasoning	.69**	.68**	.13*	.37**	1							
6. Critical thinking (total)	.64**	.68**	.21**	.58**	.65**	1						
7. Plagiarism	-.21**	-.12*	.06	-.09	-.19**	-.18**	1					
8. Unauthorized help	-.15**	-.16**	.03	-.07	-.21**	-.17**	.56**	1				
9. Academic dishonesty	-.18**	-.17**	.04	-.09	-.23**	-.19**	.34**	.47**	1			
10. Cognitive strategies	.21	.12	.12	.15*	.25**	.21**	-.22**	-.20**	-.22**	1		
11. Metacognitive strategies	-.16**	-.09	.36**	.29*	.18**	.15**	-.24**	-.29**	-.23**	.68**	1	
12. Motivational beliefs	-.13*	-.14	.24*	.14**	.12*	.12**	-.28**	-.27**	-.27**	.59**	.61**	1

**p < .01; *p < .05.

The results of Table 2 showed that there was a negative and significant relationship between academic dishonesty and critical thinking (r = -.19, p < .01). The results also showed that cognitive strategies (r = .21), metacognitive strategies (r = .15), and motivational beliefs (r = .12) had positive and significant relationships with critical thinking (p < .01). In addition, the results showed that cognitive strategies (r = -.22), metacognitive strategies (r = -.23), and motivational beliefs (r = -.27) had negative and significant relationships with academic dishonesty (p < .01).

Figure 1

Conceptual Model of the Study with Standardized Coefficients

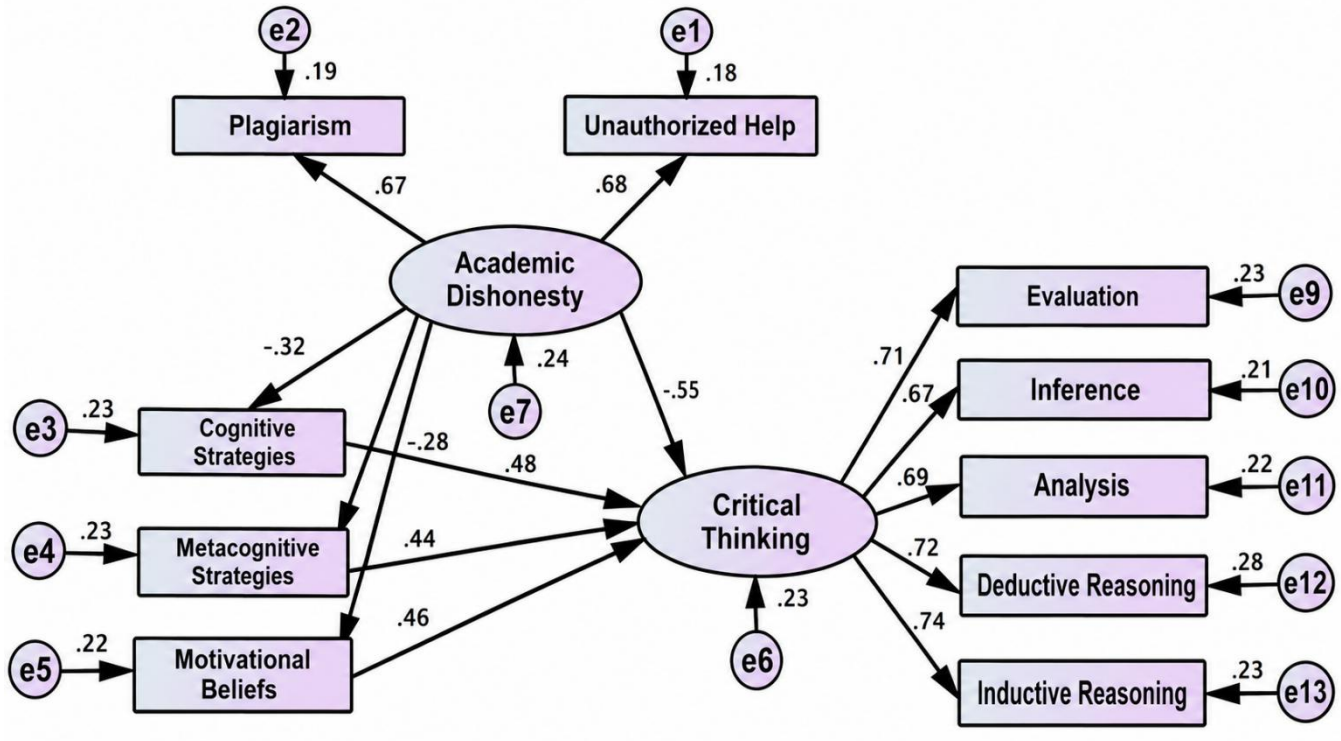

Table 3

Direct Path Coefficients and Significance of Model Paths

Outcome–Predictor Variable	b	S.E.	β	Sig.
Critical thinking ← Academic dishonesty	-1.17	0.11	-0.55	0.002
Critical thinking ← Cognitive strategies	0.42	0.12	0.48	0.001

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Critical thinking ← Metacognitive strategies	0.44	0.11	0.44	0.002
Critical thinking ← Motivational beliefs	0.45	0.13	0.46	0.001
Cognitive strategies ← Academic dishonesty	-0.17	0.11	-0.32	0.019
Metacognitive strategies ← Academic dishonesty	-0.23	0.11	-0.28	0.002
Motivational beliefs ← Academic dishonesty	-0.20	0.11	-0.34	0.001

*The mean difference is significant at $p < .05$.

The results showed that academic dishonesty had a negative direct effect on critical thinking (β = -.55). Moreover, cognitive strategies (β = .48), metacognitive strategies (β = .44), and motivational beliefs (β = .46) had direct effects on critical thinking. In addition, academic dishonesty had negative direct effects on cognitive strategies (β = -.32), metacognitive strategies (β = -.28), and motivational beliefs (β = -.34).

Table 4

Mediating Role of Self-Regulated Learning Strategies in the Relationship Between Academic Dishonesty and Critical Thinking

Paths	b	S.E.	β	Sig.
Academic dishonesty → Cognitive strategies → Critical thinking	-0.15	0.04	-0.47	0.001
Academic dishonesty → Metacognitive strategies → Critical thinking	-0.12	0.14	-0.46	0.001
Academic dishonesty → Motivational beliefs → Critical thinking	-0.13	0.12	-0.38	0.002

The results of the bootstrap test showed that cognitive strategies (β = -.47), metacognitive strategies (β = -.46), and motivational beliefs (β = -.38) played negative and significant mediating roles in the relationship between academic dishonesty and critical thinking ($p < .01$). In other words, academic dishonesty, through self-regulated learning strategies, including cognitive strategies, metacognitive strategies, and motivational beliefs, was associated with a reduction in students' critical thinking. Table 5 presents the fit indices.

Table 5

Fit Indices Obtained from Structural Equation Modeling

Fit Indices	CMIN	df	CMIN/DF	CFI	GFI	AGFI	TLI	IFI	NFI	RMSEA
Research model	89.45	26	1.77	0.98	0.96	0.92	0.97	0.98	0.96	0.06
Decision criterion	p > .05	—	< 5	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90	> 0.90	< 0.08

The results of Table 5 showed that the goodness-of-fit indices obtained from structural equation modeling of the conceptual model supported the desirable fit of the research model with the collected data. Accordingly, it can be stated that the proposed model had a satisfactory fit.

4. Discussion

The present study aimed to investigate the mediating role of self-regulated learning strategies in the relationship between academic dishonesty and critical thinking among upper-secondary school students in Hamadan. The findings demonstrated that academic dishonesty had a significant negative direct effect on critical thinking. Furthermore, cognitive strategies, metacognitive strategies, and motivational beliefs exerted significant positive direct effects on critical thinking. The results also revealed that academic dishonesty negatively predicted cognitive strategies, metacognitive strategies, and motivational beliefs. Finally, the bootstrap analysis confirmed that self-regulated learning strategies, including cognitive strategies, metacognitive strategies, and motivational beliefs, significantly mediated the relationship between academic dishonesty and critical thinking. Overall, the findings indicate that academic dishonesty affects students' critical thinking both directly and indirectly through its influence on self-regulated learning processes.

One of the most important findings of the study was the significant negative relationship between academic dishonesty and critical thinking. This result suggests that students who engage more frequently in dishonest academic behaviors tend to demonstrate lower levels of critical thinking. From a theoretical perspective, critical thinking requires students to actively analyze information, evaluate evidence, question assumptions, and engage in reflective

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judgment. Academic dishonesty, however, often involves avoiding genuine cognitive engagement and relying on shortcuts to achieve academic goals. Consequently, students who frequently engage in dishonest practices may have fewer opportunities to develop the higher-order cognitive skills that underlie critical thinking. This finding is consistent with the conceptual arguments presented by Facione and Facione, who emphasized that critical thinking develops through active engagement with complex cognitive tasks and reflective reasoning processes (Facione & Facione, 2013). Students who circumvent these processes through cheating or plagiarism may therefore experience diminished development of critical thinking abilities.

The negative association between academic dishonesty and critical thinking is also supported by recent research examining the psychological foundations of cheating behavior. Yu and colleagues found that students' attitudes toward academic integrity play an important role in determining their engagement in dishonest academic behaviors (Yu et al., 2021). Similarly, Johnson-Clements and colleagues demonstrated that academic cheating is influenced by multiple psychological and motivational factors that affect students' academic decision-making processes (Johnson-Clements et al., 2025). Because critical thinking involves evaluating consequences, considering ethical implications, and making reasoned judgments, students with stronger critical thinking skills may be less likely to rationalize dishonest behaviors. Conversely, repeated engagement in academic dishonesty may weaken opportunities for intellectual growth and reflective learning, thereby contributing to lower critical thinking performance.

The findings further revealed that cognitive strategies positively predicted critical thinking. This result is theoretically expected because cognitive strategies such as rehearsal, elaboration, organization, and comprehension facilitate deeper information processing and meaningful learning. Students who actively employ cognitive learning strategies are more likely to analyze information systematically, connect new knowledge to prior understanding, and engage in higher-order reasoning processes. These activities are closely related to the development of critical thinking skills. The present finding is consistent with the work of Pintrich and De Groot, who argued that cognitive learning strategies enhance students' academic performance by promoting active cognitive engagement with learning materials (Pintrich & De Groot, 1990). Similarly, Bakhshi and colleagues reported a positive relationship between self-regulation strategies and critical thinking among university students (Bakhshi et al., 2012). The positive influence of cognitive strategies on critical thinking observed in the present study therefore reinforces the notion that students' learning approaches play a crucial role in fostering analytical and evaluative thinking.

Another important finding was the positive direct effect of metacognitive strategies on critical thinking. Metacognitive strategies involve planning, monitoring, regulating, and evaluating one's own learning processes. Students who use metacognitive strategies are more likely to reflect on their thinking, identify weaknesses in their understanding, and adjust their learning behaviors accordingly. Such reflective processes are fundamentally aligned with the core dimensions of critical thinking. The finding is consistent with previous studies indicating that metacognitive awareness and self-monitoring contribute significantly to higher-order cognitive functioning and reflective judgment (Ghadampour et al., 2014; Kusmaryono, 2023). Moreover, critical thinking itself has often been conceptualized as a metacognitive process involving deliberate reflection and self-regulation of reasoning. Consequently, students who effectively regulate their cognitive activities are better positioned to evaluate information critically and make informed judgments.

The results also demonstrated that motivational beliefs positively influenced critical thinking. Motivational beliefs, including self-efficacy, goal orientation, intrinsic value, and academic engagement, provide the psychological foundation necessary for sustained cognitive effort and persistence. Students who believe in their abilities and value learning are more likely to invest effort in complex cognitive tasks, engage in reflective inquiry, and persist when confronted with challenging problems. These characteristics facilitate the development of critical thinking skills. This finding is consistent with the work of Pintrich and De Groot, who highlighted the central role of motivational factors in self-regulated learning and academic achievement (Pintrich & De Groot, 1990). Similarly, Saepuloh and colleagues reported that educational approaches designed to enhance higher-order thinking skills also improve students' self-efficacy and critical thinking abilities (Saepuloh et al., 2021). Therefore, motivational beliefs appear to function as an important psychological resource that supports critical engagement with learning tasks.

The present study further found that academic dishonesty negatively predicted cognitive strategies, metacognitive strategies, and motivational beliefs. This finding suggests that students who engage more frequently in dishonest

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academic behaviors are less likely to utilize effective learning strategies and maintain positive motivational orientations. One possible explanation is that academic dishonesty reflects an avoidance-oriented approach to learning. Rather than investing effort in understanding material, dishonest students may seek immediate academic outcomes through shortcuts, thereby reducing their reliance on adaptive cognitive and metacognitive strategies. This interpretation aligns with research indicating that academic dishonesty is associated with weaker academic ethics, lower self-regulation, and maladaptive learning behaviors (Azadi et al., 2024; Azizian Kohan et al., 2022). Students who adopt dishonest academic practices may gradually become less motivated to engage deeply with learning activities, which in turn undermines the development of effective learning strategies.

The negative relationship between academic dishonesty and motivational beliefs may also be explained through self-efficacy and goal-orientation theories. Students who lack confidence in their academic abilities may be more likely to resort to dishonest practices when faced with academic challenges. At the same time, repeated engagement in cheating may prevent students from experiencing genuine mastery and competence, thereby weakening their motivational beliefs over time. Research on academic cheating interventions has demonstrated that improving students' psychological functioning and cognitive-emotional regulation can reduce cheating behavior and promote healthier academic engagement (Ocheni et al., 2025). Likewise, initiatives designed to strengthen academic integrity have been found to improve students' commitment to authentic learning and ethical academic conduct (Guruge et al., 2025; Vo et al., 2025).

Perhaps the most significant contribution of the present study lies in the finding that self-regulated learning strategies mediated the relationship between academic dishonesty and critical thinking. Specifically, cognitive strategies, metacognitive strategies, and motivational beliefs each functioned as significant mediators. This result suggests that academic dishonesty does not merely affect critical thinking directly; rather, it also influences the learning processes that facilitate the development of critical thinking. Students who engage in academic dishonesty may become less likely to employ effective cognitive and metacognitive strategies and may experience lower motivational engagement. These deficiencies subsequently reduce opportunities for critical analysis, reflective reasoning, and intellectual growth.

This mediating mechanism is highly consistent with self-regulated learning theory. According to Pintrich and De Groot, self-regulated learning involves the integration of cognitive, motivational, and behavioral processes that enable students to achieve meaningful learning outcomes (Pintrich & De Groot, 1990). When academic dishonesty undermines these processes, the development of critical thinking is likely to suffer. Previous research has repeatedly demonstrated strong connections between self-regulated learning and critical thinking (Bakhshi et al., 2012; Ghadampour et al., 2014; Kusmaryono, 2023). The present findings extend this literature by showing that self-regulated learning strategies serve as a mechanism through which academic dishonesty influences critical thinking outcomes.

The findings are also consistent with intervention-based studies demonstrating that strengthening self-regulated learning and critical thinking simultaneously produces positive educational outcomes. Mohammadi and colleagues found that training in self-regulated learning strategies and critical thinking improved students' well-being and educational functioning (Mohammadi et al., 2024). Similarly, Fahami and Emami Zavareh reported that critical thinking training enhanced self-regulation and reduced maladaptive cognitive patterns among secondary school students (Fahami & Emami Zavareh, 2024). Research on blended learning and media literacy education has likewise demonstrated that educational environments promoting active learning, reflection, and self-regulation contribute significantly to critical thinking development (Asgari Majareh et al., 2021; Mesquita-Romero et al., 2022; Pagán-Castaño et al., 2025; Pierre, 2024). Together, these findings support the view that educational programs designed to strengthen self-regulated learning may simultaneously reduce academic dishonesty and enhance critical thinking.

5. Conclusion

In summary, the findings of the present study provide strong evidence that academic dishonesty is detrimental to students' critical thinking and that self-regulated learning strategies represent a crucial mechanism underlying this relationship. Students who engage in dishonest academic behaviors appear less likely to utilize adaptive cognitive, metacognitive, and motivational processes, thereby limiting opportunities for critical reflection and higher-order thinking. Conversely, fostering self-regulated learning strategies may not only strengthen critical thinking but also contribute to the promotion of academic integrity and ethical

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educational practices. The results therefore highlight the importance of addressing academic dishonesty and self-regulated learning simultaneously when seeking to enhance students' cognitive and academic development.

Several limitations should be considered when interpreting the findings of the present study. First, the study employed a cross-sectional correlational design, which limits the ability to draw causal conclusions regarding the relationships among academic dishonesty, self-regulated learning strategies, and critical thinking. Second, all variables were assessed using self-report questionnaires, which may have increased the possibility of social desirability bias and response distortion. Third, the study was conducted among upper-secondary school students in a single city, which may restrict the generalizability of the findings to students in other educational levels, cultural contexts, or geographic regions. Finally, other potentially influential variables such as family environment, academic stress, school climate, and personality characteristics were not examined.

Future studies should employ longitudinal and experimental designs to better establish causal relationships among academic dishonesty, self-regulated learning strategies, and critical thinking. Researchers may also investigate additional mediating and moderating variables, including academic motivation, psychological well-being, emotional regulation, resilience, and school engagement. Comparative studies across different educational levels and cultural contexts would further contribute to understanding the generalizability of the findings. In addition, qualitative investigations could provide deeper insights into students' perceptions of academic dishonesty and the cognitive processes underlying critical thinking development.

Educational institutions should develop comprehensive programs aimed at simultaneously strengthening academic integrity and self-regulated learning skills. Teachers can incorporate instructional practices that promote metacognitive reflection, independent learning, problem-solving, and ethical decision-making. Schools may also provide workshops designed to enhance students' motivational beliefs, self-efficacy, and critical thinking competencies. Creating supportive learning environments that encourage authentic learning, academic responsibility, and active engagement may reduce dishonest academic behaviors while fostering higher-order cognitive development. Furthermore, curriculum developers should integrate critical thinking and self-regulated learning instruction across subject areas to promote sustained intellectual growth and ethical academic conduct among students.

Authors' Contributions

Authors equally contributed to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

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Declaration of Interest

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

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