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Impact of Metacognitive Self-Regulated Listening Approach on EFL Learners' Listening Proficiency and Strategy Use

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Self-regulation plays a vital role in language learning; however, little research has been conducted on the contribution of self-regulated learning to L2 listening. This study addresses this gap by examining the extent to which metacognitive intervention enhances listening proficiency within a self-regulated learning framework. A total of 138 first-year EFL learners from a public university in China participated in this study. The experimental group received additional instruction on metacognitive self-regulated listening strategies while the control group received only traditional instruction. The mean scores of the experimental group increased from 82.84 (pre-test) to 86.55 (post-test), demonstrating a significant improvement over the control group. In addition, the experimental group significantly outperformed the control group in strategy use across all three phases: in the Forethought phase, in the Performance phase, and in the Self-reflection phase, indicating that the intervention could enhance learners' listening comprehension abilities and improve their use of self-regulated listening strategies. Moreover, high-proficient listeners exhibited significantly higher use frequency of goal-setting and comprehension monitoring strategies than low-proficient listeners. This study adds empirical evidence on the impacts of self-regulated learning on listening achievement and provides important insights into the integration of metacognitive strategy instruction with self-regulated learning in informal settings.

Keywords: L2 listening comprehension, informal setting, metacognitive strategy instruction, self-regulated learning, self-regulated strategy use

INTRODUCTION

Listening comprehension is a crucial aspect of language learning that does not only refer to auditory reception, but represents a sophisticated process of meaning construction (Al-Khresheh & Alruwaili, 2024). This is why EFL students often face unique difficulties in developing L2 listening abilities. In real EFL classrooms, listening is frequently perceived as the most challenging skill to learn by learners (e.g.,Sutrisna &

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Artini, 2020; Alzamil, 2021) and teachers (Barjesteh & Ghaseminia, 2023). This is not only because the listening comprehension process is implicit and demanding (Xu & Luo, 2024), but also because the teaching and learning methodologies are inefficient (Cao & Lin, 2020). In the EFL environment, such as in China, the instructional time allocated for L2 listening is considerably restricted, resulting in learners having inadequate practice within language classrooms and insufficient exposure to English in daily communication (Yabukoshi, 2021; Zeng & Goh, 2018). Moreover, pedagogical approach to the EFL listening classroom is often teacher-centered, requiring students to complete one-way listening exercises and then check with teachers (Qiu & Xu, 2022). This monotonous teaching procedure lays emphasis on practicing listening comprehension of complete texts and utilizing comprehension questions to determine whether students understand the contents, which prioritizes declarative knowledge above procedural knowledge. The efficiency and effectiveness of increasing listening skills would thus be severely reduced if listeners were forced to remain in such a passive and high-pressure position (Zhu, 2021). Therefore, there is an urgent need for language teachers in China to facilitate an efficient way to teach EFL learners how to listen and improve listening abilities.

Given the portability of mobile applications and the convenience they bring for language learning (Khan & Gupta, 2022; Wrigglesworth, 2020), EFL students are motivated to practice listening autonomously in self-directed contexts (Aldukhayel, 2021). However, it is important to use these technological tools cautiously because sometimes the listening possibilities presented by mobile technology may be excessive (Goh & Vandergrift, 2021). Consequently, to engage in effective and successful listening with mobile technology in self-directed environments, students must self-regulate their learning by establishing listening objectives, controlling and monitoring listening process as well as evaluating their learning outcomes (Oxford, 2015; Yabukoshi, 2024). Despite Chinese EFL students undertaking substantial independent listening practice, it is essential to provide instructor guidance that fosters learners' self-regulation to guarantee that their listening progress is intentional rather than incidental (Zeng & Goh, 2018). Teachers can help students develop their self-regulated learning (SRL) skills directly by teaching strategies and indirectly by fostering a learning environment that enables students to regulate their own learning (Latva-aho et al., 2024), because students' use of SRL strategies is significantly positively correlated with teachers' instruction in SRL strategies (Dignath & Veenman, 2021). Effective learning thus occurs when learners are able to regulate their own listening and have a positive belief that they can finish the assigned task (Wang & Zhan, 2020).

In this study, the researchers instructed Chinese university EFL learners to regulate their independent listening comprehension process and examined its effects on listening outcomes as well as strategic uses. The metacognitive strategy instruction focused on procedures in the self-regulated listening practice, including planning, monitoring, and reflection. The standardized listening assessment (Test for English Majors in China) was conducted to evaluate learners' L2 listening ability. The researchers were permitted to use the metacognitive SRL Strategy Questionnaire (SRLSQ) (see Appendix) by Yabukoshi (2024) to analyse learners' use of strategies and the differences between low- and high-proficient learners in strategy use after the intervention.

LITERATURE REVIEW

Metacognition and Self-regulated Learning

Self-regulated learning (SRL) denotes the autonomous process by which learners convert their cognitive capabilities into academic competencies (Zimmerman, 2002). SRL encompasses the interplay of cognitive processes (such as elaboration and organization), metacognitive processes (including planning, monitoring, and regulation), and motivational factors throughout the learning process (Pintrich, 2004).

According to Flavell (1976), metacognition is the basis for the learning process, as it involves activating, monitoring, and regulating cognitive processes to meet learning goals. Metacognitive strategies involve cognitive abilities that include purposeful planning, monitoring, problem-solving, reflecting and evaluating in the learning process. Metacognitive strategies for listening thus include planning, monitoring, problem-identifying and evaluating (Vandergrift, 2007). Metacognition has long been acknowledged by educational psychologists as a crucial element of self-regulation (e.g., Zeng & Goh, 2018) and is correlated with listening comprehension to varying degrees (Bozorgian & Shamsi, 2025).

Likewise, Zhang and Zhang (2019) conceptualized self-regulation as a broad construct that includes a metacognitive aspect. Ambaryani and Putranta (2022) also posited that self-regulated learning is significantly associated with metacognition. Halpern (1998), Schraw and Dennison (1994) suggested that students' learning can be maximized by interventions for self-regulation and metacognitive strategies. In other words, academic self-regulation functions with the aid of metacognition (Zimmerman, 1995). Aligning with this conceptualization, this study adopts Zimmerman and Moylan's (2009) SRL model as a guiding framework, which divides SRL into a cyclic process including Forethought phase, Performance phase and Self-reflection phase. In the Forethought phase, listeners use metacognitive strategies such as setting learning goals, analyzing learning tasks and planning for strategies. In the Performance phase, listeners execute different strategies to fulfill the listening tasks including attention management, monitoring the learning process and use strategies to solve listening problems. In the Self-reflection phase, listeners evaluate their listening performance and the efficiency of the strategies used, identify listening problems, make adaptive plans for further learning.

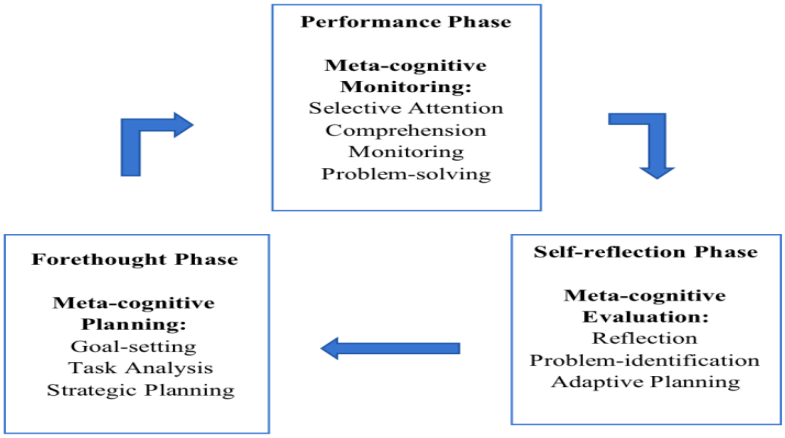

Figure 1
Metacognitive SRL Model adapted from Zimmerman and Moylan (2009)

The study used Yabukoshi's (2024) SRLSQ that concentrates on metacognitive strategies as a measure to investigate EFL learners' self-regulated listening practice in the Forethought phase, Performance phase and Self-reflection phase respectively (see Figure 1).

Research on Self-regulated Language Learning (SRLL)

Self-regulated Learning, which serves as a significant predictor of academic achievement (Zimmerman, 2002), can be understood as "the processes whereby learners personally activate and sustain cognition, affects, and behaviors that are systematically oriented toward the attainment of personal goals" (Zimmerman & Schunk, 2012, p.1). SRL (Zimmerman, 2008) is the term used to describe the learners' ability to actively and autonomously participate in the learning process, which is essential for success in such an environment (Guo et al., 2022). Recently, mobile technologies and devices have become more accepted and used to achieve educational goals (e.g., Li, 2022; Burston & Giannakou, 2022). Thus, the emphasis of L2 listening is transitioning from instructor-led education to autonomous learning (Pei et al., 2023; Yabukoshi, 2023). Using smart phones, tablets, or mobile applications, learners have easy access to various online resources, and personalize their own daily or weekly learning plans towards long-term learning goals. In mobile-assisted learning environments outside the classroom, learners are obligated to assume responsibility for their own education by managing and adjusting learning activities autonomously, without teacher intervention (Rasheed et al., 2020), which is very helpful for learners in the EFL context to complement inadequate in-class instruction. Furthermore, recent research revealed that mobile-assisted language learning (MALL) enhances learners' self-regulated learning abilities, which in turn facilitate MALL (Palalas & Wark, 2020). To conclude, SRL and MALL are correlated. In this regard, researchers in China have also proven the positive effects of MALL, but their attention was mostly drawn to vocabulary learning (Guo et al, 2022), development of reading (Li, 2022), writing (Jiang & Zhang, 2020) and oral skills (e.g., Huang, 2021;

Fischer & Yang, 2022), leaving L2 Listening under-explored. Likewise, listening, a crucial language skill, has been insufficiently examined in the domain of SRLL (Teng & Zhang, 2021),which necessitates the current study of investigating L2 learners' self-regulated listening practice with the aid of mobile devices.

Related Studies on L2 Listening in China

In the language classes in China's universities, English listening is often taught as a stand-alone compulsory course or integrated with a speaking course. Listening is regarded as the most challenging language skill to master among Chinese EFL learners (Zeng & Goh, 2018), and EFL teachers with advanced overall English proficiency seem to have weaker listening abilities compared to those of speaking, reading and writing (Renandya & Hu, 2018). This is because College EFL listening instruction has often prioritized a product-based approach, focusing on bottom-up skills such as decoding sounds, vocabulary, and grammar. This has resulted in passive student engagement and unsatisfactory learning outcomes.

More recently, in recognition of the significance of listening as a process, EFL teachers in China have shown more interest in strategy-based instructional approach with a focus on metacognition as suggested by Goh and Vandergrift (2021). Consistently, Cao and Lin (2020) report a positive correlation between vocational college students' metacognitive strategies and their listening comprehension skills. They also demonstrate that high listening achievers significantly differ from low achievers in planning, monitoring, and evaluating listening comprehension process, with monitoring strategies showing the biggest difference. Also, Li et al. (2022), in a more recent study on non-English major students with low-level English proficiency in a Chinese University, point out that the metacognitive method powerfully motivated students and significantly improved their listening abilities, despite the fact that their English proficiency may be a constraint on their participation. The qualitative findings suggest that metacognitive training offers a thorough process-oriented methodology for L2 listening. The benefits of this method are evident in enhancing listening abilities and may contribute to long-term comprehension gains. In addition, EFL learners are encouraged to practice listening independently since teaching strategies in class and practicing listening outside of class should be complementary to each other (Goh & Vandergrift, 2021).

To conclude, teachers of L2 listening in China should train students to use strategies in planning and preparing adequately for listening assignments, monitoring and regulating listening process, along with evaluating strategies for listening comprehension in informal learning settings, so as to promote self-regulated learning outside the class. To this end, the study is directed by the following research questions:

1. Is there a significant disparity in participants' listening comprehension ability before and after the intervention?

2. Is there a significant disparity in participants' utilization of metacognitive SRL strategies before and after the intervention?

3. Is there a substantial correlation between participants' listening comprehension ability and their use of metacognitive SRL strategies?

4. Is there a substantial disparity in the utilization of metacognitive SRL strategies between low-proficient and high-proficient participants?

METHOD

Research Design

This study utilized a quasi-experimental approach with a pre-test and a post-test. Quantitative data were collected through listening tests and questionnaires. The metacognitive intervention was conducted among the experimental group (EG), while the control group (CG) received the traditional instruction. Participants' listening proficiency served as the dependent variable while their utilization of metacognitive SRL strategies is the independent variable.

Participants

This research involved 138 first-year university EFL learners from two intact classes, each consisting of 69 students. These participants have been learning English for an average of 12 years. At the time of the research, they were currently leveled as intermediate learners (CEFR B2) according to China's national placement test before college enrolment. The two classes were designated as the experimental group and the control group, respectively. Prior to the investigation, participants completed consent forms and were told the project's academic objectives, data confidentiality, and their right to withdraw at any time.

Instruments

Test for English Majors Band 4

The Test for English Majors Band 4 (TEM-4 test) is a national English proficiency test in China, which has been subject to rigorous validation processes since its introduction in 1992 (Jin & Fan, 2011). The test's validity and Cronbach's alpha of 0.85 were confirmed by Sino-British cooperative validation research (The TEM Test Center, 1997, p. 63), which ensured its high quality as an assessment tool. The listening sub-test of TEM-4 test accounts for 20% of the whole test, and comprises two parts: Dictation (10%) and Listening Comprehension (10%). In general, the listening sub-test is a context-specific test that measures learners' overall English listening proficiency. To further confirm the validity of the listening sub-test of TEM-4 test, the pre-test and post-test were conducted with a cohort of 63 non-participants in the pilot study. Table 1 shows the reliability results for the pre-test and post-test. The two tests had satisfactory reliability indices of 0.814 and 0.810 respectively.

Table 1
Reliability of the Pre-test and Post-test

	Cronbach's alpha	Items
Pre-test	0.814	21
Post-test	0.810	21

Questionnaire

The researcher was permitted to use the Self-regulated Listening Strategy Questionnaire (SRLSQ), designed and validated by Yabukoshi (2024). The questionnaire uses a 6-

point Likert scale ranging from 1 (*not at all true of me*) to 6 (*extremely true of me*). Its purpose is to evaluate learners' usage of metacognitive SRL strategies for L2 listening practice beyond the classroom. This questionnaire measures the metacognitive aspects of self-regulatory listening strategies from three phases: Forethought phase (7 items), Performance phase (4 items) and Reflection phase (3 items). Before the main study, the reliability of the questionnaire was tested among a cohort of non-participants, demonstrating a strong internal consistency with a Cronbach α value of 0.94. The questionnaire's validity was further tested via confirmatory factor analysis (CFA). Table 2 shows the indicators of model fitness. As can be seen, the chi-square value obtained and the comparison to the goodness-of-fit Chi-square value with degrees of freedom is 3.212 (< 5), indicating an acceptable match (Hayduk, 1987). The Goodness-of-Fit Index (GFI) is 0.913 (>0.9), suggesting a good fit. The Comparative Fit Index (CFI) is 0.945, and the Normal Fit Index (NFI) is 0.923, all higher than 0.85 (Kaya & Altınkurt, 2018). The RMR value is 0.033 and indicates good fit when below 0.08 (Wong & Carlbäck, 2018). It can be concluded that the scale also has an acceptable fit for the three-factor model. In addition, the loading of the standard values for the three-factor model, including Forethought phase, Performance phase and Self-reflection phase, was displayed in a path diagram generated by AMOS 29.0 (see Figure 2).

Table 2
Confirmatory Factor Analysis of the Goodness-of-fit Values

Indicators	X^2/df	NFI	IFI	TLI	CFI	GFI	RMSEA	RMR
Suggested value	3.212	0.923	0.946	0.933	0.945	0.913	0.079	0.033
	<5	>0.9	>0.9	>0.9	>0.9	>0.9	<0.08	<0.05

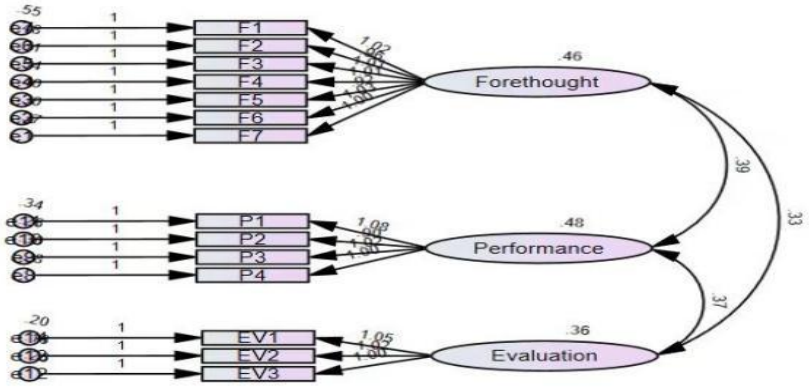

Figure 2
Path Diagram of the Model

Table 3 indicates that the CR coefficients exceeded the standard cut-off value of 0.70 and threshold of 0.60 (Bagozzi & Yi, 1988), while three AVE values were beyond the advised level of 0.50 (Fornell & Larcker, 1981), demonstrating sufficient convergent validity of the scale.

Table 3
Factor Loading Coefficients, AVE and CR for Convergent Validity

Factors	Items	Estimate	AVE	CR
Forethought	Item1	0.682	0.54	0.891
	Item2	0.687		
	Item3	0.775		
	Item4	0.763		
	Item5	0.701		
	Item6	0.786		
	Item7	0.746		
Performance	Item8	0.788	0.618	0.866
	Item9	0.776		
	Item10	0.789		
	Item11	0.791		
Self-reflection	Item12	0.819	0.651	0.848
	Item13	0.836		
	Item14	0.763		

Table 4 shows the square root of AVE, indicating a satisfactory discriminant validity of the questionnaire, with each AVE square root being larger than the corresponding correlation coefficients (0.735>0.727>0.702; 0.786>0.77). As a result, this scale is a reliable and valid measurement of metacognitive SRL strategy uses in the self-regulated listening process beyond the formal classroom.

Table 4
Square Root of AVE

	Forethought	Performance	Self-reflection
Forethought	0.735		
Performance	0.727	0.786	
Self-reflection	0.702	0.77	0.807

Chao Xing (CX) Network Teaching and Learning Platform

The Chao Xing (CX) Network Teaching Platform, developed by Chaoxing Education Group, is a comprehensive web and mobile-based teaching system that integrates instructors, students, devices, and management (Jing et al., 2020). It was selected for this study's L2 listening instruction because its use of authentic, media-based audio-visual activities helps students connect in-class learning with real-world language use, thereby encouraging them to engage in independent listening outside the classroom. Such in-depth listening is both inherently rewarding and essential for the development of proficient L2 listening (Renandya & Hu, 2018). Meanwhile, the corresponding listening exercises will be assigned every other week to student participants via this platform. Also, teachers can track learners' performance and send reminders to them via the teacher's panel.

Research Procedure

The study lasted one semester, from October to December, 2024, with an intervention of 10 weeks. Participants in the two groups received the same in-class instruction and

used the same coursebook as well as additional resources. They both were familiarized with specific listening strategies (i.e. predicting and inferring) and test-taking listening strategies (i.e. skimming or scanning) in accordance with the course textbook. Following each class, students were required to apply the newly acquired skills to complete weekly listening tasks on their own. To consolidate their learning, they were also instructed to utilize the scripts and explanatory notes provided by the researcher at the week's end to systematically identify and address any sounds, vocabulary, or phrases that they failed to understand. Additionally, the EG was instructed to use strategies that emphasized the metacognitive dimensions of self-regulated listening processes (i.e., goal setting, task analysis, strategic planning, and time management in the Forethought phase, selective attention and monitoring in the Performance phase, as well as evaluation and adaptation in the Self-reflection phase). In the last week, both groups took the same listening post-test and filled out the SRLSQ again.

Data Analysis

All quantitative data were analyzed using SPSS 26.0. Specifically, an independent-samples t-test was conducted to examine whether there was a significant difference between the control group (CG) and experimental group (EG) on the listening proficiency post-test. A one-way analysis of covariance (ANCOVA) was employed in the study to analyze the differences between the two groups on SRLSQ posttest. The outcomes of tests on between-participant effects were analyzed to determine the statistical significance of the principal effects of the independent variable. An independent t-test was employed to analyze the differences in strategy utilization between high- and low-proficiency learners.

FINDINGS

Listening Test Results for RQ1

The pre- and post- listening test scores matched the assumption of variance homogeneity in Levene's equality test (P>0.05). According to Table 5, the EG showed a rise in post-listening scores (M=86.55) when compared to the pre-test (M=82.84), whereas the control group showed a small decline from 83.42 to 82.51. Although this contradicts the finding of Milliner and Dimoski (2024), who reported a reduction in listening scores of the strategy group after the training, it concurs with the result of Pei et al (2023) that the listening scores of CG went down after the intervention, implying that improving listening skills by practice takes time and "extensive listening can play a supportive role in listening pedagogy" (Siegel, 2011, p.318).

Table 5
Test of Homogeneity of Variances

	Mean+SD		*F.*	*P.*
	CG (*n*=69)	EG (*n*=69)		
Pre-test	83.42±3.80	82.84±3.04	1.801	0.182
Post-test	82.51±5.47	86.55±4.39	1.571	0.212

Thereafter, an ANCOVA test was conducted to look at the group effect, with pre-test scores as the co-variate and post-test scores as the dependent variable. The results in Table 6 indicated a significant group effect ($p=0.001<0.01$) with a medium effect ($\eta^2=0.12>0.06$), suggesting that metacognitive self-regulated listening practice can significantly improve learners' L2 listening comprehension ability.

Table 6
ANCOVA Test of Group Effect

Source	df	Mean Square	F	p	η^2
Group	1	101.721	13.191	0.001**	0.120
Pretest	1	31.633	4.102	0.046*	0.041
Residual	97	7.711			

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Questionnaire Results for RQ2

Table 7 presents the descriptive analysis of the data for each sub-category of self-regulated learning, encompassing the Forethought, Performance, and Self-reflection phases. The assumption of homogeneity of variances was satisfied for the pre- and post-test scores for each factor ($p>0.05$). As can be seen, both EG and CG enhanced their strategic utilization in the Forethought, Performance, and Reflection phases, as evidenced by the comparison of pre-test and post-test scores, with the most significant advancements noted in the Forethought phase.

Table 7
Test of Homogeneity of Variances

Factors		CG (N=69)		EG(N=69)		*F*	*P*
		Mean	SD	Mean	SD		
Forethought	Pre-test	31.54	5.06	32.84	4.48	1.474	0.227
	Post-test	31.43	5.84	35.01	8.00	0.299	0.585
Performance	Pre-test	19.10	2.67	19.59	2.68	0.013	0.908
	Post-test	18.33	3.05	19.91	2.44	3.059	0.083
Self-reflection	Pre-test	14.28	2.61	14.45	2.05	2.725	0.101
	Post-test	14.32	2.61	14.61	2.18	1.664	0.199

An ANCOVA was performed to analyze the group effect across the three SRL variables, with post-test scores as the dependent variable and pre-test scores as co-variate. Table 8 illustrates a statistically significant group effect for both the Forethought phase ($p<0.01$) and the Self-reflection phase ($p<0.01$), exhibiting a substantial influence in the former ($\eta^2=0.165>0.14$) and an extensive effect in the latter ($\eta^2=0.848>0.14$). A notable group impact for the Performance phase was identified ($p<0.05$), albeit with a minimal effect size ($\eta^2=0.040<0.06$). The findings suggest that metacognitive self-regulated listening practice can markedly enhance learners' application of strategies, particularly those related to self-reflection.

Table 8
ANCOVA Test of Group Effect

Source	Factors	*df*	Mean Square	*F*	*p*	η^2
Group	Forethought	1	1097.083	26.586	0.000**	0.165
	Performance	1	41.621	5.657	0.019*	0.040
	Self-reflection	1	665.856	751.815	0.000**	0.848

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Furthermore, an independent samples *t*- test was conducted to examine the changes of specific strategy use in each SRL phase. Table 9 shows significant differences in the overall strategy use ($p=0.003<0.01$), strategic use in the Forethought ($p=0.003<0.01$) and Performance phases ($p=0.001<0.01$) between the CG and EG, indicating participants in the EG tended to use these strategies more frequently than their peers in the CG after the intervention. However, there was no difference in the use of reflection strategies between the CG and EG. In particular, significant changes between the two groups were observed in the use of task analysis (item 4, $p<0.01$), time management (item 7, $p<0.01$), selective attention (item 8, $p<0.01$), comprehension monitoring (item 10, $p<0.05$), problem identifying (item 11, $p<0.05$), followed by person knowledge (item 2, $p<0.05$), and strategic planning (item 6, $p<0.05$).

Table 9
Independent Samples t-test of Strategy Use

Items	Factors	(M±SD)		*t*	*p*
		CG (*n*=69)	EG (*n*=69)		
1	Goal-setting	4.36±1.07	5.49±6.12	-1.512	0.133
2	Goal-setting	4.33±0.89	4.75±1.02	-2.584	0.011*
3	Task analysis	4.58±0.96	4.87±0.91	-1.823	0.071
4	Task analysis	4.45±1.05	5.06±0.75	-3.925	0.000**
5	Strategic planning	4.72±1.07	5.03±0.86	-1.845	0.067
6	Strategic planning	4.51±0.98	4.83±0.91	-1.984	0.049*
7	Time management	4.48±0.92	4.99±0.78	-3.506	0.001**
8	Selective attention	4.48±0.92	4.97±0.79	-3.390	0.001**
9	Selective attention	4.74±0.87	4.94±0.89	-1.356	0.177
10	Comprehension monitoring	4.55±0.90	5.00±0.80	-3.092	0.002**
11	Problem solving	4.57±0.92	5.00±0.87	-2.853	0.005**
12	Evaluation	4.59±0.97	4.74±0.89	-0.914	0.362
13	Problem identification	4.81±0.93	4.97±0.84	-1.058	0.292
14	Adaption	4.91±0.90	4.90±0.93	0.093	0.926
Forethought Phase		31.43±5.84	35.01±8.00	-3.003	0.003**
Performance Phase		18.33±3.05	19.91±2.44	-3.364	0.001**
Self-reflection Phase		14.32±2.61	14.61±2.18	-0.708	0.480
Overall Strategies		64.09±10.60	69.54±10.65	-3.012	0.003**

Note. *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Correlation Results between Strategy Use and Listening Comprehension for RQ3

Table 10 shows the results of Pearson correlation test. Metacognitive SRL strategies in the Forethought phase, Performance phase and Self-reflection phase were all significantly correlated with learners' listening comprehension performance ($p<0.01$), indicating that the more strategies the learners used, the higher listening scores they gained. The results demonstrated that, compared to the Performance and Self-reflection phases, the strategies in the Forethought phase had the largest coefficient ($r=0.354$), indicating their strongest association with listening scores.

Comprehension monitoring (item 10) in the Performance phase ($r=0.358$, $p<0.01$) and Goal-setting (item 2) in the Forethought phase ($r=0.355$, $p<0.01$) had the most significant correlation with learners' listening comprehension scores. Among the total 14 strategies, only strategic planning (item 8) "*I pay attention to specific linguistic aspects (e.g., word pronunciation, sentence structures, listening speed, and so on)*" in the performance phase was not significantly related to learners' listening comprehension ($p=0.080>0.05$).

Table 10
Pearson's Correlation Test

Items	Factors	p	r
1	Goal-setting	0.018	0.201*
2	Goal-setting	0.000	0.355**
3	Task analysis	0.000	0.302**
4	Task analysis	0.000	0.308**
5	Strategic planning	0.003	0.253**
6	Strategic planning	0.002	0.261**
7	Time management	0.001	0.279**
8	Selective attention	0.080	0.150
9	Selective attention	0.001	0.271**
10	Comprehension monitoring	0.000	0.358**
11	Problem solving	0.009	0.223**
12	Evaluation	0.003	0.250**
13	Problem-identification	0.007	0.228**
14	Adaption	0.002	0.262**
Forethought Phase		0.000	0.354**
Performance Phase		0.000	0.312**
Self-reflection Phase		0.001	0.281**

Note. *. Correlation is significant at the 0.05 level. (2-tailed)
**. Correlation is significant at the 0.01 level. (2-tailed)

Strategic Differences between High- and Low- proficiency Achievers for RQ4

To further examine the relation between strategic use and learners' listening outcomes, participants in the EG and CG were subdivided into three groups according to their listening scores. Table 11 shows that participants whose scores fell between 79.59±5.20 were labeled as low-proficient and those whose scores fell between 89.59±2.72 were labeled as high-proficient.

Table 11
Division of Proficiency Groups

	Group (M±SD)		t（CR）	p
	Low (n=44)	High (n=37)		
Listening test scores	79.59±5.20	89.59±2.72	11.075	0.000**

Thereafter, an Independent samples *t*-test was conducted to compare the differences in strategy use between learners in the two proficiency groups. Table 12 shows that low-proficiency learners differed significantly from high-proficiency learners in their overall strategy use ($p=0.002<0.01$). The largest difference lay in strategy use in the Forethought phase ($p=0.004<0.01$), followed by differences in the Performance phase ($p=0.010<0.01$) and Self-reflection phase ($p=0.011<0.05$). In regard to specific strategies, there was no significant difference in the use of goal-setting strategy (item 1), strategic planning (item 5), selective attention (item 8) in the forethought phase and problem-solving (item 11) in the performance phase between the two proficiency groups while largest differences lay in their use of goal-setting (item 2, $p<0.01$) and time management (item 7, $p<0.01$) in the Forethought phase, comprehension monitoring (item 10, $p<0.01$) in the Performance phase, with high-proficiency learners using these strategies more frequently than their peers.

Table 12
Independent t Test of Strategy Uses between Proficiency Groups

Items	Factors	Mean±Std. Deviation		*t*	*p*
		Low (*n*=44)	High (*n*=37)		
1	Goal-setting	4.29±0.98	5.90±7.21	-1.596	0.114
2	Goal-setting	4.13±0.84	4.92±0.86	-4.625	0.000**
3	Task analysis	4.48±0.96	4.90±0.85	-2.310	0.023*
4	Task analysis	4.44±0.96	4.88±0.95	-2.292	0.024*
5	Strategic planning	4.71±0.96	5.04±1.06	-1.641	0.104
6	Strategic planning	4.37±0.99	4.78±1.01	-2.064	0.042*
7	Time management	4.44±0.89	4.96±0.93	-2.840	0.005**
8	Selective attention	4.54±1.02	4.76±0.78	-1.205	0.231
9	Selective attention	4.56±1.00	4.94±0.77	-2.134	0.035*
10	Comprehension monitoring	4.42±0.91	5.00±0.79	-3.396	0.001**
11	Problem solving	4.62±0.91	4.92±0.89	-1.693	0.094
12	Evaluation	4.46±0.98	4.88±0.83	-2.293	0.024*
13	Problem-identification	4.69±0.94	5.04±0.82	-1.985	0.050*
14	Adaption	4.67±1.02	5.10±0.71	-2.454	0.016*
Forethought Phase		30.87±5.29	35.37±9.47	-2.971	0.004**
Performance Phase		18.13±3.02	19.61±2.56	-2.641	0.010**
Self-reflection Phase		13.83±2.73	15.02±1.85	-2.580	0.011*
Overall Strategies		62.83±10.03	70.00±12.18	-3.239	0.002**

DISCUSSION

Listening Comprehension Abilities

This study aimed to examine how self-regulated listening practice influences listening comprehension of Chinese university EFL learners, as well as the strategic variations among learners with differing levels of listening skill. The experimental group undergoing the metacognitive SRL intervention surpassed the control group in the listening post-test, demonstrating a beneficial treatment effect. This result is in alignment with previous finding that metacognitive strategy instruction could enhance learner's listening comprehension (e.g., Fan et al., 2025; Thitipraserth & Manosuthikit, 2025). This result contributes to a consensus in the literature, as previous studies have collectively suggested that self-regulated learning (SRL) instruction and metacognitive strategy training are more effective than traditional methods in improving EFL learners' listening comprehension (Pei et al., 2023; Xu & Luo, 2024; Yabukoshi, 2023; Zeng & Goh, 2018).

Metacognitive SRL Strategies

With respect to the second research question, the EG revealed a greater increase in strategy use in the Forethought phase ($p<0.001$). Moreover, a smaller improvement for metacognitive strategy in the Performance phase ($p<0.05$) was also notable.

Despite the absence of a significant difference between the EG and CG ($p=0.408$), the use of metacognitive strategies in the Self-reflection phase improved significantly within the EG over the course of the intervention ($p< 0.001$). The notable alterations in metacognitive strategy utilization during the Forethought and Reflection phases align with the findings of Zhou and Thompson (2023), which demonstrated a substantial increase in EFL students' metacognitive awareness, including planning and evaluation, following the intervention.

Correlation between Metacognitive SRL and Listening Comprehension

Responding to the third question, learners' listening comprehension was significantly correlated with metacognitive strategy use in all the three SRL phases. This finding aligns with Su (2025), who indicated a positive association between EFL learners' listening comprehension and their general metacognitive awareness.

Likewise, Wallace (2022) asserted that learners' metacognitive awareness was positively correlated with their listening comprehension by indirectly influencing listeners' conceptual knowledge and top-down processes. In the same vein, the experimental group in this study also significantly increased their abilities for task analysis, identifying problems and monitoring comprehension in the listening processes after the intervention. These findings further highlight the importance of strengthening listeners' metacognition, which could help them gain information about themselves (person knowledge), understand the nature and requirements of listening tasks (task knowledge), know how to employ effective listening methods (strategy knowledge) thus supporting them in organizing, tracking, and assessing their own learning tasks and endeavors (Goh and Vandergrift, 2021).

In this study, specific metacognitive strategies including task analysis, time management, strategic planning, goal-setting, problem-solving and problem identification were all significantly related to learners' listening outcome. Conversely, Robillos and Bustos (2022) found that problem-solving was not related to listening outcomes. The contradictory result could be explained by learner differences such as age and proficiency levels (Vandergrift & Baker, 2018), warranting further studies taking into account learner variables in metacognitive instruction for self-regulated L2 listening practice.

Strategic Differences between High- and Low-proficient Listeners

Results for the fourth question showed that high-proficient achievers differed significantly from low-proficient achievers in both the frequency and numbers of metacognitive listening strategies used across all three SRL phases. This finding aligns with Yabukoshi (2023), whose pedagogical intervention similarly encouraged learners, particularly those with higher proficiency, to engage more actively in self-regulated learning processes during autonomous listening.

Furthermore, the greatest difference between the higher achievers and lower achievers lies in their frequency of strategy use during the forethought phase, followed by strategy use frequency in the performance phase and reflection phase. This finding aligns with Yabukoshi (2021), indicating that learners' motivation influences their use of metacognitive strategies during self-regulated listening, particularly in the Forethought and Self-reflection phase, thereby affecting outcomes. Specifically, higher achievers more consciously set objectives in the Forethought phase, identified specific issues upon reflection, and subsequently established adaptive goals to address them. In a more recent study, Su (2025) also reported that high-proficient listeners tended to exhibit higher levels of metacognitive awareness than their lower-proficient counterparts, justifying the predictive and facilitative role of self-regulated metacognitive strategies in L2 listening comprehension.

CONCLUSION

Major Findings

This study addresses a research gap in the effect of learners' out-of-class self-regulated practice on L2 listening gains, metacognitive awareness, and strategy use. The findings demonstrate that self-regulated listening practice significantly enhances listening comprehension and metacognitive strategy adoption among Chinese intermediate-level EFL learners. Specifically, learners in the experimental group showed notable improvements in strategy application during the Forethought and Performance phases, particularly in goal-setting, task analysis, time management, selective attention, and comprehension monitoring. Correlation analyses further confirmed positive relationships between listening proficiency and strategy use across all three SRL phases: Forethought ($r = 0.354$, $p < .01$), Performance ($r = 0.312$, $p < .01$), and Self-reflection ($r = 0.281$, $p < .01$). Within Self-reflection, evaluation and adaptation strategies were particularly influential, despite no significant change in the overall frequency of reflective strategy use.

This study compares strategic use between high-and low-proficient listeners, with high-proficient achievers outperforming lower-proficient achievers in the overall use of metacognitive strategies during the three phases of self-regulated listening process. The greatest difference lies in Goal-setting and Comprehension Monitoring, indicating that helping learners establish achievable objectives during the listening process can be an important predictor for self-regulated L2 listening.

This study also presents significant methodological advancements. Firstly, the researcher combined listening strategy training with the SRL model, which allows learners to plan, monitor, regulate, and evaluate listening comprehension by using corresponding strategies in different stages beyond the formal settings and thus enables them to become autonomous L2 listeners. Secondly, it is found that higher-achievers differ from lower-achievers in strategy use including Goal-setting and Comprehension Monitoring. Therefore, based on the identified differences in strategy use, a key pedagogical recommendation is to implement differentiated instruction. Specifically, educators should design targeted interventions that help lower-proficiency learners develop skills in goal-setting and comprehension monitoring to foster greater autonomy.

Based on these findings, several pedagogical recommendations are proposed. Firstly, educators should implement explicit strategy instruction embedded within the SRL framework, teaching students how to plan, monitor, and evaluate their listening comprehension processes. Secondly, differentiated instruction is essential—for lower-proficiency learners, scaffolded exercises in goal-setting and real-time comprehension monitoring should be provided, such as using pre-listening prediction templates and self-questioning techniques during listening. Thirdly, teachers should design progressive autonomous learning tasks that guide students in applying these strategies beyond classroom settings, gradually fostering learner independence. Regular strategy reflection sessions could also be incorporated to enhance students' awareness of their own learning processes.

Nevertheless, the study exclusively offered quantitative evidence, potentially omitting insights into learners' actual usage and perceived modifications in strategy application during the listening process. Future research should incorporate learners' reflective learning journals and interviews to attain a comprehensive understanding of the impact of SRL on learners' listening outcomes and the distinctions between the two proficiency groups. Besides, as learners' variables such as motivation and self-efficacy also play a vital role L2 listening (Yabukoshi, 2023), future studies should explore the interplay between personal traits and metacognition on L2 listening performance.

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APPENDIX

Questionnaire of Metacognitive Self-regulated Learning Strategies for Out-of-Class Listening adopted from Yabukoshi (2024)

Forethought Phase *Before engaging in self-regulated listening tasks*	Very untrue of me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
I set a specific goal (e.g., to understand the main idea of the talk, to get 80% of the questions correct, and so on).						
I set a goal that is slightly challenging for me.						
I analyze the question type (e.g.,thinking that I am going to try a question that asks me to make the connection between a graphic and the talk, and so on).						
I analyze the difficulty of the question (e.g., thinking that it is difficult for me to understand a conversation between two speakers because the content tends to be complicated).						
I plan how to approach the question(e.g, to scan the paragraphs before listening to the passage).						
I plan how to approach the question depending on the difficulty level of the question.						
I manage my schedule to secure time for the listening practice outside the classroom.						
Performance Phase *While engaging in self-regulated listening tasks*	Very untrue of me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
I pay attention to specific linguistic aspects (e.g.,word pronunciation, sentence structures, listening speed,and so on).						
I pay attention to the topic development of the conversation or talk.						
I monitor my comprehension(e.g.,asking myself whether it is easier than the previous listening comprehension).						
I focus on my listening problems (e.g, identifying academic terms and prepositions, and so on).						
Self-reflection Phase *After finishing the listening tasks*	Very untrue of me	Untrue of me	Somewhat untrue of me	Somewhat true of me	True of me	Very true of me
I evaluate the effectiveness of the target strategy use (e.g., goal setting, and so on).						
I identify my specific listening problems (e.g, specific sounds that I could not catch, and so on).						
I set specific learning agendas for my future study to overcome my listening problems.						