Effectiveness of a Self-Regulated Learning Model on Academic Procrastination Among Chinese University Students

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Abstract

This study aimed (1) to evaluate the effectiveness of a structured SRL intervention in reducing academic procrastination after implementation and (2) to compare its effectiveness between experimental and control groups during and after the intervention period. A quasi-experimental design was conducted with 90 first-year undergraduates randomly assigned to an experimental group (n = 45) and a control group (n = 45). No significant baseline differences were found between groups. The experimental group received a 12-week SRL intervention, whereas the control group continued traditional instruction. Academic procrastination was measured using a validated 26-item scale covering six dimensions—Fear of Failure, Difficulty in Deciding, Task Aversiveness, Rebellion Against Control, Dependency, and Risk-Taking—at pre-test, post-test, and four-week follow-up. Based on the repeated-measures ANOVA, the key findings were as follows: 1) The experimental group showed significant reductions in overall academic procrastination from pre-test (M = 3.88) to post-test (M = 2.82) and follow-up (M = 2.73) ($p < .001$), with decreases observed across all six dimensions. 2) Significant interaction effects between time and group indicated that these reductions in the experimental group were significantly greater than those in the control group, whose scores remained consistently high (pre-test M = 3.98; follow-up M = 3.92). The largest between-group differences emerged in dependency, risk-taking, and fear of failure.

The findings extend the applicability of the Self-Regulated Learning Model to the Chinese higher education context and provide empirical evidence that structured SRL programs can systematically reduce multidimensional academic procrastination among undergraduate students.

Keywords: Academic Procrastination; Self-Regulated Learning; Undergraduate Students; Quasi-Experimental Design; Chinese Higher Education

Introduction

Academic procrastination has become one of the most pervasive and persistent behavioral problems among undergraduate students in higher education. As a form of dysfunctional self-regulation, academic procrastination refers to the voluntary delay of intended academic tasks despite awareness of potential negative consequences (Qi et al., 2025). It is frequently accompanied by anxiety, guilt, shame, and reduced academic confidence (Meng et al., 2025; Yip & Chung, 2022). Within contemporary educational psychology, procrastination is increasingly understood not merely as poor time management, but as a multidimensional self-regulatory failure involving deficits in planning, monitoring, and behavioral control (Yue et al., 2024). Therefore, addressing academic procrastination requires a theoretically grounded self-regulation framework rather than isolated behavioral techniques. Beyond its psychological implications, academic procrastination has been associated with lower academic achievement, reduced engagement, delayed degree completion, and weakened academic persistence, positioning it as a critical concern for student success and quality assurance in higher education.

The prevalence of academic procrastination further underscores the urgency of systematic intervention. Globally, approximately 70% of university students report engaging in procrastination, and nearly half identify themselves as chronic procrastinators (Syabilla et al., 2018). In China, the situation appears even more concerning: prevalence rates increase from around 40% in adolescence to 70%–80% among university students, substantially higher than rates observed in the general adult population (Geng et al., 2018). Regional evidence from Guangdong Province indicates that nearly 75% of students exhibit varying degrees of academic procrastination, with documented negative consequences for both academic achievement and psychological well-being (Li et al., 2019). These statistics demonstrate that academic procrastination among Chinese undergraduate students is not a marginal issue but a widespread educational challenge that directly affects learning quality and student development.

In this regard, the Self-Regulated Learning (SRL) model provides a theoretically robust and empirically supported framework for understanding and reducing academic procrastination. Rooted in social cognitive theory, SRL conceptualizes learning as a cyclical process involving forethought, performance, and self-reflection phases (Zimmerman, 2002). Through goal-setting, strategic planning, self-monitoring, and adaptive reflection, students actively regulate their cognition, motivation, and behavior. Empirical research has demonstrated that higher levels of self-regulated learning are associated with lower levels of academic procrastination and improved

academic outcomes (Grunschel et al., 2018; Lee & Hall, 2020). In the present study, SRL is conceptualized not merely as a set of discrete learning strategies but as a structured intervention model systematically embedded into instructional practice. However, although SRL interventions have shown promise in educational contexts, empirical validation of a structured Self-Regulated Learning Model for reducing academic procrastination among Chinese undergraduate students remains scarce. Furthermore, much of the existing evidence is correlational in nature, leaving a need for intervention-based research that examines sustained behavioral change within authentic university settings.

Beyond its theoretical contribution, this study offers meaningful societal value. Academic procrastination not only undermines individual academic performance but also affects students' psychological well-being, learning efficiency, and long-term professional readiness. By identifying effective regulatory mechanisms and intervention pathways, the findings may inform curriculum reform, first-year transition programs, and institutional support systems aimed at cultivating autonomous, resilient, and self-directed learners. Strengthening students' self-regulatory competence contributes not only to improved academic outcomes but also to the development of lifelong learning capacities that are essential in rapidly evolving social and economic environments.

Therefore, this study aims to evaluate the effectiveness of a structured Self-Regulated Learning (SRL) model in reducing academic procrastination among Chinese undergraduate students and to provide empirical evidence supporting the systematic integration of SRL-based interventions into higher education practice.

Research Objectives

1. To evaluate the effectiveness of the self-regulated learning (SRL) model in reducing academic procrastination among Chinese university students post-implementation.

2. To compare the effectiveness of the self-regulated learning (SRL) model in reducing academic procrastination between the experimental and control groups during and after the intervention period.

Literature Review

Academic procrastination has been widely conceptualized as a self-regulatory failure characterized by the voluntary delay of intended academic tasks despite awareness of potential negative consequences (Solomon & Rothblum, 1984). Rather than reflecting simple laziness or

poor time management, procrastination involves complex interactions among cognitive, motivational, emotional, and behavioral processes. Scholars have emphasized that procrastination often arises from deficits in goal–setting, planning, emotional regulation, and self–control, positioning it as a dysfunction within the broader self–regulation system. From this perspective, academic procrastination represents a breakdown in learners' ability to translate intentions into timely actions, particularly when tasks are perceived as aversive, difficult, or threatening to self–efficacy. This theoretical positioning establishes a conceptual foundation for examining procrastination through the lens of self–regulated learning (SRL).

Social Cognitive Theory (SCT) provides a comprehensive theoretical foundation for understanding such regulatory breakdowns. Proposed by Bandura (1986), SCT posits that human functioning results from the reciprocal interaction of personal factors (e.g., cognition, beliefs, emotions), behavioral patterns, and environmental influences—a process known as triadic reciprocal determinism. Central to this theory is the concept of self–efficacy, referring to individuals' beliefs in their capabilities to organize and execute courses of action required to manage prospective situations. Within academic contexts, students' self–efficacy beliefs influence their goal selection, effort investment, persistence, and resilience when facing difficulties. When self–efficacy is low or environmental demands are perceived as overwhelming, students are more likely to avoid tasks, leading to procrastination behaviors (Hitches et al., 2022). Thus, academic procrastination can be interpreted as a maladaptive outcome emerging from dysfunctional reciprocal interactions among personal, behavioral, and contextual factors.

Building upon Social Cognitive Theory, self–regulated learning (SRL) represents the operationalization of these reciprocal processes in academic settings. Self–regulated learning (SRL) has been widely recognized as a critical determinant of academic success and a protective factor against academic procrastination. SRL is a dynamic, cyclical process encompassing three phases: planning, execution, and reflection, which involve coordinating cognitive, motivational, emotional, and behavioral factors to optimize learning outcomes (Zimmerman, 2002; Panadero, 2017). Students who effectively engage in SRL strategies demonstrate higher levels of goal–setting, strategic planning, self–monitoring, and adaptive reflection, resulting in improved task engagement and reduced procrastination (Schunk & Greene, 2018). Given that procrastination reflects a failure in these very regulatory processes, SRL provides a theoretically coherent framework for understanding and mitigating procrastination behaviors.

Early empirical studies highlighted the link between SRL and procrastination. Bandura's (1978) self–efficacy theory suggests that learners' beliefs in their ability to succeed shape their engagement in goal–directed behaviors. Consistently, Wolters et al. (2017) found that students with higher self–efficacy and better time–management skills were less prone to procrastination. Similarly, Wang et al. (2017) emphasized the importance of cognitive and metacognitive regulation, including planning and monitoring, in mitigating task avoidance. These findings further support the argument that procrastination is closely tied to deficiencies in motivational beliefs and regulatory competence, both central components of SRL.

Intervention studies provide further evidence for SRL's efficacy in addressing procrastination. Zimmerman and Martinez–Pons (1986, 1988) developed the Self–Regulated Learning Interview Schedule (SRLIS) to systematically assess SRL strategies, laying the groundwork for intervention research. Azevedo and Cromley (2004) implemented SRL training in multimedia learning environments based on Pintrich's stage theory, demonstrating significant improvements in students' cognitive and metacognitive strategies alongside reductions in procrastination. Schmitz and Wiese (2006) reported that diary–based, time–series interventions focused on goal–setting, planning, and time management enhanced SRL behaviors and decreased procrastination. Cho and Heron (2015) highlighted that self–regulated learners in online courses who actively planned, monitored, and persisted in challenging tasks exhibited lower procrastination levels. More recently, Boyd (2022) implemented a two–part intervention integrating interactive classroom activities and individual coaching, leading to improvements in SRL skills and reductions in procrastination among first–year medical students.

The theoretical underpinnings of SRL offer insight into its mechanisms in reducing procrastination. Zimmerman's (2002) cyclical model includes forethought, performance, and self–reflection phases. In the forethought phase, learners set goals, activate prior knowledge, and cultivate motivational beliefs such as self–efficacy and intrinsic interest, helping prevent task delay. The performance phase involves implementing strategies, monitoring progress, and exercising self–control. The self–reflection phase emphasizes evaluating outcomes, analyzing the causes of success or failure, and adapting strategies for future tasks. Pintrich's (2004) model similarly integrates forethought, monitoring, control, and reflection, highlighting the importance of motivational and emotional regulation alongside cognitive strategies. By explicitly targeting each phase of the self–regulation cycle, SRL interventions directly address the underlying regulatory deficits that give rise to procrastination.

Empirical evidence consistently supports the negative relationship between SRL and academic procrastination. Yap and Roslan (2016) found that components of self-regulation, including goal-setting and strategy use, negatively correlated with procrastination, while anxiety positively correlated. Paris and Paris (2001) emphasized that autonomy and self-direction enhance intrinsic motivation, further reducing procrastination tendencies. Zhao (2012) demonstrated that interventions targeting time management, self-control, and goal-setting decreased procrastination among graduate students, reinforcing the critical role of SRL in both undergraduate and postgraduate contexts.

To address these gaps, the present study adopts Zimmerman's (2002) cyclical SRL model as its theoretical framework, systematically investigating the impact of SRL on academic procrastination. By examining the interrelationships among planning, execution, and reflection, this study aims to identify the key pathways through which SRL influences procrastination behaviors among Chinese university students, providing both theoretical insights and practical strategies for developing effective interventions in higher education.

Conceptual Framework

The conceptual framework of this study is visually summarized in Figure 1. Grounded in Social Cognitive Theory (Bandura, 1986), the framework posits that the interplay of personal, behavioral, and environmental factors influences learning outcomes. These factors collectively act upon the Self-regulated Learning (SRL) Model, which serves as the core mediating process. The SRL model, comprising the Forethought Phase, Performance Phase, and Self-Reflection Phase, functions as the key mechanism through which the aforementioned factors operate (Zimmerman, 2002). Consequently, the effectiveness or breakdown of self-regulation within these phases directly predicts the manifestation of Academic Procrastination, conceptualized here through its specific dimensions: Fear of failure, Difficulty in deciding, Task aversiveness, Rebellion against control, Dependency, and Risk-taking. Thus, the SRL model phases are central explanatory variables that link the broader theoretical antecedents to the dependent variable of multi-dimensional academic procrastination.

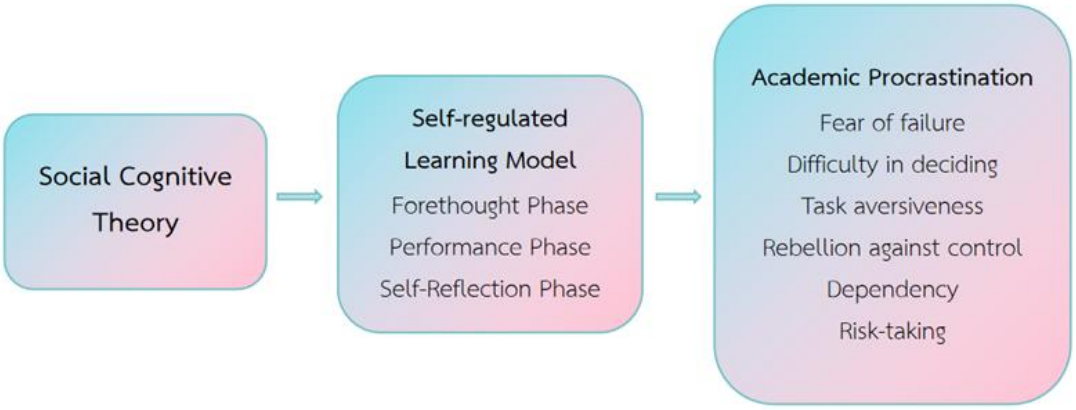


Figure 1 Conceptual Framework

Research Methodology

Research Design

This study employed a quasi–experimental design to evaluate the effectiveness of a self–regulated learning model in reducing academic procrastination among first–year undergraduate students at Guangdong University of Science and Technology. The population included 524 first–year undergraduate students enrolled in the E–commerce program. To ensure sufficient statistical power for repeated–measures analysis, the required sample size was estimated using G*Power, assuming conventional effect size and power values. The calculation indicated that approximately 34–36 students per group would be sufficient. To account for potential attrition and maintain robustness, two classes were selected, each consisting of 45 students, resulting in a total sample of 90 participants. Random sampling was employed to enhance coverage and minimize selection bias, ensuring that the sample was representative of the target population.

Measures

Academic procrastination was measured using a questionnaire developed based on Solomon and Rothblum's (1984) theoretical framework and reviewed by three experts for content validity assessment. The scale, adapted from Yip and Chung (2022) for Chinese university students, comprised 26 items across six dimensions: Fear of Failure (7 items), Difficulty in Deciding (3 items), Task Aversiveness (5 items), Rebellion Against Control (2 items), Dependency (3 items), and Risk–Taking (2 items). Participants responded on a five–point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Content validity was confirmed through Item–Objective Congruence (IOC) evaluation by three experts, with all items achieving an acceptable

IOC score (≥0.67). All 26 items obtained IOC values ranging from 0.67 to 1.00, meeting the acceptable criterion of ≥ 0.67. A pilot test with 50 first-year students indicated strong internal consistency, with a Cronbach's alpha of 0.896, demonstrating that the questionnaire is a reliable and valid instrument for assessing academic procrastination among university students.

Implementation of the Self-Regulated Learning Model

The self-regulated learning model was implemented in three phases. In the pre-test phase, baseline academic procrastination levels were assessed in both the experimental and control groups. During the intervention phase, the experimental group completed a standardized 12-week program with weekly 60-minute sessions covering self-starting, execution control, and self-reflection stages, while the control group continued with traditional instruction without participation in the program. In the post-test and follow-up phases, academic procrastination was measured immediately after the intervention and four weeks later to evaluate both immediate and sustained effects.

Attendance was recorded throughout the 12-week intervention period. While most students participated in all sessions, a small number were absent from one or more sessions due to personal reasons. Students who missed sessions were provided with structured supplementary materials to ensure exposure to the core content. All participants completed the pre-test, post-test, and follow-up assessments.

Data Collection

Data were collected at three time points: pre-test, post-test, and follow-up. Prior to the intervention, both the experimental group (EG) and the control group (CG) completed a pre-test to assess baseline academic procrastination levels. After the 12-week self-regulated learning model intervention, a post-test was administered to both groups to evaluate immediate intervention effects. A follow-up test was conducted four weeks later to examine the sustainability of the intervention outcomes. The same academic procrastination instrument and standardized procedures were used across all measurement points.

Data Analysis

Data analysis was conducted using statistical software to examine the effectiveness of the self-regulated learning model in reducing academic procrastination among college students. The analysis process consisted of two main stages.

First, preliminary data analysis was performed using descriptive statistical techniques, including means, standard deviations, and mean differences, to summarize the characteristics of

the research sample and to describe overall trends in academic procrastination across the three measurement points. The criteria was shown in Table 1 (Abu-Baker et al., 2019).

Second, repeated measures analysis of variance (Repeated Measures ANOVA) was employed to examine within-group and between-group differences in academic procrastination scores across the pre-test, post-test, and follow-up stages. This analytical approach allowed for the assessment of (a) the main effect of time, (b) the main effect of group, and (c) the interaction effect between time and group. Through this analysis, the study evaluated both the immediate effectiveness of the self-regulated learning model and the persistence of its effects over time.

Table 1 The Range of Mean Score Interpretation

Mean Score Range	Respondents' Perceptions Level
4.21–5.00	Highest
3.41–4.20	High
2.61–3.40	Moderate
1.81–2.60	Low
1.00–1.80	Lowest

Source: Abu-Baker et al. (2019)

Research Results

Objective 1. To evaluate the effectiveness of the self-regulated learning (SRL) model in reducing academic procrastination among Chinese university students post-implementation.

A one-way repeated measures ANOVA was conducted to examine variations in academic procrastination among first-year undergraduates in the experimental group across three assessment points: pre-test, post-test, and follow-up.

Table 2 shows the experimental group's academic procrastination scores at three points. The pre-test mean was 3.88 (SD = 0.87), indicating high procrastination. After the intervention, the post-test mean decreased to 2.82 (SD = 0.58), showing a moderate reduction. At follow-up, the mean remained at a moderate level (M = 2.73, SD = 0.50), suggesting that the effects of the self-regulated learning model were sustained over four weeks. These results indicate that the intervention effectively reduced academic procrastination among first-year undergraduates.

Table 2 Overall Academic Procrastination Scores of the Experimental Group Before, After, and Follow-up (n = 45).

Experimental Stage	M	SD	Interpretation
Pre-test	3.88	0.87	High
Post-test	2.82	0.58	Moderate
Follow-up	2.73	0.50	Moderate

According to Table 3 , students in the experimental group demonstrated substantial reductions in all components of academic procrastination across the three time points. At pre-test, scores were high for Fear of Failure (M = 3.78, SD = 0.60), Difficulty in Deciding (M = 3.76, SD = 0.67), Task Aversiveness (M = 4.09, SD = 0.67), Rebellion Against Control (M = 3.81, SD = 0.68), Dependency (M = 4.18, SD = 0.80), and Risk-Taking (M = 4.19, SD = 0.81). Following the self-regulated learning intervention, all component scores decreased to moderate levels at post-test, with Fear of Failure (M = 2.68, SD = 0.42), Difficulty in Deciding (M = 2.77, SD = 0.46), and Task Aversiveness (M = 2.89, SD = 0.47) showing marked reductions. These improvements were sustained at follow-up, with all dimensions remaining at moderate levels. The results indicate that the intervention effectively reduced students' academic procrastination across multiple dimensions, and the effects persisted for at least four weeks after the SRL model intervention concluded.

Table 3 Results of Academic Procrastination Components for Experimental Group Students at Three Time Points (Pre-test, Post-test, Follow-up) (n = 45)

Dimension	Experimental Stage	M	SD	Interpretation
Fear of Failure	Pre-test	3.78	0.60	High
	Post-test	2.68	0.42	Moderate
	Follow-up	2.63	0.50	Moderate
Difficulty in Deciding	Pre-test	3.76	0.67	High
	Post-test	2.77	0.46	Moderate
	Follow-up	2.71	0.50	Moderate
Task Aversiveness	Pre-test	4.09	0.67	High
	Post-test	2.89	0.47	Moderate
	Follow-up	2.89	0.67	Moderate
Rebellion Against Control	Pre-test	3.81	0.68	High
	Post-test	2.82	0.42	Moderate
	Follow-up	2.71	0.48	Moderate
Dependency	Pre-test	4.18	0.80	High
	Post-test	2.76	0.46	Moderate

Dimension	Experimental Stage	M	SD	Interpretation
Risk-Taking	Follow-up	2.56	0.54	Moderate
	Pre-test	4.19	0.81	High
	Post-test	2.87	0.43	Moderate
	Follow-up	2.78	0.50	Moderate

Repeated measures ANOVA was conducted to evaluate changes across six facets of academic procrastination: fear of failure, difficulty in decision-making, task aversiveness, rebellion against control, dependency, and risk-taking (see Table 4). Significant reductions were observed across pre-test, post-test, and follow-up assessments ($F = 37.559–80.982$, $p < 0.001$). LSD post-hoc analyses revealed significant pairwise differences between all stages ($p < 0.001$), indicating notable declines from pre-test to post-test that were generally sustained at follow-up, with post-test scores slightly exceeding follow-up scores in most dimensions. These findings indicate that the intervention effectively reduced academic procrastination and maintained its impact over time.

Table 4 Descriptive Statistics and ANOVA Results for Pre-test, Post-test, and Follow-up Stages of Different Academic Procrastination Dimensions

Component	Stage	M	SD	F	Sig.	LSD
Fear of Failure	Pre-test	3.78	0.60	54.947***	0.001	1 > 2
	Post-test	2.68	0.42			1 > 3
	Follow-up	2.63	0.50			2 > 3
Difficulty in Deciding	Pre-test	3.76	0.67	37.559***	0.001	1 > 2
	Post-test	2.77	0.46			1 > 3
	Follow-up	2.71	0.50			2 > 3
Task Aversiveness	Pre-test	4.09	0.67	70.747***	0.001	1 > 2
	Post-test	2.89	0.47			1 > 3
	Follow-up	2.89	0.67			2 > 3
Rebellion Against Control	Pre-test	3.81	0.68	39.879***	0.001	1 > 2
	Post-test	2.82	0.42			1 > 3
	Follow-up	2.71	0.48			2 > 3
Dependency	Pre-test	4.18	0.80	80.982***	0.001	1 > 2
	Post-test	2.76	0.46			1 > 3
	Follow-up	2.56	0.54			2 > 3
Risk-Taking	Pre-test	4.19	0.81	61.109***	0.001	1 > 2
	Post-test	2.87	0.43			1 > 3
	Follow-up	2.78	0.50			2 > 3

***Note:** LSD = Least Significant Difference post hoc test; ***p < 0.001

Objective 2. To compare the effectiveness of the self-regulated learning (SRL) model in reducing academic procrastination between the experimental and control groups during and after the intervention period. Table 5 presents the pre-test, post-test, and follow-up scores of the experimental and control groups on overall academic procrastination and its six dimensions: fear of failure, difficulty in deciding, task aversiveness, rebellion against control, dependency, and risk-taking. The data show that in the experimental group, following the intervention and at follow-up, all dimensions of academic procrastination significantly decreased from high to moderate levels, indicating substantial improvement. In contrast, the control group's scores remained consistently high across all stages, showing minimal change. These results underscore the effectiveness of the intervention in reducing academic procrastination and its underlying components, with sustained effects observed over time.

Table 5. Academic procrastination scores of two groups, including experimental group (n = 45) and control group (n = 45), across pretest, posttest, and follow-up phases

Dimension	Time	Control Group (n = 45) M ± SD	Experimental Group (n = 45) M ± SD
Overall Academic	Pre-test	3.98 ± 0.42	3.88 ± 0.87
Procrastination	Post-test	3.89 ± 0.40	2.82 ± 0.58
	Follow-up	3.92 ± 0.36	2.73 ± 0.50
Fear of Failure	Pre-test	3.77 ± 0.60	3.78 ± 0.60
	Post-test	3.78 ± 0.37	2.68 ± 0.42
	Follow-up	3.81 ± 0.42	2.63 ± 0.50
Difficulty in Deciding	Pre-test	3.76 ± 0.67	3.76 ± 0.67
	Post-test	3.78 ± 0.51	2.77 ± 0.46
	Follow-up	3.79 ± 0.56	2.71 ± 0.50
Task Aversiveness	Pre-test	4.09 ± 0.67	4.09 ± 0.67
	Post-test	4.05 ± 0.44	2.89 ± 0.47
	Follow-up	4.02 ± 0.50	2.89 ± 0.67
Rebellion Against Control	Pre-test	3.81 ± 0.68	3.81 ± 0.68
	Post-test	3.80 ± 0.62	2.82 ± 0.42
	Follow-up	3.91 ± 0.59	2.71 ± 0.48
Dependency	Pre-test	4.19 ± 0.81	4.18 ± 0.80
	Post-test	4.13 ± 0.52	2.76 ± 0.46
	Follow-up	4.03 ± 0.47	2.56 ± 0.54
Risk-Taking	Pre-test	4.19 ± 0.81	4.19 ± 0.81
	Post-test	4.10 ± 0.60	2.87 ± 0.43
	Follow-up	4.11 ± 0.57	2.78 ± 0.50

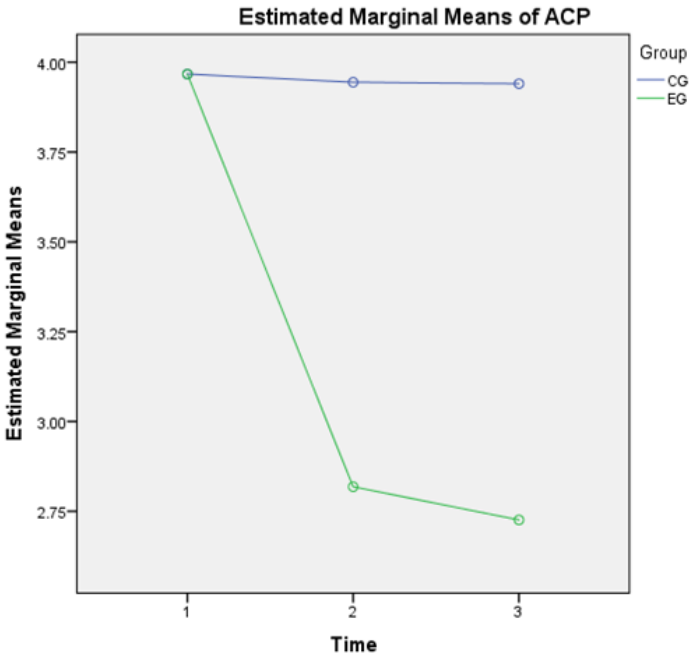
Independent-samples t tests were conducted to compare academic procrastination between the experimental and control groups at each measurement point (see Table 6). No significant difference was found at pre-test, $t(88) = 0.45$, $p = .654$, indicating baseline equivalence. However, significant differences emerged at post-test, $t(88) = 8.32$, $p < .001$, and at follow-up, $t(88) = 7.91$, $p < .001$, with the control group reporting higher procrastination scores than the experimental group. The findings indicate that the SRL intervention produced significant and sustained reductions in academic procrastination.

Table 6. Between-Group Comparisons of Academic Procrastination at Each Measurement Point

Time Point	EG (M ± SD)	CG (M ± SD)	Mean Difference (CG–EG)	t (88)	p	95% CI
Pre-test	3.88 ± 0.87	3.98 ± 0.42	0.1	0.45	0.654	[–0.18, 0.28]
Post-test	2.82 ± 0.58	3.89 ± 0.40	1.07	8.32	< .001	[0.81, 1.33]
Follow-up	2.73 ± 0.50	3.92 ± 0.36	1.19	7.91	< .001	[0.94, 1.44]

Note: EG = Experimental Group; CG = Control Group. Positive mean differences indicate higher procrastination scores in the control group.

Figure 2 illustrates the effects of the self-regulated learning model intervention on academic procrastination. The X-axis represents the three measurement points, and the Y-axis shows the estimated marginal means. The control group's scores remained relatively stable across all measurements, showing little change over time. In contrast, the Experimental Group demonstrated a marked reduction in academic procrastination from pre-test to post-test, which was largely maintained at follow-up. These results indicate that the intervention effectively lowered academic procrastination among university students.



Group CG = Control group

Group EG = Experimental group

Time 1 = Pre-test

Time 2 = Post-test

Time 3 = Follow up

Figure 2 Estimated Marginal Means of Academic Procrastination

In summary, while no significant difference was observed between the experimental and control groups at pre-test, significant differences emerged at post-test and follow-up. The experimental group demonstrated substantial and sustained reductions in overall academic procrastination and its six dimensions, whereas the control group showed minimal change across all measurement points. These findings indicate that the SRL intervention was more effective than the control condition in reducing academic procrastination during and after the intervention period. Therefore, Objective 2 was supported.

Discussions

This study extends existing research on Self-Regulated Learning (SRL) and academic procrastination by examining how an SRL intervention operates within the transitional context of Chinese higher education. Beyond confirming that SRL reduces overall academic procrastination, the findings provide a more differentiated understanding of how various dimensions of

procrastination change following intervention, thereby contributing to a context-sensitive perspective on regulatory development.

Consistent with prior research, academic procrastination emerged as a multidimensional construct (Li et al., 2019; Wang et al., 2017; Yip & Chung, 2022). The SRL intervention produced substantial reductions across all dimensions, with the largest decreases observed in Dependency and Risk-Taking, followed by Fear of Failure. Although all subdimensions showed meaningful improvement, the magnitude of change suggests that autonomy-related and motivationally vulnerable components may be particularly responsive during the first-year university transition. Importantly, these interpretations are based on observed patterns of reduction rather than formal tests of differential responsiveness across dimensions.

From a theoretical standpoint, these findings offer nuance to Zimmerman's (2002) cyclical SRL model by underscoring the relevance of the Forethought and Self-Reflection phases in transitional learning environments. Elevated baseline levels of Dependency indicate that first-year students may initially rely heavily on external prompts and authority structures. As institutional scaffolding diminishes in university settings, limitations in self-initiated regulation may become more apparent. The pronounced reduction in Dependency following the SRL intervention suggests that structured training in goal setting, monitoring, and reflection may serve a compensatory role during this developmental shift.

Similarly, the reduction in Fear of Failure aligns with the motivational regulation perspective articulated by Pintrich (2000). While the present study did not directly measure self-efficacy or emotional regulation, the decline in avoidance-oriented dimensions of procrastination is consistent with the possibility that SRL intervention supports more adaptive motivational regulation. By integrating goal-setting, monitoring, and reflective feedback, the intervention appears to reduce avoidance-oriented procrastination. In this respect, the findings extend prior intervention research (Azevedo & Cromley, 2004; Cho & Heron, 2015; San et al., 2016) by indicating that SRL intervention may influence not only behavioral engagement but also motivationally grounded forms of delay.

These findings should be interpreted within the institutional structure of Chinese higher education. The transition into university involves increased academic workload, reduced teacher supervision, and greater responsibility for long-term planning. In educational systems characterized by relatively high teacher–student power distance, students may enter university with limited experience in autonomous regulation. The elevated baseline levels of Dependency and

Risk–Taking may therefore reflect structural and developmental adjustment processes rather than individual deficiencies.

The sustained reduction in academic procrastination at the four–week follow–up suggests that the effects of the SRL intervention were not transient. Embedding SRL strategies during the first year may facilitate adjustment to university learning demands. Accordingly, the contribution of the study is both psychological and institutional: SRL intervention may function as a structured bridge between externally regulated secondary education and the autonomy demands of higher education. By situating SRL within the ecology of university transition, the study responds to calls for contextually grounded SRL research (Panadero, 2017) and extends findings from Western contexts (Boyd, 2022) to Chinese higher education.

Several limitations warrant consideration. First, the relatively short intervention and follow–up period limit conclusions regarding long–term regulatory development across academic years. Second, although the multidimensional measure captures nuanced aspects of procrastination, cultural interpretations of constructs such as Dependency and Rebellion Against Control may vary across contexts. Third, because the study was conducted within a single institutional setting, caution is required when generalizing findings to other universities or cultural systems.

In sum, the findings indicate that SRL intervention is associated with substantial reductions across multiple dimensions of procrastination, with particularly pronounced changes in autonomy–related and motivational dimensions during transitional stages of higher education.

New Knowledge from Research

Rather than treating procrastination as a singular behavioral deficit or merely testing whether self–regulated learning (SRL) is effective, this research demonstrates that SRL intervention produces consistent reductions across multiple dimensions of procrastination and links these changes to underlying regulatory processes, including strengthened self–regulation capacity and enhanced self–efficacy.

Importantly, the study situates these effects within the first–year university transition, a developmental and structural context characterized by reduced external regulation and increased academic autonomy. By embedding SRL effectiveness within this boundary condition, the research moves beyond general intervention validation and reframes academic procrastination in higher education as an autonomy adaptation challenge rather than simply a time–management problem.

This integrative and context–sensitive perspective extends the application of SRL theory within higher education research.

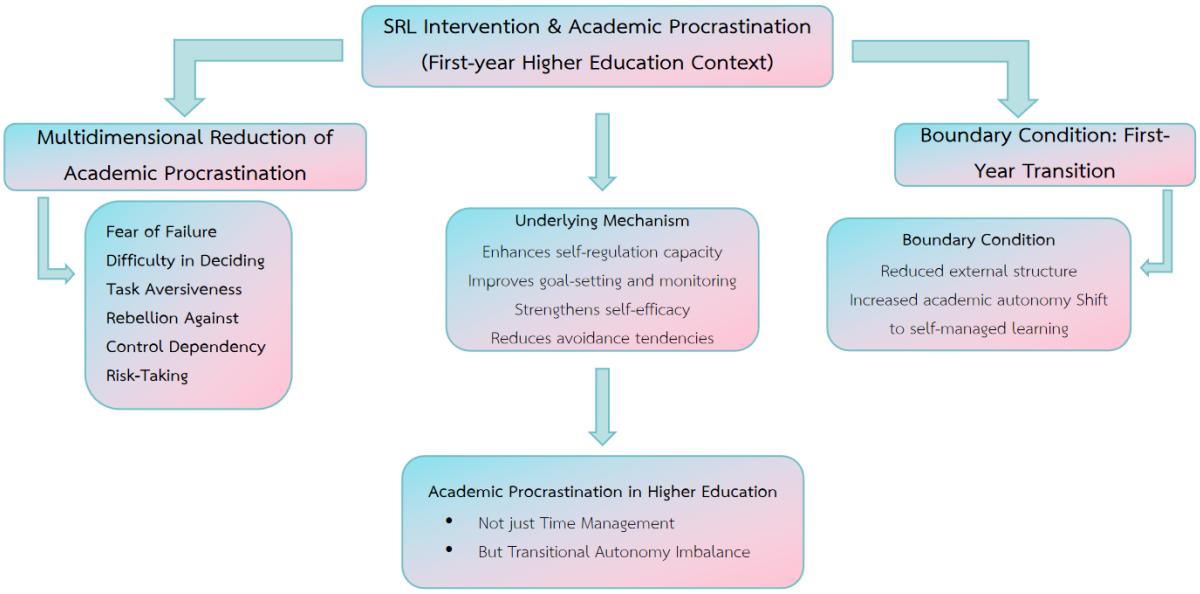


Figure 3 Knowledge from Research

Conclusion

This study provides intervention–based evidence that academic procrastination can be systematically reduced through a structured self–regulated learning framework embedded within university instruction. By moving beyond correlational examinations, the findings demonstrate that strengthening students' cyclical regulation processes—forethought, performance control, and self–reflection—can produce stable behavioral change over time. The results substantiate the explanatory and practical value of the SRL model in addressing multidimensional procrastination within authentic higher education settings. Overall, this research contributes to the growing body of intervention–oriented scholarship by validating self–regulated learning as a scalable mechanism for enhancing students' regulatory capacity and academic functioning.

Suggestions

Given the significant and sustained reductions in overall academic procrastination observed in the study, universities should integrate structured self–regulated learning (SRL) training into first–year curricula. Embedding goal setting, strategic planning, self–monitoring, and reflective practices early in the university transition may function as a preventive mechanism, supporting students' adjustment to increased academic autonomy and reducing multidimensional

procrastination over time. Furthermore, the clear post–intervention differences between the experimental and control groups indicate that procrastination does not decrease through routine instruction alone. Institutions should therefore incorporate explicit regulatory scaffolding rather than relying on natural adaptation processes. Future research should extend follow–up periods and replicate the intervention across diverse institutional contexts to examine the long–term stability and generalizability of SRL–based interventions.

Future studies should replicate the intervention across multiple institutional contexts and cultural settings. Longer follow–up periods are necessary to determine whether regulatory gains persist across academic years. Additionally, incorporating process–based measures (e.g., real–time SRL monitoring or learning analytics) would allow researchers to examine how specific regulatory mechanisms mediate reductions in procrastination over time.

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