KMAN PUBLISHING INSTITUTE
Journal Website

Article history:
Received 10 February 2025
Revised 14 April 2025
Accepted 19 April 2025
Published online 10 May 2025

Journal of Adolescent and Youth Psychological Studies

Volume 6, Issue 5, pp 1-9

E-ISSN: 2981-2526

The Effectiveness of Dynamic Mindset Training on Students' Buoyancy and Academic Self-Efficacy

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A r t i c l e I n f o

Article type:
Original Research

How to cite this article:
Abdieh, S., Delavarpour, M., Tabatabaee, S. M., & Moradi, S. (2025). The Effectiveness of Dynamic Mindset Training on Students' Buoyancy and Academic Self-Efficacy. *Journal of Adolescent and Youth Psychological Studies, 6*(5), 1-9.
http://dx.doi.org/10.61838/kman.jayps.6.5.8

A B S T R A C T

Objective: This research aimed to determine the effectiveness of dynamic mindset training on the buoyancy and academic self-efficacy of secondary school students.

Methods and Materials: The research method was quasi-experimental with a pre-test-post-test design, including three follow-up assessments. A total of 37 female high school students from District 1 of Tehran in the academic year 2023-2024 were selected using purposive sampling and were randomly assigned to experimental and control groups. Initially, both groups completed the Academic Buoyancy Questionnaire (Dehghanizadeh & Hossein Chari, 2013) and the Academic Self-Efficacy Scale (Morgan & Jinks, 1999) as pre-tests. The experimental group then participated in 10 sessions of dynamic mindset training, each lasting 90 minutes, while the control group received no intervention. Following the training, both groups underwent post-tests and follow-up assessments. Data analysis was conducted using repeated measures analysis of variance.

Findings: The findings indicated a significant increase in post-test and follow-up scores for academic buoyancy and self-efficacy in the experimental group ($p < 0.001$).

Conclusion: Therefore, it is suggested that dynamic mindset training be implemented to enhance students' academic buoyancy and self-efficacy.

Keywords: *dynamic mindset, academic buoyancy, academic self-efficacy.*

1. Introduction

The growth and development of all societies depend on their educational systems. Today, education constitutes a significant part of individuals' lives, and both the quality and quantity of education have profound effects on their future (Badali et al., 2022; Hasnur et al., 2025). Given that student success in school is the fundamental goal of any educational system, providing positive experiences for learners in all psychological, emotional, social,

behavioral, and biological dimensions is crucial (King, 2025; Mashraki, 2025). Throughout life, individuals encounter various challenges, opportunities, and constraints, some of which occur during their educational journey. School years involve cognitive, social, and emotional changes that require students to develop adaptive strategies. Therefore, understanding and managing various academic challenges is of great importance (Leenknecht et al., 2021).

One of the critical factors in students' academic performance is academic buoyancy. Academic buoyancy is an internal sense that ensures students' mental well-being and has been described by researchers as a beneficial, desirable, straightforward, and essential construct for understanding students' well-being (Thomas & Allen, 2021). This variable significantly enhances students' coping abilities when facing academic challenges. Academic buoyancy reflects academic resilience within the framework of positive psychology (Granziera et al., 2022). Students with higher academic buoyancy actively participate in health-related activities, utilize their resources more efficiently, and mobilize greater energy reserves (Thomas & Allen, 2021). Similar to other psychological constructs, academic buoyancy is influenced by environmental and social factors; however, given its relatively recent emergence as a research focus, its environmental antecedents have been studied to a limited extent (Razi & Asadi Mojreh, 2022).

Additionally, a review of research indicates that students' academic success is influenced by their self-efficacy (Sims & Skarbek, 2019). Bandura (1997) identified self-efficacy as a cognitive process that contributes to the development of social behaviors and personal characteristics (Burger et al., 2020). Academic self-efficacy, a subdimension of self-efficacy, refers to students' beliefs in their abilities and skills to complete academic tasks and achieve school-related goals, as well as their self-assessment after completing these tasks (Alemany-Arrebola et al., 2020). Studies show that experiences, interactions with the environment, behavior, and school context play crucial roles in shaping academic self-efficacy (Li & Xu, 2020). Students with high academic self-efficacy believe they can reduce academic stressors and, as a result, demonstrate greater confidence (Pianta & Stuhlman, 2014). Academic self-efficacy is also a predictor of positive behaviors. Moreover, students with higher self-efficacy experience fewer difficulties in stressful academic situations and achieve better academic performance while experiencing less social anxiety (Naz et al., 2022).

A review of the existing literature suggests that various interventions have been implemented to improve student characteristics associated with academic achievement and performance, such as academic buoyancy and self-efficacy. These interventions include instructional design based on different models (Badali et al., 2022), self-regulation training (Cleary et al., 2017; Zangiabadi et al., 2019), and training in cognitive and metacognitive strategies (Noghabi, 2016; Radfar et al., 2019).

One of the innovative and effective educational programs designed to enhance students' cognitive capabilities is Dweck's dynamic mindset training. The dynamic mindset program is a social-cognitive structure that has recently gained attention in psychology as a supportive factor for adolescents in coping with adverse life events. Dweck (2006) introduced two types of intelligence beliefs: fixed and growth mindset (Dweck, 2008; Dweck & Yeager, 2019). The dynamic mindset training program is based on Dweck's theory of growth intelligence beliefs. Individuals with a dynamic mindset perceive intelligence as a flexible trait that can be developed through learning and effort, leading them to focus on growth and improvement. In contrast, individuals with a fixed intelligence belief consider intelligence to be a static trait that cannot change. This latter group is more concerned with proving their competencies to others (Dweck, 2008; Dweck & Yeager, 2019).

A fixed intelligence belief is associated with mental health issues (Naz et al., 2022), negative emotions (King et al., 2012), anxiety and depression (Cromley, 2014), and procrastination (Howell & Buro, 2009). Dweck and Yeager (2019) found that students with a dynamic mindset, compared to those with a fixed mindset, are less affected by negative emotions when they encounter academic difficulties. These students are more likely to maintain and enhance positive emotions (Dweck & Yeager, 2019). Research on the dynamic mindset has shown that it predicts lower anxiety, reduced helplessness attributions, lower emotional arousal, and increased experiences of joy and pride (Blackwell et al., 2007). Moreover, a dynamic mindset predicts school satisfaction, enjoyment of learning (Martin et al., 2013), and lower dropout rates (Cromley, 2014).

As observed, prior research has primarily focused on academic success and learning achievements, while less attention has been given to psychological aspects such as academic buoyancy and self-efficacy. Given the significance of these variables in improving academic outcomes, dynamic mindset training could play a crucial role in enhancing the quality of education. However, further

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research is necessary to examine whether dynamic mindset training can effectively improve students' academic buoyancy and self-efficacy.

2. Methods and Materials

2.1. Study Design and Participants

The present study employed an applied, quasi-experimental research design with a pre-test, post-test, and follow-up assessments, utilizing two experimental groups and one control group. The statistical population consisted of all female secondary school students in District 1 of Tehran during the 2022-2023 academic year. From this population, after obtaining permission from the Department of Education and acquiring a list of secondary schools, the researcher explained the study to school administrators. As a result, 130 students expressed their willingness to participate. Following an eligibility assessment based on the inclusion criteria, 40 students were selected using convenience sampling.

The final sample consisted of 40 students, with 20 participants assigned to each group. The inclusion criteria were as follows: female students in grades 10 to 12, no history of specific learning disorders, no prior psychiatric disorders (based on self-reports, parental reports, and school counselor assessments), and willingness to cooperate and participate in the study. The exclusion criteria included concurrent participation in other psychological therapy sessions, unwillingness to continue the intervention, incomplete responses to the research instruments, and absence from two or more training sessions.

The study procedure began with obtaining ethical approval. The researcher then visited secondary schools to recruit participants. Following the research announcement, 130 students expressed their interest. Those meeting the inclusion criteria were provided with detailed information about the study, and after obtaining informed consent, they were enrolled in the research. After finalizing the sample, 40 students were randomly assigned to two experimental groups and one control group. Three students withdrew for personal reasons after completing the initial questionnaire.

At the beginning of the study, all participants completed the research questionnaires. The experimental groups underwent Dweck's dynamic mindset training in ten 60- to 90-minute sessions, held once a week. The control group received no intervention. One week after completing the intervention, all participants completed the post-test questionnaires. A follow-up assessment was conducted three months later.

To maintain ethical considerations, at the end of the study, the control group was offered the opportunity to participate in the training sessions.

2.2. Measures

2.2.1. Academic Buoyancy

Dehghanizadeh and Hossein Chari (2013) developed the Academic Buoyancy Questionnaire based on the academic buoyancy scale by Martin and Marsh (2006), which originally contained four items. The adapted questionnaire consists of nine items, rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total score, obtained by summing responses across the nine items, ranges from 9 to 45, with higher scores indicating greater academic buoyancy. To assess the validity of this questionnaire, Dehghanizadeh and Hossein Chari (2013) conducted principal component analysis with varimax rotation, revealing factor loadings between 0.50 and 0.64. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.83, and Bartlett's test of sphericity (χ^2 = 360.611) confirmed sufficient factorability. The scree plot and eigenvalues greater than one indicated a single-factor structure, accounting for 37% of the variance in academic buoyancy. In a study by Sufiyan et al. (2022), the Cronbach's alpha coefficient for the questionnaire was reported as 0.80, with a test-retest reliability of 0.73. The correlation of individual items with the total score ranged from 0.51 to 0.68 (Emami Khotbesara et al., 2024). In the present study, Cronbach's alpha for this instrument was found to be 0.88.

2.2.2. Academic Self-Efficacy

The Academic Self-Efficacy Scale by Morgan and Jinks (1999) consists of 30 items measuring three components: ability, effort, and context. The original scale contained 59 items, which were evaluated by university professors, teachers, and students to assess content validity. Items deemed inappropriate or ambiguous were revised or removed. Factor analysis identified three subscales—ability, effort, and context—resulting in a final 30-item scale. Responses are recorded on a four-point Likert scale (1 = strongly disagree, 4 = strongly agree), with total scores ranging from 30 to 120. The internal consistency reliability (Cronbach's alpha) for the overall scale was 0.82, with

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subscale reliabilities of 0.78 for ability, 0.70 for context, and 0.66 for effort. Karimzadeh and Mohseni (2006) reported reliability coefficients of 0.76 for the total scale, 0.66 for the ability subscale, 0.65 for the effort subscale, and 0.60 for the context subscale (Shabani et al., 2024). In the present study, Cronbach's alpha for the Academic Self-Efficacy Scale was 0.86.

2.3. Intervention

2.3.1. Dweck's Dynamic Mindset Training

The dynamic mindset training program was developed based on Carol Dweck's theory of intelligence beliefs. Experts in the field confirmed the validity of the training package, which was implemented for the experimental groups in eight 60- to 90-minute training sessions.

Session 1: Introduction to the Structure and Process of Sessions

The first session focuses on providing an overview of the purpose and structure of the training program. The facilitator introduces themselves and allows participants to introduce themselves to the group. A general explanation of the training package, its components, and expected outcomes is provided. The session also includes a discussion of the rules and guidelines for participation to ensure a structured and respectful learning environment.

Session 2: Introduction to Mindfulness and Its Techniques

This session introduces the concept of mindfulness, defining its key elements and practical applications. Students learn mindfulness techniques such as thought stopping, reacting to change, and listing negative thoughts. The session includes in-class exercises and home assignments, such as mindful breathing, active listening, and reflection on unpleasant experiences. These activities help students develop awareness and self-regulation skills.

Session 3: Understanding Self-Awareness Skills

The session begins with a review of the previous session's key points and an assessment of assigned exercises. Participants are introduced to different theories of self-awareness and the factors influencing it. They learn about the components of self-awareness and strategies to enhance it. The session includes practical exercises aimed at improving introspection and emotional regulation, followed by home assignments.

Session 4: Continuation of Self-Awareness Skills

This session builds on the previous discussion by reinforcing self-awareness concepts. The focus shifts to understanding intelligence, different perspectives on intelligence, and the role of mindset in academic achievement. Students explore the psychological basis of intelligence and learn about fixed and growth intelligence beliefs, with real-life examples to illustrate these concepts.

Session 5: Understanding Intelligence and Intelligence Beliefs

Participants review their previous assignments and engage in discussions on real-life examples of individuals who, despite having average intelligence, achieved significant success through an incremental intelligence belief. The session highlights how adopting a growth mindset fosters resilience and persistence. Students reflect on their own beliefs about intelligence and how they can reshape them for academic success.

Session 6: Introduction to Attribution Styles

The session begins with a review of previous topics and a discussion of assigned exercises. Participants learn about the concept of attribution, the different types of attribution styles, and their impact on academic and personal motivation. The session also covers learned helplessness, its causes, and how it can be overcome. Real-life examples are provided to illustrate how attributions shape individuals' responses to challenges.

Session 7: Introduction to the Brain and Its Different Components

This session introduces participants to the structure of the brain and its major regions, including the frontal, parietal, occipital, and temporal lobes, along with their primary functions. Understanding the brain's role in learning and decision-making helps students appreciate the biological basis of intelligence and cognitive flexibility. Homework assignments encourage students to explore brain functions through self-reflection and observation.

Session 8: Continuation of Brain-Related Topics and Neuroplasticity

Building on the previous session, this session explores the concept of brain plasticity and how learning creates new neural connections. Students learn that the brain changes and strengthens with effort and practice, reinforcing the idea that intelligence and abilities are not fixed but can be developed over time. Home assignments encourage students to apply these insights to their own learning experiences.

Session 9: Introduction to Study Skills

This session focuses on academic skills that enhance learning efficiency. Participants are introduced to different study methods, time management strategies, and self-regulated learning techniques. They reflect on their current

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study habits and identify areas for improvement. The session includes practical demonstrations of effective study strategies, followed by home assignments for practice.

Session 10: Summary and Review of All Sessions

The final session is dedicated to reviewing and consolidating the key concepts covered throughout the program. Participants reflect on their learning experiences, discuss their progress, and share insights gained during the training. The session concludes with an appreciation ceremony, where students submit their workbooks and completed assignments. The facilitator provides final encouragement and recommendations for continued application of the growth mindset principles in academic and personal life.

2.4. Data Analysis

Given that data were collected at three time points (pre-test, post-test, and follow-up), repeated measures analysis of variance (ANOVA) was used for statistical analysis. Prior to conducting ANOVA, the assumptions of normality and homogeneity were tested using the Shapiro-Wilk test, Levene's test, Box's M test, and Mauchly's test.

3. Findings and Results

In this study, 37 students participated in two groups. The mean age of the control group was 17.65 years (SD = 1.05), while the mean age of the dynamic mindset group (Experimental Group 2) was 17.87 years (SD = 1.12). An analysis of variance (ANOVA) test showed that the difference in mean age between the groups was not statistically significant. The following sections present the main findings of the study.

Table 1

Means and Standard Deviations of Pre-test, Post-test, and Follow-up Scores for Academic Buoyancy and Academic Self-Efficacy by Group

Variable	Phase	Dynamic Mindset (M ± SD)	Control (M ± SD)
Academic Buoyancy	Pre-test	22.00 ± 6.43	22.84 ± 7.33
	Post-test	34.77 ± 4.25	23.21 ± 7.05
	Follow-up	36.00 ± 4.41	23.78 ± 6.57
Academic Self-Efficacy	Pre-test	58.44 ± 4.55	59.73 ± 6.14
	Post-test	83.77 ± 7.62	59.57 ± 6.30
	Follow-up	84.22 ± 7.93	59.47 ± 6.24

As indicated in Table 1, the mean scores for academic buoyancy and academic self-efficacy in the dynamic mindset group increased in the post-test and follow-up phases compared to the pre-test. However, there was no substantial difference between post-test and follow-up scores, suggesting stability of the intervention effects. In contrast, the control group's scores showed only minor variations across the three time points.

Table 2

Repeated Measures Analysis for Examining the Effect of Dweck's Dynamic Mindset Training on Students' Academic Buoyancy and Academic Self-Efficacy

Variable	Factor	Wilks' Lambda	F	Hypothesis df	Error df	p-value	Partial Eta Squared
Academic Buoyancy	Group Factor	0.219	60.451	2.000	34.000	0.001	0.781
	Group × Time Interaction	0.265	47.120	2.000	34.000	0.001	0.735
Academic Self-Efficacy	Group Factor	0.215	63.767	2.000	35.000	0.001	0.785
	Group × Time Interaction	0.210	65.980	2.000	35.000	0.001	0.790

Table 2 presents the results of the multivariate tests assessing the impact of Dweck's dynamic mindset training on students' academic buoyancy and academic self-efficacy. The results confirm that the interaction between group and time was statistically significant for both variables. Given the effect sizes of 0.735 and 0.785 for academic buoyancy and self-efficacy, respectively, it is evident that dynamic mindset training had a significant and positive effect on these variables.

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To further examine differences across the three time points (pre-test, post-test, and follow-up), pairwise comparisons were conducted. The results are presented in Table 3.

Table 3

Pairwise Comparisons of Mean Scores for Academic Buoyancy and Academic Self-Efficacy Across Three Time Points

Variable	Time A	Time B	Mean Difference	SD	p-value
Academic Buoyancy	Pre-test	Post-test	-12.772*	1.767	0.001
		Follow-up	-14.00*	1.619	0.001
	Post-test	Follow-up	-1.23	0.123	0.113
Academic Self-Efficacy	Pre-test	Post-test	-25.331*	1.189	0.001
		Follow-up	-25.780*	1.512	0.001
	Post-test	Follow-up	-0.452	0.152	0.132

The findings in Table 3 indicate that there was a statistically significant difference between the pre-test and post-test mean scores, as well as between the pre-test and follow-up scores, for both academic buoyancy and self-efficacy ($p < 0.01$). Specifically, the mean scores in the post-test and follow-up phases were significantly higher than in the pre-test.

Furthermore, no significant difference was found between post-test and follow-up scores, suggesting that the effects of the dynamic mindset training remained stable over time. This finding indicates that the intervention had a lasting impact on students' academic buoyancy and self-efficacy.

4. Discussion and Conclusion

Based on the findings presented in the fourth chapter, the results indicate that Dweck's dynamic mindset training has a significant and positive impact on academic buoyancy and academic self-efficacy. This means that the post-test and follow-up scores for self-defeating behaviors, academic buoyancy, and academic self-efficacy in the experimental group significantly changed compared to the pre-test scores. This finding aligns with previous studies (Li et al., 2024; Orth & Robins, 2022; Park & Jeong, 2022; Zander et al., 2018; Zhao et al., 2023{Suharsono, 2024 #40762)}.

Dweck and colleagues, through three decades of research and training, have demonstrated that motivation and academic resilience can be enhanced at different educational levels. In the Iranian context, studies on academic resilience and academic procrastination highlight serious challenges faced by students in these areas (Suharsono, 2024). Additionally, other studies have examined various educational interventions and their impact on students' academic outcomes. For instance, critical thinking training has been shown to enhance academic self-efficacy and learning styles in female high school students (Granziera et al., 2022). An intervention based on academic engagement effectively reduced self-defeating academic behaviors among secondary school students. Furthermore, self-regulated learning strategy training had a positive impact on academic self-efficacy and critical thinking skills in female high school students (Li & Xu, 2020). Moral intelligence training was found to improve academic ethics and academic self-efficacy among 10th-grade female students (Howard et al., 2021; King et al., 2012; Leenknecht et al., 2021; Levontin et al., 2013). Collectively, these findings suggest that targeted educational interventions can significantly enhance various aspects of students' academic performance, including self-efficacy, critical thinking, learning strategies, and ethical behavior. The body of research consistently highlights the potential of educational programs to positively influence academic outcomes and student behavior in high school settings.

One explanation for these findings is that dynamic mindset training, also known as a "growth mindset," is a concept introduced by Dweck that suggests individuals' abilities and talents can develop through effort and learning. This mindset is shaped by experiences and learning, encouraging individuals to embrace challenges and learn from failures. The concept has received considerable attention in educational and psychological research, as growth mindset training can influence students' academic and behavioral outcomes. Studies show that students with a growth mindset are less likely to engage in maladaptive behaviors. These individuals perceive failure not as a threat but as a learning opportunity, making them less likely to avoid challenges. Therefore, dynamic mindset training helps students use failures as opportunities for learning and growth. This perspective reduces self-defeating behaviors

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and encourages students to put in more effort, which in turn positively affects their academic buoyancy.

In the context of students' academic experiences, academic buoyancy is an essential factor that refers to a positive emotional state and motivation for daily activities. Students with a growth mindset typically experience greater academic buoyancy because they perceive challenges positively, believing that effort can enhance their skills, which in turn increases their sense of satisfaction with learning. This belief fosters greater motivation and enthusiasm for learning, ultimately leading to higher academic buoyancy. Consequently, fostering a growth mindset in educational environments can enhance students' resilience and motivation.

Regarding academic self-efficacy, this construct refers to students' beliefs in their ability to perform academic tasks successfully. Students with a growth mindset tend to exhibit higher academic self-efficacy, as they believe that effort and practice lead to academic success. This belief strengthens their persistence in the face of challenges and helps them learn from setbacks.

5. Limitations & Suggestions

Implementing dynamic mindset training can shift students' perceptions of intelligence and talent from fixed to growth-oriented, encouraging them to work harder, persist longer, and become more engaged in achieving their goals. This shift in mindset enhances their academic self-efficacy, ultimately improving their academic performance. The core idea is that if students are prepared for lifelong learning, educators must allocate sufficient time to help change students' fixed intelligence beliefs into growth-oriented ones. Such changes can have a profound impact on students' academic self-efficacy, enabling them to organize their academic plans more effectively to achieve higher performance. The findings suggest that dynamic mindset training has the potential to enhance academic self-efficacy and improve learning outcomes within educational systems.

Overall, Dweck's dynamic mindset training can have positive effects on self-defeating behaviors, academic buoyancy, and academic self-efficacy in high school students. Strengthening this mindset enables students to face challenges and achieve greater success in their learning and development. Therefore, implementing growth mindset-based educational programs in schools could improve the quality of education and support students' personal and academic growth.

The primary limitation of this study was the use of non-random sampling. Since the sample was drawn from a specific region, the results may be limited by the cultural and social conditions of that area, and caution should be exercised in generalizing the findings. Additionally, contextual and cultural differences were not controlled in this study. There is a possibility that participants overestimated the effects of the intervention due to contextual factors. Moreover, external influences such as social, economic, and familial pressures could also affect the study variables. To enhance the generalizability of the findings, future research should employ random sampling methods. Additionally, it is recommended that this study be conducted on both genders and in various regions to compare the results with the present findings. Lastly, future research should incorporate additional demographic variables, such as birth order, economic status, family conflicts, and parenting styles, as potential moderating variables.

Acknowledgments

We would like to express our appreciation and gratitude to all those who cooperated in carrying out this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

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

Transparency of Data

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

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

Authors' Contributions

All authors equally contributed to this article.

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JAYPS Adolescent and Youth Psychological Studies
E-ISSN: 2981-2526