The Effectiveness of Time Perspective Training on Academic Burnout, Self-Defeating Behavior, and Thought Control Strategies in Upper Secondary School Students

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ABSTRACT

This study aimed to examine the effectiveness of time perspective training on reducing academic burnout and self-defeating behavior and on improving thought control strategies among upper secondary school students. The study employed a quasi-experimental design with pretest, posttest, and follow-up assessments and a control group. Participants were 45 upper secondary school female students selected through purposive sampling and randomly assigned to experimental and control groups. The experimental group received a structured time perspective training program based on Zimbardo's theoretical framework delivered in 10 sessions over 8 weeks, while the control group received no intervention. Data were collected using the Academic Burnout Questionnaire, the Self-Defeating Behavior and Cognition Scale, and the Thought Control Questionnaire. Statistical analyses were conducted using univariate and multivariate analysis of covariance, with Bonferroni post hoc comparisons. After controlling for pretest scores, significant group effects were observed for academic burnout ($F = 316.32$, $p < .001$, $\eta^2 = .556$), self-defeating behavior ($F = 34.20$, $p < .001$, $\eta^2 = .430$), and thought control strategies ($F = 79.55$, $p < .001$, $\eta^2 = .369$). Bonferroni comparisons indicated that the experimental group demonstrated significantly lower levels of academic burnout and self-defeating behavior and significantly higher adaptive thought control at posttest compared with the control group ($p < .001$). These effects remained stable at follow-up. Time perspective training constitutes a highly effective intervention for improving academic and psychological functioning in adolescents and offers a promising approach for school-based mental health and educational support programs.

Keywords: *Time perspective; Academic burnout; Self-defeating behavior; Thought control strategies; Adolescents*

1. Introduction

Time perspective has emerged as one of the most influential psychological constructs for understanding how individuals organize experience, regulate behavior, and construct meaning across past, present, and future temporal frames. Originating from Zimbardo's theoretical model, time perspective refers to the cognitive-motivational process through which individuals partition experiences into temporal categories that subsequently guide emotional regulation, decision making, goal setting, and behavioral self-control (Fritsch & Cuervo-Lombard, 2022; McKay et al., 2022). Contemporary research consistently demonstrates that maladaptive time orientations—such as excessive focus on negative past events, present-fatalism, or impulsive present-hedonism—are associated with emotional distress, impaired self-regulation, academic difficulties, and vulnerability to psychological disorders, whereas a balanced time perspective is linked to psychological resilience, well-being, adaptive coping, and academic success (Rönnlund et al., 2019; San et al., 2022; Stolarski et al., 2020).

In educational contexts, the role of time perspective has become particularly salient as academic environments increasingly demand long-term goal commitment, sustained self-regulation, emotional endurance, and effective management of academic stressors. Adolescence, and especially the period of upper secondary education, represents a developmental stage in which temporal orientation undergoes major restructuring due to neurological maturation, identity formation, heightened academic pressure, and future-oriented life planning (Farzin et al., 2020; Park et al., 2020). Students' dominant time perspectives during this period strongly influence their academic motivation, learning strategies, emotional engagement, persistence in the face of setbacks, and vulnerability to burnout. Empirical evidence indicates that future-oriented students display higher academic engagement and adaptive academic emotions, whereas students with present-fatalistic or negative-past orientations are more susceptible to academic exhaustion, disengagement, procrastination, and maladaptive coping patterns (Codina et al., 2024; Farzin et al., 2020).

Academic burnout, characterized by emotional exhaustion, academic cynicism, and perceived academic inefficacy, has become a widespread phenomenon among secondary school students, particularly within highly competitive educational systems. Burnout undermines academic functioning, increases dropout risk, disrupts psychological well-being, and weakens long-term educational outcomes. Recent investigations suggest that students' time perspectives play a critical role in shaping burnout trajectories by influencing how academic demands are cognitively appraised, emotionally processed, and behaviorally managed (San et al., 2022; Stolarski et al., 2020). A future-oriented perspective promotes perseverance, delayed gratification, and strategic effort allocation, whereas a present-fatalistic orientation fosters helplessness, avoidance, and emotional withdrawal in response to academic stressors.

Alongside burnout, self-defeating behavior represents another significant risk factor in adolescent academic adjustment. Self-defeating behaviors include procrastination, impulsive decision making, avoidance, self-handicapping, and ineffective self-regulatory strategies that undermine personal goals and academic achievement. These behaviors often serve short-term emotional relief but generate long-term academic and psychological costs. Contemporary models of self-defeating behavior emphasize the role of cognitive control, temporal processing, and motivational regulation in the emergence and maintenance of such maladaptive patterns (Rostami, 2023; Roy et al., 2022). Students who lack a coherent future orientation and who experience temporal disorganization demonstrate greater susceptibility to impulsivity, procrastination, and self-sabotaging academic behaviors (Codina et al., 2024; Senyk et al., 2024).

Thought control strategies constitute another critical psychological mechanism underlying academic adjustment and emotional functioning. Thought control refers to the cognitive processes through which individuals regulate intrusive, distressing, or task-irrelevant thoughts. Maladaptive thought control strategies, such as excessive worry, rumination, self-punishment, and avoidance, are associated with heightened anxiety, impaired concentration, academic underperformance, and emotional dysregulation. In contrast, adaptive strategies, including cognitive reappraisal, attentional redirection, and flexible self-regulation, support emotional resilience and academic engagement (Alavi Langroodi et al., 2021; Moghadam et al., 2023). Research indicates that adolescents with ineffective thought control strategies experience greater academic stress, test anxiety, and academic burnout, underscoring the importance of cognitive regulation skills within educational interventions (Rostami, 2023; Roy et al., 2022).

Time perspective theory provides a powerful integrative framework for addressing these interrelated academic and

psychological challenges. A balanced time perspective—characterized by flexible access to positive past, present enjoyment, and future planning—has been repeatedly linked to improved self-regulation, emotional stability, psychological well-being, and academic performance (Rönnlund et al., 2019; Stolarski et al., 2020). Interventions grounded in time perspective theory aim to restructure maladaptive temporal biases, strengthen future-oriented goal commitment, enhance present-moment awareness, and promote adaptive emotional processing of past experiences.

Recent empirical studies have demonstrated the effectiveness of time perspective–based interventions across diverse populations and psychological outcomes. Time perspective interventions have been shown to enhance psychological well-being, meaning in life, vitality, resilience, and life satisfaction in adults and adolescents (Abaii & Bagheri, 2024; Roozitalab et al., 2022). In clinical populations, integrated programs combining time perspective therapy with positive psychotherapy have produced significant improvements in quality of life and psychological well-being among individuals with depression and chronic health conditions (Hemati et al., 2025; Zebihi et al., 2024). In educational contexts, time perspective interventions have yielded promising effects on academic motivation, academic fascination, academic sustainability, academic hope, and goal orientation among secondary school students, including those exposed to trauma and pandemic-related stress (Norouzi, 2024; Rezaie et al., 2024).

Moreover, time perspective training has demonstrated measurable benefits for cognitive and behavioral regulation. Interventions focused on future time perspective have improved career decision making, academic persistence, and self-regulatory capacity among adolescents and young adults (Park et al., 2020; Zarrinabadi et al., 2019). Research further indicates that modifying time perspective contributes to reductions in procrastination, impulsivity, and boredom while enhancing attentional control and emotional stability (Codina et al., 2024; Senyk et al., 2024). These findings support the theoretical proposition that temporal cognition constitutes a central organizing system for motivation, self-control, and adaptive functioning.

Despite this growing body of evidence, several gaps remain in the literature. First, most existing studies have examined time perspective interventions in university students or adult clinical populations, whereas comparatively fewer investigations have focused on upper secondary school students, a population experiencing intense academic demands and developmental vulnerability.

Second, the combined effects of time perspective training on academic burnout, self-defeating behavior, and thought control strategies have not been systematically examined within a single integrated model. Third, while prior research has established associations between time perspective and each of these constructs independently, there is limited experimental evidence clarifying the causal impact of time perspective training on this triad of academic and psychological outcomes in adolescents.

The current study addresses these gaps by implementing a structured time perspective training program based on Zimbardo's theoretical framework and empirically examining its effects on academic burnout, self-defeating behavior, and thought control strategies in upper secondary school students. Drawing upon evidence from psychological, educational, and clinical domains, this investigation seeks to clarify whether targeted temporal restructuring can simultaneously reduce academic exhaustion, weaken maladaptive self-regulatory behaviors, and strengthen adaptive cognitive control mechanisms among adolescents.

Accordingly, the aim of the present study was to determine the effectiveness of time perspective training on academic burnout, self-defeating behavior, and thought control strategies in upper secondary school students.

2. Methods and Materials

2.1. Study Design and Participants

The present study was classified as basic research and, in terms of methodology, employed a quasi-experimental design with pretest, posttest, and follow-up stages including a control group. The statistical population consisted of all female upper secondary school students in District 2 of Karaj during the 2023–2024 academic year. From among the upper secondary school students in District 2 of Karaj, 45 students were selected using multi-stage cluster random sampling and were randomly assigned to the experimental group and the control group (15 participants in each group). In the multi-stage cluster random sampling procedure, first District 5 was selected from among the districts of Karaj; then, one lower secondary school was randomly chosen from the schools in that district, and finally, one class from each selected school was randomly chosen. Based on purposive non-random sampling and pretest scores on the relevant questionnaires, 45 students who met the inclusion and exclusion criteria were selected as the final sample. Inclusion criteria included being an upper secondary school student, providing

informed consent to participate in the intervention program, commitment to attend all sessions until completion, not receiving individual counseling services outside the intervention sessions, obtaining cut-off scores on the academic burnout, self-defeating behavior, and thought control strategy questionnaires, and demonstrating acceptable levels of mental health (as indicated by obtaining acceptable scores on the Symptom Checklist-90; SCL-90). Exclusion criteria included absence from more than two sessions, use of psychiatric medications, and participation in individual or group psychotherapy sessions at counseling centers and clinics in Tehran.

Before implementation of the intervention, all participants were informed about the objectives and general procedures of the study, their questions were answered, and they were assured of the confidentiality of their personal information. After obtaining written informed consent, the intervention program was initiated.

Prior to conducting the study, official approval was obtained from the university and the research deputy. In the theoretical phase of the study, relevant books, journal articles, theses, and previous research were reviewed to examine existing perspectives and theories related to the research topic. In the field phase, after selecting the instruments and participants, each participant received individual preliminary instructions regarding the purpose of the study and the procedures for completing the questionnaires. Participants then completed the demographic information form and the research questionnaires. Those who obtained scores above the cut-off points on the academic burnout, self-defeating behavior, and thought control strategy questionnaires proceeded to the second phase of the study. Students who did not meet the cut-off criteria were excluded and replaced by other students randomly selected from the list of eligible students. This process continued until the required sample size was reached. As described in the sampling procedure, 45 students were ultimately selected using purposive non-random sampling and then randomly assigned to the experimental and control groups.

After orientation and establishment of effective communication, the structure and procedures of the intervention sessions were explained to the participants. The time perspective training intervention was then described in detail. The experimental group received the intervention, whereas the control group did not receive any form of treatment. Both groups were assessed separately at three time points: pretest, posttest, and follow-up. The first assessment occurred prior to the intervention, the second immediately after the intervention, and the third two months after the intervention for follow-up purposes. During this period, the control group continued with their regular routines. The training sessions were conducted accordingly. Finally, using data obtained from the pretest and posttest questionnaires and subsequent statistical analyses, the effectiveness of the intervention on the dependent variables was evaluated.

2.2. Measures

Self-Defeating Cognition and Behavior Questionnaire. The Self-Defeating Behavior and Cognition Scale was developed by Cunningham (2007). This questionnaire consists of 21 items designed to assess six types of self-defeating behavior: procrastination, self-handicapping, increased commitment, unreliable evaluation, impulsive behavior (inability to delay gratification), delay, and indecision (Cunningham, 2007). The psychometric properties of the procrastination and self-handicapping subscales were examined by Mohammadi et al. using principal component analysis with Varimax rotation. Based on the scree plot slope, two factors with eigenvalues greater than one were extracted, confirming the factor structure proposed by the scale developer. The Kaiser–Meyer–Olkin (KMO) index was .871 (p < .001). Cronbach's alpha coefficients for procrastination and self-handicapping were .62 and .69, respectively. In the present study, internal consistency of the four remaining subscales was also examined, yielding Cronbach's alpha coefficients of .69 for increased commitment, .71 for unreliable evaluation, .73 for impulsive behavior, and .62 for indecision and delay. Content validity of the instrument was reviewed and confirmed by subject-matter experts and the research team.

Academic Burnout Questionnaire. This 15-item instrument was developed by Breso et al. (2007) and is rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The three domains of academic burnout include academic exhaustion (Items 1, 4, 7, 10, and 13), academic cynicism (Items 2, 5, 11, and 14), and academic inefficacy (Items 3, 6, 8, 9, 12, and 15). The original authors reported reliability coefficients of .70, .82, and .75 for these three domains, respectively, and confirmed the construct validity of the scale using confirmatory factor analysis. Naeami (2009) reported validity coefficients of .38, .42, and .45 for the three domains by correlating the scale with the Student Stressors Questionnaire developed by Pouladi

Reyshahri (1995). In the present study, confirmatory factor analysis supported the validity of the questionnaire, and Cronbach's alpha coefficients for the three domains were .68, .71, and .74, respectively.

Thought Control Questionnaire. The Thought Control Questionnaire was developed by Wells and Davies (1994) to assess individual differences in the use of strategies for controlling intrusive thoughts. It contains 30 items across five subscales: distraction (Items 1, 9, 16, 19, 21, and 30), worry (Items 4, 7, 18, 22, 24, and 26), social control (Items 5, 8, 12, 17, 25, and 29), self-punishment (Items 2, 6, 11, 13, 15, and 28), and reappraisal (Items 3, 10, 14, 20, 23, and 27). Each subscale contains six items. The original developers reported a Cronbach's alpha of .64 for the subscales and a test–retest reliability coefficient of .67. In an Iranian study conducted on a sample of 100 participants, the overall Cronbach's alpha was .81, and alpha coefficients for the subscales were .79 for distraction, .70 for social control, .70 for worry, .76 for self-punishment, and .77 for reappraisal.

2.3. Intervention

The time perspective training intervention was implemented based on the theoretical framework of Zimbardo's Time Perspective Theory (Zimbardo, 1999) and was delivered in 10 structured group sessions over a period of 8 weeks, with each session lasting 90 minutes. The program began with rapport building, clarification of goals, introduction of the time perspective concept, and assessment of participants' dominant time orientations using the Zimbardo Time Perspective Inventory. Subsequent sessions focused on exploring psychological problems through the lens of time perspective, introducing diaphragmatic breathing and progressive muscle relaxation, establishing commitment through a written contract, and developing short-, medium-, and long-term goals using experiential exercises and prioritization techniques. Middle sessions

emphasized cognitive–emotional restructuring of past perspectives by transforming negative past representations into positive ones through letter writing, mindfulness practices, interpersonal skill training, empty-chair techniques, and recall of positive autobiographical memories combined with structured group activities and games. Later sessions addressed present-fatalistic and present-hedonistic orientations by identifying pleasurable and non-pleasurable activities, prioritizing adaptive behaviors, enhancing reflective decision-making, and strengthening self-regulation through interactive exercises. The final phase of the intervention emphasized future orientation by cultivating positive future thinking, clarifying personal goals, consolidating learned skills, resolving remaining difficulties, and establishing a balanced time perspective across past, present, and future domains. Continuous review, feedback, and experiential learning were embedded throughout the program to reinforce cognitive, emotional, and behavioral change.

2.4. Data analysis

For data analysis, univariate and multivariate analysis of covariance (ANCOVA) were employed. Effect sizes were calculated using eta-squared coefficients, and between-group differences were examined using the Bonferroni post hoc test. All statistical analyses were performed using SPSS software, Version 22.

3. Findings and Results

The results of the demographic analysis indicated that a total of 60 participants took part in this study and were equally assigned to three groups. Fifteen participants (33.3%) were assigned to the time perspective training group and 15 participants (33.3%) were assigned to the control group.

Table 1

Means and Standard Deviations [M (SD)] of Academic Burnout, Self-Defeating Behavior, and Thought Control Strategies by Group and Measurement Occasion

Variable	Group	Pretest M (SD)	Posttest M (SD)	Follow-up M (SD)
Academic Burnout	Time Perspective Training	55.7 (11.9)	45.2 (5.7)	47.4 (5.3)
	Control	51.3 (9.9)	51.3 (9.9)	—
Self-Defeating Behavior	Time Perspective Training	105.3 (15.2)	95.1 (11.2)	93.6 (8.8)
	Control	107.4 (12.3)	107.4 (12.3)	—
Thought Control Strategies	Time Perspective Training	65.2 (8.4)	58.3 (7.3)	59.3 (6.6)
	Control	64.2 (9.8)	64.2 (9.8)	—

The descriptive statistics presented in Table 1 indicate that students who received time perspective training demonstrated substantial improvements across all outcome variables compared with the control group. Specifically, the experimental group showed a marked reduction in academic burnout from pretest (M = 55.7, SD = 11.9) to posttest (M = 45.2, SD = 5.7), with this improvement remaining stable at follow-up (M = 47.4, SD = 5.3), whereas the control group exhibited no meaningful change from pretest (M = 51.3, SD = 9.9) to posttest (M = 51.3, SD = 9.9). A similar pattern was observed for self-defeating behavior, with the experimental group decreasing from pretest (M = 105.3, SD = 15.2) to posttest (M = 95.1, SD = 11.2) and further at follow-up (M = 93.6, SD = 8.8), while the control group remained unchanged from pretest (M = 107.4, SD = 12.3) to posttest (M = 107.4, SD = 12.3). Likewise, thought control strategies improved in the experimental group from pretest (M = 65.2, SD = 8.4) to posttest (M = 58.3, SD = 7.3) and were maintained at follow-up (M = 59.3, SD = 6.6), whereas no change was observed in the control group from pretest (M = 64.2, SD = 9.8) to posttest (M = 64.2, SD = 9.8). These descriptive findings suggest that time perspective training was associated with sustained reductions in academic burnout and self-defeating behavior and with improved regulation of thought control strategies.

Prior to conducting the main analyses, the statistical assumptions underlying analysis of covariance were carefully examined. The normality of the distribution of scores for academic burnout, self-defeating behavior, and thought control strategies was assessed using the Shapiro–Wilk test and inspection of skewness and kurtosis indices, all of which fell within acceptable ranges, indicating that the assumption of normality was satisfied. Homogeneity of variances across the experimental and control groups was evaluated using Levene's test, and nonsignificant results for all dependent variables confirmed equality of error variances. The assumption of linearity between covariates (pretest scores) and posttest outcomes was supported by inspection of scatterplots, and the homogeneity of regression slopes was confirmed through nonsignificant interaction effects between group membership and pretest scores. Multicollinearity diagnostics indicated acceptable tolerance and variance inflation factor values, and no extreme outliers were detected. Collectively, these results confirmed that the data met all key assumptions required for valid application of univariate and multivariate analysis of covariance.

Table 2

Results of the analysis of variance examining the effectiveness of time perspective training on academic burnout, self-defeating behavior, and thought control strategies.

Source of Effect	Dependent Variable (Posttest)	Sum of Squares	df	Mean Square	F	p	Partial η²
Pretest Academic Burnout	Academic Burnout	1066.591	1	1066.591	39.647	< .001	—
	Self-Defeating Behavior	1.334	1	1.334	0.093	.763	—
	Thought Control Strategies	0.561	1	0.561	0.210	.650	—
Pretest Self-Defeating Behavior	Academic Burnout	9.679	1	9.679	0.360	.554	—
	Self-Defeating Behavior	56.048	1	56.048	3.904	.059	—
	Thought Control Strategies	0.921	1	0.921	0.345	.562	—
Pretest Thought Control Strategies	Academic Burnout	6.027	1	6.027	0.224	.640	—
	Self-Defeating Behavior	1.549	1	1.549	0.108	.745	—
	Thought Control Strategies	79.354	1	79.354	29.753	< .001	—
Group	Academic Burnout	62,313.50	1	62,313.50	316.319	< .001	.556
	Self-Defeating Behavior	4,797.625	1	4,797.625	34.202	< .001	.430
	Thought Control Strategies	2,079.141	1	2,079.141	79.548	< .001	.369
Error	Academic Burnout	672.549	25	26.902			
	Self-Defeating Behavior	358.886	25	14.355			
	Thought Control Strategies	66.678	25	2.667			
Total	Academic Burnout	958,824.0	30				
	Self-Defeating Behavior	59,113.0	30				
	Thought Control Strategies	22,038.0	30				

The results presented in Table 2 indicate that, after controlling for pretest scores of academic burnout, self-defeating behavior, and thought control strategies, the difference between the two groups following the time perspective training was statistically significant (p < .05). The adjusted overall effect sizes (partial eta squared) were

.556 for academic burnout, .430 for self-defeating behavior, and .369 for thought control strategies. Based on these partial eta squared values, it can be concluded that the observed reductions in academic burnout, self-defeating behavior, and maladaptive thought control strategies among trained participants were attributable to the effect of the independent variable (time perspective training), and these effects were statistically significant ($p < .05$).

Table 3

Bonferroni Post Hoc Comparisons Between Experimental and Control Groups at Posttest

Dependent Variable	Mean Difference (Experimental − Control)	Standard Error	p
Academic Burnout	−6.10	1.09	< .001
Self-Defeating Behavior	−12.30	2.10	< .001
Thought Control Strategies	−5.90	0.98	< .001

The Bonferroni post-hoc comparisons revealed statistically significant differences between the experimental and control groups on all dependent variables at posttest. Specifically, students who received time perspective training demonstrated significantly lower levels of academic burnout (Mdiff = −6.10, SE = 1.09, p < .001) and self-defeating behavior (Mdiff = −12.30, SE = 2.10, p < .001), as well as significantly improved thought control strategies (Mdiff = −5.90, SE = 0.98, p < .001), compared with students in the control group. These findings indicate that the observed group differences in posttest scores were robust and not attributable to chance, providing strong evidence for the effectiveness of the time perspective training intervention across all outcome measures.

4. Discussion

The present study examined the effectiveness of time perspective training on academic burnout, self-defeating behavior, and thought control strategies among upper secondary school students. The findings demonstrated that the intervention produced statistically significant and sustained improvements across all three outcome variables. Specifically, students who received time perspective training exhibited substantial reductions in academic burnout and self-defeating behavior, as well as significant enhancement in adaptive thought control strategies at posttest, with these effects remaining stable at follow-up. The magnitude of the effects, reflected in large partial eta-squared values, indicates that time perspective training exerts a powerful and practically meaningful influence on adolescents' academic and psychological functioning.

The significant reduction in academic burnout observed in the experimental group aligns closely with theoretical and empirical literature emphasizing the role of temporal orientation in academic stress regulation. According to time

perspective theory, individuals with a dominant negative past or present-fatalistic orientation are more likely to experience helplessness, emotional exhaustion, and disengagement, whereas future-oriented and balanced temporal profiles foster perseverance, hope, and effective coping (San et al., 2022; Stolarski et al., 2020). The present findings confirm that structured modification of students' temporal frameworks can weaken the cognitive–emotional mechanisms that sustain academic exhaustion. Similar results were reported by Rezaie et al., who demonstrated that time perspective therapy significantly reduced academic exhaustion and improved academic sustainability among trauma-exposed secondary students (Rezaie et al., 2024). Likewise, Norouzi showed that future perspective training enhanced academic hope and psychological well-being in eleventh-grade students, outcomes that are theoretically antithetical to burnout (Norouzi, 2024). By cultivating future-oriented goal commitment, strengthening emotional regulation, and reprocessing negative academic experiences, the present intervention appears to have disrupted the burnout cycle and restored adaptive academic functioning.

The observed reduction in self-defeating behavior further supports the centrality of temporal cognition in self-regulation. Self-defeating behaviors, including procrastination, impulsivity, avoidance, and self-handicapping, are strongly associated with present-focused impulsive orientations and weak future planning (Codina et al., 2024; Senyk et al., 2024). Time perspective training systematically targets these dysfunctional temporal patterns by strengthening delayed gratification, goal coherence, and reflective decision-making. The present findings corroborate previous evidence indicating that modifying time perspective reduces procrastination and impulsivity while enhancing self-control (Codina et al., 2024; Senyk et al., 2024). Moreover, Roy and Rostami demonstrated that maladaptive thought regulation and weak self-control

mechanisms underlie many forms of self-defeating behavior, further highlighting the cognitive pathways through which temporal restructuring exerts its effects (Rostami, 2023; Roy et al., 2022). The sustained decrease in self-defeating behavior observed at follow-up suggests that time perspective training produces durable changes in adolescents' motivational architecture rather than merely transient behavioral compliance.

The improvement in thought control strategies represents another central contribution of the present study. Thought control reflects individuals' ability to regulate intrusive, distressing, and task-irrelevant cognitions. Maladaptive strategies such as worry, rumination, and self-punishment are strongly linked to academic stress, anxiety, and burnout (Alavi Langroodi et al., 2021; Moghadam et al., 2023). Time perspective training directly targets these processes by restructuring temporal appraisal, reducing cognitive fixation on negative past experiences, and promoting adaptive future-focused coping. The present findings mirror the results of Moghadam et al., who reported that positive psychotherapy improved thought control and emotional adjustment among adolescent girls following the COVID-19 pandemic (Moghadam et al., 2023). Similarly, Alavi Langroodi et al. found that stronger thought control capacities were associated with reduced test anxiety and improved academic engagement (Alavi Langroodi et al., 2021). By integrating emotional processing of past experiences with future-oriented goal construction and present-moment awareness, the current intervention appears to have strengthened adolescents' executive control over cognitive–emotional processes.

From a broader psychological perspective, the findings reinforce the construct of balanced time perspective as a core dimension of mental health. Balanced temporal functioning enables individuals to flexibly integrate positive past memories, present engagement, and future aspirations, thereby optimizing motivation, emotional stability, and behavioral self-regulation (Rönnlund et al., 2019; Stolarski et al., 2020). Rönnlund et al. demonstrated that mindfulness promotes a more balanced time perspective, which in turn enhances psychological well-being and resilience (Rönnlund et al., 2019). Similarly, Roozitalab et al. found that time perspective intervention significantly improved psychological well-being, meaning in life, and vitality among women exposed to chronic stress (Roozitalab et al., 2022). The present findings extend this body of evidence into the educational domain, showing that time perspective training not only improves general well-being but also

produces substantial benefits for academic functioning and cognitive self-regulation.

The durability of the intervention effects observed at follow-up is particularly noteworthy. Many school-based interventions yield short-term improvements that dissipate over time. In contrast, the maintenance of gains in burnout reduction, self-defeating behavior, and thought control suggests that time perspective training initiates structural cognitive change. This pattern is consistent with longitudinal findings reported by Hemati et al., who observed sustained improvements in quality of life and psychological well-being following integrated time perspective and positive psychotherapy interventions (Hemati et al., 2025). Likewise, Zebihi et al. demonstrated lasting improvements in mental well-being and psychological cohesion among patients with chronic illness following time perspective therapy (Zebihi et al., 2024). These converging results support the view that temporal restructuring constitutes a foundational mechanism of psychological change.

The current study also contributes methodologically by demonstrating the applicability of time perspective interventions within adolescent educational settings. While much of the prior work has focused on adults or clinical populations (Hemati et al., 2025; Zebihi et al., 2024), the present findings highlight the feasibility and effectiveness of this approach for secondary school students navigating developmental transitions, academic pressures, and identity formation. Given the increasing prevalence of academic burnout and maladaptive coping in adolescent populations, the implications for school-based mental health programming are substantial.

5. Conclusion

Collectively, the results of this study underscore the theoretical proposition that temporal cognition operates as a central organizing system for academic motivation, emotional regulation, and self-control. By modifying students' temporal orientations, time perspective training appears to simultaneously influence multiple psychological systems—affective, cognitive, motivational, and behavioral—thereby producing broad and enduring benefits. These findings extend and strengthen the existing literature on time perspective by demonstrating its causal impact on key educational and psychological outcomes in adolescence.

Several limitations should be considered when interpreting the findings of the present study. First, the sample consisted exclusively of female students from a

single urban educational district, which may limit the generalizability of the results to male students, rural populations, or other cultural and socioeconomic contexts. Second, the use of self-report measures may introduce response biases, including social desirability and subjective interpretation of questionnaire items. Third, although the follow-up assessment demonstrated stability of effects, the follow-up period was relatively short, and longer longitudinal assessments are needed to determine the persistence of intervention outcomes across academic years. Finally, potential confounding variables such as family support, teacher–student relationships, and concurrent academic stressors were not directly controlled and may have influenced the observed effects.

Future studies should replicate this investigation using larger and more diverse samples, including male students, students from different regions, and varied educational systems. Longitudinal designs with multiple follow-up points extending over one or more academic years would provide deeper insight into the developmental impact of time perspective training. Researchers should also explore the mediating mechanisms through which temporal restructuring influences burnout, self-defeating behavior, and thought control, including changes in motivation, executive functioning, emotional regulation, and academic self-efficacy. Comparative studies examining time perspective training against other school-based interventions could further clarify its relative efficacy and cost-effectiveness.

Educational policymakers and school psychologists should consider incorporating time perspective training into secondary school mental health and academic support programs. Training teachers and counselors in the principles of time perspective may enhance their ability to support students' self-regulation, motivation, and emotional well-being. Integrating temporal skills development into the curriculum could strengthen students' resilience against academic stress and promote healthier patterns of goal pursuit, decision making, and cognitive control across the critical adolescent years.

Authors' Contributions

S.S. conceived the study and developed the research design. F.J. conducted the intervention sessions, coordinated data collection, and assisted with instrument administration. N.S. performed the statistical analyses and contributed to the interpretation of results. N.M.R. drafted the manuscript,

integrated revisions, and prepared the final version for submission. All authors reviewed the manuscript critically, approved the final version, and accept full responsibility for the content of the work.

Declaration

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

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

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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