



Research Paper

Predicting Critical Thinking Based on Self-Efficacy Beliefs with the Mediating Role of Solution-Building Mindset in Students



Mohammadreza Yaghubi¹, Faezeh Niroomand², Alireza Mollaie Mehneh^{3*}, Akbar Atadokht⁴

1. Faculty of Educational Science and Psychology, University of Mohaghegh Ardabili, Ardabil, Iran.

2. Master of Science in Clinical Psychology, Department of Clinical Psychology, Neyshabur Branch, Islamic Azad University, Neyshabur, Iran.

3. Faculty of Educational Science and Psychology, University of Mohaghegh Ardabili, Ardabil, Iran.

Corresponding author: alirezamollaie1380@gmail.com

4. Faculty of Educational Science and Psychology, University of Mohaghegh Ardabili, Ardabil, Iran.

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Abstract

This study aimed to investigate the predictive role of self-efficacy beliefs in critical thinking among university students, with the solution-building mindset as a mediating variable. It sought to explore how these psychological constructs interact to enhance students' cognitive and intellectual development, emphasizing their implications for academic success and lifelong learning. A correlational design with path analysis was employed, involving 211 students (113 female, 98 male) from the University of Mohaghegh Ardabili in the 2025 academic year, selected via cluster sampling. Data were collected using Ricketts' Critical Thinking Questionnaire, Sherer's General Self-Efficacy Scale, and the Solution-Building Inventory. Results revealed significant positive correlations ($p \leq 0.01$) between critical thinking (and its subcomponents: creativity, maturity, commitment), self-efficacy beliefs, and solution-building mindset. Path analysis confirmed good model fit (CFI, IFI, GFI, RMSEA), with direct paths from self-efficacy to solution-building mindset ($p < 0.001$), self-efficacy to critical thinking ($p < 0.001$), and solution-building mindset to critical thinking ($p < 0.001$). The indirect effect of self-efficacy on critical thinking via solution-building mindset was also significant ($p < 0.001$), indicating mediation. Standardized coefficients underscored the solution-building mindset's role in enhancing critical thinking outcomes. The study confirms that self-efficacy beliefs significantly predict critical thinking, with the solution-building mindset mediating this relationship, fostering creativity, commitment, and maturity. These findings highlight the importance of cultivating self-efficacy and solution-focused thinking to enhance students' analytical skills and psychological well-being. Universities should implement workshops integrating solution-focused techniques, such as goal-setting and resource identification, to boost self-efficacy and critical thinking. Faculty training programs should encourage educators to model solution-building behaviors, creating reflective and collaborative classroom environments. Future research should employ longitudinal designs and objective measures to validate findings across diverse populations. These interventions can empower students to navigate academic and professional challenges, fostering independent and innovative thinkers equipped for the modern world.

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Introduction

The university years represent one of the most significant stages in an individual's life, providing opportunities to develop skills and prepare for the workforce. This period is crucial for fostering personal and professional competencies, forming positive habits, enhancing cognitive flexibility, and acquiring professional skills (*David et al., 2024*). Among the critical cognitive skills developed during this time is critical thinking. Critical thinking refers to the ability to evaluate information, question assumptions, and make reasoned judgments based on evidence. It encompasses cognitive skills such as analysis, interpretation, inference, explanation, and self-regulation, enabling individuals to reflect on and reason about what they hear or read without accepting information at face value (*García-Carmona, 2025*). This process helps identify biases, recognize logical fallacies, and make informed decisions (*García-Carmona, 2025*).

Recent research emphasizes the role of critical thinking in educational settings, particularly in universities, and its impact on students' academic success (*Butler, 2024*). Critical thinking enables students to analyze, evaluate, and synthesize information skills essential for academic achievement and lifelong learning. It encourages deep engagement with course content, questioning assumptions, and developing reasoned arguments (*Yang, 2024*). By fostering critical thinking, students can become independent learners capable of navigating the vast amount of information in today's digital age (*Abdul Razzak, 2016*). Critical thinking also

equips students to articulate ideas, evaluate others' arguments, and collaborate effectively in academic and professional settings (*Dumitru & Halpern, 2023*). Scholars argue that cultivating critical thinking in students creates a dynamic and progressive environment in universities and society (*Butler, 2024*).

A key psychological factor associated with critical thinking is self-efficacy. Self-efficacy refers to an individual's belief in their ability to organize and execute actions required to achieve specific goals. Extensively studied in recent years, this concept highlights the role of personal judgment in one's capacity to perform tasks and overcome challenges (*Bandura & Wessels, 1997*). Self-efficacy influences how individuals think, feel, and act (*Bandura & Wessels, 1997*). High self-efficacy enhances motivation and persistence, leading to improved performance and outcomes in various domains, including academia (*Saks, 2024*). Individuals with high self-efficacy are more likely to set challenging goals, remain committed to them, and recover quickly from setbacks (*Vancouver et al., 2018*). Self-efficacy is a critical factor in self-directed learning, as students with high self-efficacy actively seek additional resources and learning opportunities (*Hao, 2025*). Such individuals also demonstrate greater creativity, initiative, adaptability, and flexibility (*Tao et al., 2024*).

Several variables may mediate the relationship between critical thinking and self-efficacy, one of which is the solution-building mindset (SBM). Mindset refers to a set of thoughts, beliefs, and attitudes that

predict individuals' behaviors in various situations and determine their responses to challenges and stimuli (Yeager *et al.*, 2022). Mindset is particularly important during the university years, as it is positively associated with physical and mental health, learning styles, and future success (Yeager *et al.*, 2022). The solution-building mindset, rooted in postmodern therapeutic approaches, was first introduced in the work of Steve de Shazer and Insoo Kim Berg (De Shazer & Berg, 1992). Through their development of Solution-Focused Brief Therapy (SFBT), de Shazer and Berg invited individuals to adopt a new way of thinking and living. Unlike traditional therapies that focus on identifying and resolving problems, SFBT emphasizes individuals' desires and hopes. The solution-building mindset is not merely a collection of SFBT assumptions but a lifestyle and culture that avoids dwelling on problems and their consequences. Consequently, it is logically associated with psychological well-being and positive emotions (Grant *et al.*, 2012). This mindset encourages individuals to focus on hopes, goals, and pathways to achieve them rather than problems (Karahana & Hamarta, 2020). A key characteristic of this lifestyle is that individuals directly discuss solutions and aspirations (Karahana & Hamarta, 2020). In contrast, individuals with a problem-focused mindset tend to dwell on problems and their causes, whereas those with a solution-building mindset seek to identify resources and exceptions to problems (Grant *et al.*, 2012). These individuals first envision their goals, then design and implement small steps toward achieving them using internal and external resources (Grant *et al.*, 2012).

Previous studies indicate a positive and significant relationship between solution-building mindset, hope, and positive emotions in students (Arslan & Asici, 2022). Additionally, solution-building mindset is positively associated with the quality of interpersonal relationships and cognitive flexibility (Mollaei Mehneh *et al.*, 2024). Grant *et al.* (2012) also found a negative and significant relationship between solution-building mindset and depressive symptoms. The present study aimed to investigate the role of self-efficacy beliefs in predicting critical thinking, with the mediating role of solution-building mindset in student

Materials and Methods

The study population consisted of students at the University of Mohaghegh Ardabili in the academic year 2024–2025. A sample of 211 students (113 female, 98 male) was selected using cluster sampling. Of these, 86 were undergraduate students, 65 were master's students, and 60 were doctoral students. After obtaining necessary permissions from the university's research deputy, questionnaires were distributed and completed by the participants. Inclusion criteria included being a student at the University of Mohaghegh Ardabili, completing the questionnaires, and willingness to participate. Exclusion criteria included incomplete questionnaires. Participants were assured that their data would remain confidential and used solely for research purposes. Data were collected using Ricketts' Critical Thinking Questionnaire, Sherer and Maddox's Self-Efficacy Scale (SGSES), and the Solution-Building

Inventory (SBI). The study employed a correlational design with path analysis to examine the direct and indirect effects of variables.

Ricketts' Critical Thinking Questionnaire (2003): This questionnaire, developed by [Ricketts \(2003\)](#), measures critical thinking and consists of 33 items across three subscales: creativity (11 items), maturity (9 items), and commitment (13 items). Responses are based on a 5-point Likert scale. The total score is calculated by summing the scores of the three subscales, with scores of 33–66 indicating weak critical thinking, 66–99 indicating moderate critical thinking, and above 99 indicating strong critical thinking. [Biabangard \(2012\)](#) reported correlation coefficients for test-retest reliability of 0.77 for the total sample, 0.88 for females, and 0.67 for males, indicating good validity. [Eizadifard \(2010\)](#) reported Cronbach's alpha coefficients of 0.94 for the total sample, 0.95 for females, and 0.92 for males. In the present study, Cronbach's alpha was 0.76.

Sherer's General Self-Efficacy Scale (SGSES): Developed by [Sherer et al. \(1982\)](#), this scale assesses self-efficacy. The original version included 36 items, but after factor

analysis, 13 items with factor loadings below 0.40 were removed, resulting in 23 items. Of these, 17 items measure general self-efficacy (mean = 57.99, SD = 12.8). Cronbach's alpha coefficients for the general and social self-efficacy subscales were 0.86 and 0.71, respectively ([Sherer et al., 1982](#)). The scale was translated and validated in Persian by [Barati \(1997\)](#), who reported a split-half reliability of 0.76 (Spearman-Brown) and 0.75 (Guttman). [Barati \(1997\)](#) reported a Cronbach's alpha of 0.80. In the present study, Cronbach's alpha was 0.72.

Solution-Building Inventory (SBI): Designed by [Jordan \(2014\)](#), this 12-item questionnaire measures solution-building mindset using a 5-point Likert scale (from "strongly disagree" to "strongly agree"). Higher scores indicate a stronger solution-building mindset. [Jordan \(2014\)](#) reported a Cronbach's alpha of 0.83, while [Jordan \(2014\)](#) reported 0.90 in a clinical population. [Mollaei Mehneh et al. \(2024\)](#) confirmed the convergent and face validity of the Persian version and reported a Cronbach's alpha of 0.83. In the present study, Cronbach's alpha was 0.85.

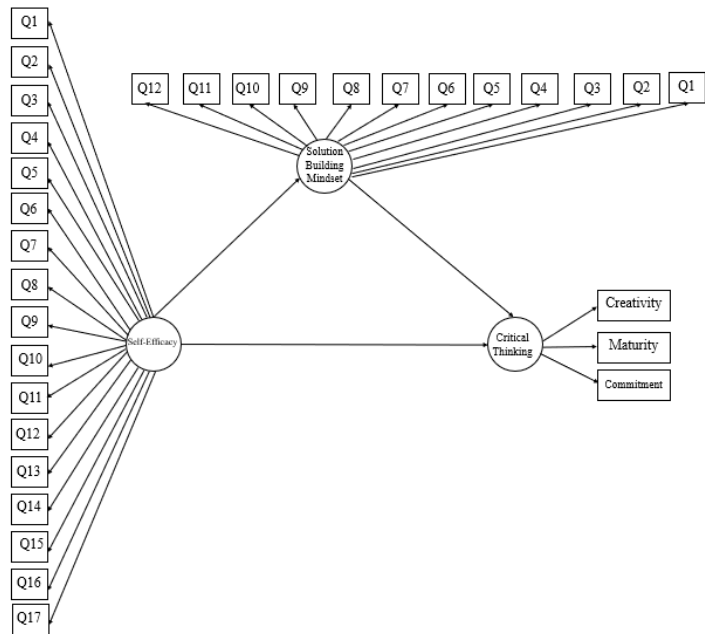


Figure 1. Proposed model of relationships among variables

Finding

Demographic data are presented in Table 1. The mean age of participants was 24.71 years (SD = 3.159).

Table 1. Demographic characteristics of the examined samples

Demographic variables	frequency	percentage
Gender		
Female	113	56.4
Male	98	44.6
Total	211	100

Table 2. Means, Standard Deviations, and Correlations Among Variables

Variables	Mean	SD	1	2	3	4	5	6
1. Critical Thinking	120.06	9.76	1					
2. Creativity	43.26	5.14	0.78**	1				
3. Maturity	32.29	4.72	0.72**	0.43**	1			
4. Commitment	44.50	3.50	0.74**	0.31**	0.33**	1		
5. Solution-Building Mindset	49.64	4.67	0.57**	0.52**	0.39**	0.37**	1	
6. Self-Efficacy Beliefs	63.41	9.74	0.40**	0.42**	0.28**	0.20**	0.56**	1

As shown in Table 2, creativity scores were positively and significantly correlated with self-efficacy beliefs, solution-building mindset, maturity, and commitment. Maturity scores were positively and significantly correlated with self-efficacy beliefs, solution-building mindset, and commitment. Commitment scores were positively and significantly correlated with self-efficacy

beliefs and solution-building mindset. Solution-building mindset scores were positively and significantly correlated with self-efficacy beliefs. Critical thinking was positively and significantly correlated with solution-building mindset and self-efficacy beliefs. All correlations were significant at $p \leq 0.01$.

Table 3. Fit indices of the proposed model

Model	X ² /df	CFI	RMSEA	IFI	GFI	AGFI
	2.43	0.97	0.073	0.97	0.98	0.89

The fit indices (CFI, IFI, RMSEA, GFI) presented in Table 3 indicate that the proposed model has a good fit.

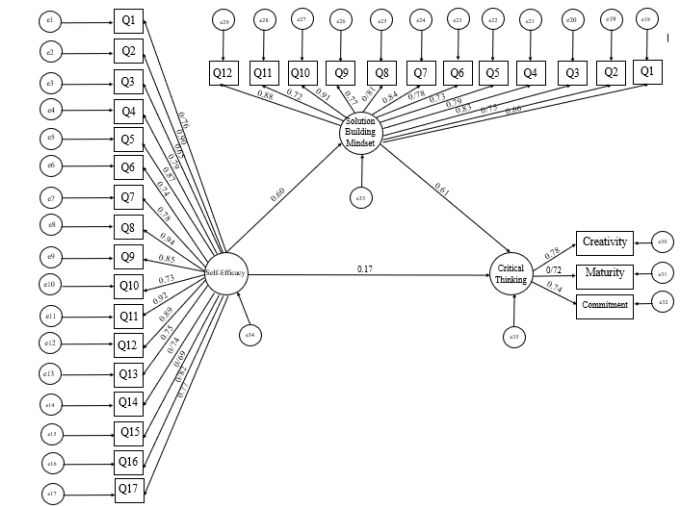


Figure 2. Standardized coefficients of the proposed model among critical thinking, self-efficacy beliefs, and solution-building mindset

Figure 2 illustrates positive and significant relationships between critical thinking and self-efficacy beliefs, as well as between solution-building mindset and both critical thinking and self-efficacy beliefs.

Table 4 presents the direct and indirect effects of independent variables on dependent variables. The direct paths from self-efficacy beliefs to solution-building mindset, self-efficacy beliefs to critical thinking, and solution-building mindset to critical thinking were significant at $p < 0.001$, indicating

positive and significant relationships. The indirect path from self-efficacy beliefs to

critical thinking was also positive and significant at $p<0.001$.

Table 4. Direct and indirect effect of independent variables on dependent

independent variable	dependent variable	Direct effect	Indirect effect	total effect	P
Self-Efficacy Beliefs	Solution-Building Mindset	0.60	---	0.60	0.001
Self-Efficacy Beliefs	Critical Thinking	0.17	0.36	0.54	0.001
Solution-Building Mindset	Critical Thinking	0.61	---	0.61	0.001

The indirect effect of self-efficacy beliefs on critical thinking through solution-building

mindset was examined using the bootstrap method, with results presented in Table 5.

Table 5. The indirect effect of Optimism on Resilience

Variables			Indirect effects				
independent	mediating	dependent	B	Eror	Min	Mix	P
Self-Efficacy Beliefs	Solution-Building Mindset	Critical Thinking	0.29	0.07	0.16	0.44	0.001

Based on the standardized coefficients in Table 5, the indirect effect of self-efficacy beliefs on critical thinking through solution-building mindset was significant at $p < 0.001$.

Discussion & Conclusions

This study sought to elucidate the predictive relationship between self-efficacy beliefs and critical thinking among university students, with the solution-building mindset as a mediating variable. The findings robustly demonstrate that self-efficacy beliefs serve as a significant predictor of critical thinking, exerting both direct and indirect effects through the solution-building mindset. These results align with prior research, including studies by *Karahan and Hamarta (2020)*, *Arslan and Asıcı (2022)*, and *Dehghani et al.*

(2011), which collectively underscore the interplay between cognitive and psychological constructs in fostering analytical and reflective thinking. Critical thinking, characterized by the ability to analyze, evaluate, and synthesize information without bias, is a cornerstone of rational decision-making and intellectual independence (*García-Carmona, 2025*). By enabling students to question assumptions, identify logical fallacies, and engage in evidence-based reasoning, critical thinking transforms academic and professional environments into dynamic spaces for innovation and collaboration (*Dumitru & Halpern, 2023*).

The indirect effect of self-efficacy beliefs on critical thinking, mediated by the solution-building mindset, highlights the pivotal role of cognitive orientation in shaping intellectual outcomes. The solution-building mindset, rooted in solution-focused brief therapy (SFBT), encourages individuals to prioritize aspirations, resources, and actionable steps over problem-centric thinking. This forward-looking approach fosters psychological well-being and positive emotions, as individuals shift their focus from deficits to possibilities (*Grant et al., 2012*). The significant positive relationships between solution-building mindset, self-efficacy beliefs, and critical thinking suggest a synergistic mechanism: students with high self-efficacy are more likely to adopt a solution-building mindset, which in turn enhances their ability to engage in critical thinking. This process is particularly evident in the subcomponents of critical thinking creativity, maturity, and commitment. The solution-building mindset promotes creativity by encouraging students to explore novel solutions, fosters commitment by aligning actions with self-determined goals, and enhances maturity by cultivating self-reliance and resilience (*Mollaei Mehneh et al., 2024*). These findings have profound implications for educational practice. Universities should prioritize interventions that bolster self-efficacy and cultivate solution-building mindsets to enhance critical thinking skills. For instance, workshops that integrate solution-focused techniques, such as goal-setting exercises and resource identification, could empower students to approach challenges with confidence and creativity. Faculty

development programs could also train educators to model solution-building behaviors, creating classroom environments that encourage questioning, reflection, and collaborative problem-solving. Moreover, the positive association between solution-building mindset and psychological well-being suggests that such interventions could yield dual benefits, enhancing both academic performance and mental health. Given the significant correlations between solution-building mindset and interpersonal relationships, as well as cognitive flexibility (*Mollaei Mehneh et al., 2024*), future research should explore how these factors interact with critical thinking in diverse educational and professional contexts.

Despite its contributions, this study has limitations that warrant consideration. The reliance on self-report questionnaires introduces potential biases, as responses may reflect participants' transient states rather than stable traits. Additionally, the sample was limited to university students, whose age, psychological status, and academic pressures may not fully represent other populations. To enhance generalizability, future studies should include diverse groups, such as teachers, adolescents, or clinical populations, and incorporate objective measures, such as cognitive assessments, to validate self-reported data. Longitudinal designs could further clarify the causal relationships between self-efficacy, solution-building mindset, and critical thinking, shedding light on how these constructs evolve over time.

In conclusion, this study underscores the critical interplay between self-efficacy

beliefs, solution-building mindset, and critical thinking, offering a nuanced understanding of how psychological and cognitive factors converge to shape intellectual development. By fostering self-efficacy and solution-building mindsets, educators can empower students to become independent, reflective, and innovative thinkers, equipped to navigate the complexities of the modern world. These insights call for a paradigm shift in educational strategies, emphasizing holistic approaches that integrate cognitive, emotional, and behavioral dimensions to prepare students for lifelong learning and societal impact.

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