The Mediating Role of Self-Efficacy Between Metacognitive Listening, Anxiety, and Comprehension in Chinese EFL Learners

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Abstract

Listening comprehension the most challenging skill for EFL (English as a Foreign Language) learners, especially in high-stakes examinations such as China's College English Test Bands 4 and 6 (CET-4/6). To better understand the factors associated with listening success, this study aims to examine how metacognitive listening strategies (MLS) and foreign language listening anxiety (FLLA) relate to listening comprehension (LC) and the mediating role of self-efficacy (SE). The date analysis is based on 408 Chinese undergraduate students. Confirmatory factor analysis (CFA) indicated a good fit (CFI = .983, RMSEA = .017), all constructs demonstrated excellent reliability ($\alpha > .96$). OLS regression showed that the proposed model accounted for 39.1% of the variance in listening comprehension (LC) ($R^2 = .391$, $F = 86.357$, $p < .001$). MLS ($\beta = .181$, $p < .001$) and SE ($\beta = .339$, $p < .001$) positively predicted LC, whereas FLLA negatively predicted LC ($\beta = -.250$, $p < .001$). Bootstrapped mediation (5,000 resamples) confirmed SE partially mediated both MLS → LC (indirect = 1.678, 95% CI [1.289, 2.093]) and FLLA → LC (indirect = −1.501, 95% CI [−1.929, −1.117]) pathways. SE was the most influential predictor. It facilitates the contribution of metacognitive strategies to listening performance. The findings provide further support for applying social cognitive theory to L2 listening and highlight the value of self-efficacy and metacognitive strategy instruction in EFL classrooms. The study is limited by the binary scoring of LC and its cross-sectional design. Future research could employ PLS-SEM or longitudinal methods.

Keywords: listening comprehension, metacognitive listening strategies, foreign language listening anxiety, self-efficacy, education quality

1. Introduction

Listening comprehension is regarded as one of the most challenging aspects of second language (L2) learning (Wang & Treffers-Daller, 2017, p. 139). Listeners must process spoken input in real time, integrate it with prior knowledge, and work within the limits of working memory (Baddeley, 2003; Field, 2009). Once the input is missed, it is difficult to revisit (Aliyar et al., 2026). These challenges are particularly evident in Chinese EFL classrooms. Listening accounts for about 35% of the total score in the College English Test Band 4 (CET-4) and Band 6 (CET-6) (National Education Examinations Authority, 2016). Many Chinese non-English-major undergraduates still experience difficulty with English listening despite years of instruction (Huang et al., 2022). This suggests that linguistic knowledge alone cannot fully explain listening performance. Cognitive-regulatory and affective factors are also likely to influence listening outcomes (Mahdian Rad & Baleghizadeh, 2025).

Among these factors, two core constructs have been identified associated with listening comprehension performance including: Metacognitive Listening Strategies (MLS) and Foreign Language Listening Anxiety (FLLA). Metacognitive Listening Strategies (MLS) are defined as a process in which a person is actively planning, monitoring, and evaluating in listening tasks (Vandergrift et al., 2006). Foreign Language Listening Anxiety (FLLA), conceptualized as a situation-specific response (Liu, 2016), refers to the "fear of misunderstanding what language learners listen to and being embarrassed by interpreting the message wrongly" (Serraj & Noordin, 2013, p.3).

Although many existing empirical studies have confirmed the positive influence of metacognitive listening strategies on listening comprehension or the negative consequences of listening anxiety independently, such a separation presents an important conceptual limitation. In actual listening situations, learners do not employ strategies in the absence of emotions, nor do they experience anxiety independently of their regulatory resources. Instead, cognitive and affective factors are likely to interact through learners' beliefs about their ability to manage listening demands (Ng et al., 2025).

Social Cognitive Theory suggests that self-efficacy may help explain how these factors influence listening comprehension. Most previous studies have examined self-efficacy alongside either metacognitive strategies or listening anxiety, rather than considering both in the same model. As a result, it is still unclear whether self-efficacy links metacognitive listening strategies and listening anxiety to listening

comprehension.

To better understand this issue, we draw on Social Cognitive Theory (SCT) (Bandura, 1986, 1997). Within this framework, self-efficacy (SE) is regarded as a key construct. It is a personal belief in one's capability to organize and execute courses of action required to attain designated types of performances (Artino, 2012). Strategic learners with high self-efficacy are more likely to persist through difficulties, creating a feedback loop where successful strategy use reinforces confidence and thereby enhances subsequent performance (Hartati, Nur'Aini, & Sukmaningrum, 2025). In contrast, anxiety-related physiological arousal may undermine efficacy expectations and thus diminish sustained cognitive engagement (Mirzaei Darvish Baghal & Khedmatgozar, 2025). Accordingly, the present study conceptualizes self-efficacy as a mediator linking metacognitive listening strategies and listening anxiety to listening comprehension.

A growing number of empirical investigations have started to consider this mediating viewpoint. Self-efficacy has been reported to mediate the relationship between metacognitive awareness and listening performance (Xu, Fan, & Luo, 2021) as well as between language anxiety and achievement (Fathi et al., 2020). However, the above investigations tend to treat antecedents separately instead of simultaneously examining metacognitive listening strategies and listening anxiety in a unified structural model.

As a result, it is not known whether self-efficacy has any explanatory power when cognitive-regulatory and affective predictors are simultaneously considered. Addressing this issue may offer a more integrated understanding of self-regulation in L2 listening. Rather than treating metacognitive listening strategies and listening anxiety as independent predictors, the present study examines whether self-efficacy functions as a common pathway linking cognitive-regulatory and affective influences to listening comprehension. By testing these relationships within a single framework, the study contributes to research on learner self-regulation and provides additional evidence for the role of self-efficacy in explaining listening performance among Chinese EFL learners. The Chinese EFL context makes this issue especially worth examining. In many classrooms, large class sizes, limited opportunities for interactive listening, and delayed feedback reduce learners' opportunities to develop mastery experiences. Such conditions may gradually weaken self-efficacy, particularly for learners who repeatedly struggle with listening tasks (Kim, 2022). This context therefore provides a strong rationale for examining self-efficacy as a mediator between metacognitive listening strategies, listening anxiety, and listening comprehension.

This study constructs and tests a structural model in which Self-Efficacy (SE) acts as a mediator between Metacognitive Listening Strategies (MLS), Foreign Language Listening Anxiety (FLLA), and Listening Comprehension (LC) for Chinese EFL learners. Besides, It addresses the following four questions.

(1)To what extent do MLS and FLLA directly predict LC?

(2)To what extent does SE directly predict LC?

(3)To what extent does SE mediate MLS to LC?

(4)To what extent does SE mediate FLLA to LC?

Through viewing self-efficacy as a central self-regulatory mechanism, this study aims to clarify how cognitive-regulatory and affective factors jointly relate to listening comprehension. It further contributes to the literature by testing whether self-efficacy serves as a common mediating pathway linking metacognitive listening strategies and listening anxiety to listening performance in high stake EFL contexts.

2. Literature Review

2.1 The Core Constructs: Definitions and Conceptualizations

2.1.1 Metacognitive Listening Strategies

Since 1979 (Flavell), metacognition has been conceptualized from different perspectives, subsequent scholars generally agree that it refers to learners' ability to regulate their cognitive processes through planning, monitoring, and evaluation (El Kassimi, 2025). O'Malley and Chamot (1990) highlighted the role of metacognitive regulation in strategic learning. Building on this work, Vandergrift et al. (2006) identified five dimensions of metacognitive listening strategies for second language listening. Planning and evaluation support preparation and monitoring, directed attention helps learners stay focused on relevant information, and problem solving facilitates inferential recovery when comprehension breaks down. Together, these strategies enable learners to allocate attention more effectively and deal with listening difficulties. Empirical evidence shows that indicate that higher degrees of metacognitive awareness correlate positively with listening performance (Vandergrift & Tafaghodtari, 2010). Nevertheless, the use of strategies should not be taken as a happening in isolation. This is because its success is influenced by the cognitive, motivational, and emotional states of the learners. This implies that affective components perhaps interact with metacognitive regulation to influence listening as a performance.

2.1.2 Foreign Language Listening Anxiety

Horwitz et al. (1986) made a theoretical distinction between foreign language anxiety and general anxiety by positing the former as a situation-specific type of anxiety. Thus foreign language listening anxiety (FLLA) was defined as the anxiety felt during the performance of the listening process, not as a stable personality trait (Liu, 2016; Zhang, 2013). Subsequent studies have also identified FLLA as a construct distinct from general language anxiety (Elkhafaifi, 2005). In contrast to trait anxiety, it is specific features of the spoken input (e.g. fast speech, accents, unfamiliar words) that cause FLLA, and it is these features which increase learners' subjective perception of processing difficulty (Kim, 2000).

Attentional Control Theory (Eysenck et al., 2007) states that anxiety decreases goal-directed attention and increases distractibility towards

task-irrelevant stimuli. Consequently, learners with anxiety may have a less efficient distribution of cognitive resources, and thus a more difficult time processing spoken input in real time. Previous studies consistently report a negative relationship between FLLA and listening performance (Liu, 2016; Liu & Xu, 2021; Wang & Cha, 2019). Most, however, focus on documenting this association rather than explaining how anxiety influences listening performance. Anxiety may therefore affect listening through more than a direct pathway. One possible explanation is that it influences listening through learners' self-efficacy and metacognitive regulation.

Existing research has established the detrimental role of FLLA in L2 listening. However, less is known about the psychological processes through which listening anxiety affects comprehension. This leaves room to examine whether self-efficacy serves as a mediator.

2.1.3 Self-Efficacy in Language Learning

Self-efficacy is a central construct in Social Cognitive Theory (Bandura, 1997) and has become an important concept in educational research. It refers to learners; beliefs in their capability to organize and execute actions required to achieve specific performance goals (Artino, 2012). Unlike self-esteem or general confidence, self-efficacy is task- and domain-specific (Chen et al., 2004). Self-efficacy is therefore best understood as a context-dependent belief that shapes learners' engagement with specific learning tasks rather than reflecting a stable personality trait.

Bandura (1977) identified four main sources of self-efficacy: mastery experiences, vicarious learning, verbal persuasion, and physiological or emotional states. In language learning, self-efficacy has been shown to positively predict academic performance (Liu & Xu, 2021). It also promotes strategic and self-regulated learning (Zimmerman & Cleary, 2006). Research has also suggested that greater self-efficacy is associated with reduced language anxiety (Mirzaei Darvish Baghal & Khedmatgozar, 2025). Altogether, this evidence indicates that self-efficacy plays a pivotal role in cognitive and affective processes in L2 learning. Moreover, it has been found that self-efficacy acts as a mediator between metacognitive strategy use and language performance, which underlines the significance of the construct in linking cognitive regulation to learners' emotional experiences (Hiver et al., 2021). Current evidence therefore points to self-efficacy as an important mechanism linking strategic regulation, emotional experiences, and language performance. Whether this mechanism operates simultaneously across cognitive and affective pathways in L2 listening, however, has received far less attention.

2.2 Relationships Among Core Variables

2.2.1 MLS and Listening Comprehension

Previous research generally supports a positive association between metacognitive listening strategies and listening comprehension (Namaziandost, Neisi, Mahdavirad, & Nasri, 2019; Vandergrift & Tafaghodtari, 2010). By monitoring and evaluating their own comprehension, learners can identify processing difficulties more effectively and adjust their listening strategies accordingly (Vandergrift & Goh, 2012). However, the effectiveness of MLS may vary according to task difficulty and learners' English proficiency (Cross, 2011). Taken together, these findings suggest that although MLS generally benefits listening comprehension, its effectiveness is likely to depend on contextual and learner-related factors.

2.2.2 FLLA and Listening Comprehension

Previous research generally supports a negative relationship between FLLA and listening comprehension (Elkhafaifi, 2005; Kim, 2000). From the perspective of working memory, anxiety consumes cognitive resources and increases interference from task-irrelevant thoughts, making it more difficult for learners to process and integrate spoken information in real time (Grant & White, 2016), Nevertheless, learners may respond to anxiety differently, as moderate levels of anxiety may improve motivation on tasks and facilitate performance (Eysenck et al., 2007). Existing research consistently shows that excessive listening anxiety leads to lower listening performance. Its impact may be modified by the level of anxiety and the context of learning, suggesting a more complex relationship than a mere negative correlation.

2.2.3 Interplay Between MLS and FLLA

Studies have reported reciprocal associations between metacognitive listening strategies (MLS) and foreign language listening anxiety (Golchi, 2012). Anxiety might be alleviated by the effective use of listening strategies because it can decrease the amount of unknown information and increase learners' feeling of control over listening. Nevertheless, greater anxiety may hinder learners from implementing the strategies when they are actually listening. However, less research has treated metacognitive listening strategies (MLS) and FLLA as related constructs within the same model.

2.2.4 Self-Efficacy and Its Correlates

Research has indicated a positive correlation between self-efficacy and listening achievement (Rahimi & Abedini, 2009). Learners with greater self-efficacy are more inclined to engage in difficult activities and to continue with their attempts at learning when confronted by barriers to learning (Zhao & Ma, 2025). In contrast, low self-efficacy is frequently related to intensive anxiety and other negative emotions (Tahmassian & Jalali Moghadam, 2011). These findings point to self-efficacy as a link between learners' strategic behavior and their emotional responses during language learning.

2.2.5 The Mediating Role of Self-Efficacy

Recent evidence indicates the mediating role of self-efficacy has received increasing attention in language learning research (Woreta et al., 2025). These studies indicate that self-efficacy may help explain how cognitive and affective factors relate to learning outcomes. However,

few studies have investigated metacognitive listening strategies (MLS) and foreign language listening anxiety (FLLA) within a unified framework while accounting for their shared variance. Consequently, it remains unclear whether self-efficacy plays a distinct mediating role when both variables are considered within the same structural framework.

2.3 The Chinese EFL Context

High-stakes examination systems have an influence on teaching instruction in Chinese tertiary education (Cheng, 2005). The large class size and limited opportunity to offer individualised feedback may restrict the students' mastery experiences. In combination, these two contextual features could have an impact on learners' use of strategies, levels of anxiety and self-efficacy, which makes the Chinese EFL context an ideal place to study their integrated effects on the prediction of listening comprehension.

2.4 The Present Study and Hypotheses

Based on Social Cognitive Theory (Bandura, 1986, 1997), this study puts forward a holistic structural model involving MLS and FLLA as independent variables, listening comprehension as the dependent variable, and self-efficacy as a mediating variable

H1: Metacognitive Listening Strategies (MLS) will positively predict Listening Comprehension (LC).

H2: Foreign Language Listening Anxiety (FLLA) will negatively predict Listening Comprehension (LC).

H3: Self-Efficacy (SE) will positively predict Listening Comprehension (LC).

H4: Self-Efficacy (SE) will mediate the relationship between Metacognitive Listening Strategies (MLS) and Listening Comprehension (LC).

H5: Self-Efficacy (SE) will mediate the relationship between Foreign Language Listening Anxiety (FLLA) and Listening Comprehension (LC).

3. Research Objectives

Based on the principles of Social Cognitive Theory (Bandura, 1986, 1997) and with response to fragmented nature of previous EFL listening studies, the current research views Self-Efficacy (SE) as a mediating factor that connects Metacognitive Listening Strategies (MLS), Foreign Language Listening Anxiety (FLLA), and Listening Comprehension (LC). The present study is guided by the following interrelated objectives:

(1). To establish and validate an integrated structural model that simultaneously examines the direct effects of MLS and FLLA on LC.

(2). To investigate the predictive effect of SE on LC, determining whether efficacy beliefs function as a proximal determinant of performance.

(3). To examine the mediating role of SE in the relationship between MLS and LC. Fourth, To examine whether SE functions as a mediator between FLLA and LC.

(4). To evaluate the proposed mediation model within the Chinese tertiary EFL context, thereby assessing the applicability of Social Cognitive Theory in a high-stakes language learning environment.

4. Research Methodology

4.1 Research Design

The present study was a quantitative cross-sectional survey designed to investigate the structural relationships among Metacognitive Listening Strategies (MLS), Foreign Language Listening Anxiety (FLLA), Self-efficacy (SE), and Listening Comprehension (LC).

4.2 Participants

The sample was composed of 408 first-year non-English major undergraduates at a comprehensive university in northeast China on voluntary basis.

A stratified cluster random sampling procedure was employed. Students were stratified by major (science/engineering vs. arts/management) prior to randomization. Within each stratum, intact classes were randomly selected and the students in the selected classes were invited to participate.

4.3 Instruments

4.3.1 Metacognitive Listening Strategies

Metacognitive listening strategies were evaluated by the Metacognitive Awareness Listening Questionnaire (MALQ), which was adapted by Vandergrift et al (2006). The 21-item questionnaire uses a five-point Likert scale (1=strongly disagree to 5=strongly agree) and assesses five factors: planning and evaluation, directed attention, person knowledge, mental translation, and problem solving. This study was based on the Potronics developed Chinese version of Fu et al. (2023), with proven linguistic clarity and contextual appropriateness.

4.3.2 Foreign Language Listening Anxiety

FLLA was assessed through the FLLAS designed by Elkhafaifi (2005). The 20 items on the scale are rated on a five-point Likert scale with 1 being strongly disagree and 5 being strongly agree. The Chinese version was used in this study, as it has been found to be reliable

in prior research with Chinese EFL students (Cronbach's $\alpha > .85$).

4.3.3 Listening Self-Efficacy

The listening self-efficacy was measured by Shepherd Martin's (2020) Listening Self-Efficacy Questionnaire (LSEQ). The questionnaire consists of 16 items which are rated a five-point likert scale where 1 represents definitely cannot do and 5 represents definitely can do.

The original English version of the instrument was translated into Chinese by using a forward-backward translation procedure to maintain semantic and conceptual equivalence (Lee et al., 2019). Prior to the main study, a pilot study was done with a few sample students on both the clarity and internal consistency of the questionnaire. Some minor revision to the wording was added by some of the participants.

4.3.4 Listening Comprehension

LC was evaluated using a standardized test on CET-4 listening module. Internal consistency was calculated through Kuder-Richardson Formula 20 (KR-20=.90).

4.4 Data Collection Procedures

Data were collected in Fall 2025 during regular English classes. The study was approved by the IRB of the researcher's institution, and formal permission was obtained. Participants received explanations of purpose, confidentiality, and withdrawal rights; written informed consent obtained. Questionnaires (MALQ, FLLAS, LSEQ) preceded the LC test (about 35 minutes in total). Anonymous responses were collected immediately and researchers were available for queries.

4.5 Data Analysis Procedures

This study adopted a two-stage analytical procedure. First, confirmatory factor analysis (CFA) was conducted to evaluate the validity and reliability of the measurement instruments. After satisfactory measurement properties were established, composite scores were computed for each construct and used in subsequent regression analyses. This approach was selected because the primary objective of the study was to examine predictive and mediating relationships among theoretically established constructs rather than to estimate a highly parameterized latent structural model. Moreover, the listening comprehension measure consisted of 25 dichotomously scored test items, making composite-score analysis a practical and interpretable approach for examining relationships among the study variables.

Data from 408 participants were analysed using R (lavaan package for CFA and bootstrapping), and SPSS (for descriptive statistics and OLS regression). The listening comprehension was the sum of 25 dichotomous items, and the total score was ranged from 0 to 25. The total score was considered as a quasi-continuous variable. The Kolmogorov-Smirnov test showed a slight violation of normality ($p = .006$). But the sample size ($N = 408$) was large enough to lessen the effect of this violation. The skewness (-0.084) and kurtosis (-1.032) were within acceptable ranges of one another a general rule of thumb ($|skw|<3$, $|kurt|<10$) which permit the use of parametric analysis. In addition, the model was re-estimated with WLSMV as a further robustness check. Factor loadings, reliability estimates, and the substantive relations among the study variables were invariant across estimation methods. This uniformity indicates that the results were robust and not due to estimator selection.

4.5.1 Measurement Model

To ensure the scales reliably measured the intended constructs, we first ran a confirmatory factor analysis (CFA) with a reflective four-factor structure: Metacognitive Listening Strategies (MLS, indicated by 21 continuous items from MLS1 to MLS21), Foreign Language Listening Anxiety (FLLA, 20 continuous items from FLLA1 to FLLA20), Self-Efficacy (SE, 16 continuous items from SE1 to SE16), and Listening Comprehension (LC, 25 binary quasi-continuous items summed as LC_total from 0-25). Maximum likelihood (ML) estimation was adopted because of the large sample size and the approximate normality of the observed variables.

The model showed good fit. The chi-square statistic was $\chi^2(3233) = 3602.31$ ($p < .001$), but with $\chi^2/df = 1.11$ well below the 5 threshold. Other key indices included CFI = .983, TLI = .982 (both > .90), RMSEA = .017 (< .08), and SRMR = .038 (< .08), all meeting or exceeding Hu and Bentler's (1999) recommendations for acceptable fit. GFI (.832) and AGFI (.823) were acceptable for a model with 82 indicators.

For convergent validity, composite reliability (CR) values exceeded the recommended threshold of .70 AVE values for MLS, FLLA, and SE exceeded the recommended value of .50 as suggested by Fornell and Larcker (1981). LC's AVE was lower at .271 than the conventional .50 criterion. This finding is typical in achievement tests consisting of dichotomously scored items, where the constrained item variance leads to attenuated factor loadings and thus smaller AVE values. Notably, the LC concept showed a high level of internal consistency (CR = .902; KR-20 = .90), suggesting the items were a reliable indicator of the same latent listening skill. As stated in Fornell and Larcker (1981), if the CR value is higher than .60, the existence of convergent validity can be established even though the AVE value is lower. Hence, the LC scale was retained because of its high reliability, factor loadings that were all statistically significant, and a theoretically consistent pattern of relationships with other constructs.

Discriminant validity held up too-the square root of each AVE exceeded the highest inter-factor correlation: $\sqrt{AVE}$ for MLS (.755) > .498, FLLA (.792) > .521, SE (.830) > .560, and LC (.520) > .488. These results supported the adequacy of the measurement model for the subsequent structural analysis.

4.5.2 Structural Paths

After the assessment of the measurement model, the direct effects of composite scores on listening comprehension were tested by using

the ordinary least squares (OLS) regression method. MLS_total, FLLA_total and SE_total were entered as predictors and LC_total as the dependent variable. The analysis was performed in SPSS on the composite scores based on the CFA-validated constructs.The regression model was statistically significant and explained 39.1% of the variance in LC_total (R^2= .391, adjusted R^2= .386), $F(3, 404) = 86.357$, $p < .001$. All three predictors were statistically significant. MLS_total showed a positive association with LC_total ($B = 1.338$, $\beta = .181$, $SE = 0.333$, $t = 4.017$, $p < .001$). FLLA_total showed a negative association ($B = -1.717$, $\beta = -.250$, $SE = 0.314$, $t = -5.466$, $p < .001$). SE_total had the largest standardized regression coefficient among the three predictors ($B = 2.046$, $\beta = .339$, $SE = 0.299$, $t = 6.833$, $p < .001$). The intercept was 7.741 ($SE = 1.753$, $t = 4.415$, $p < .001$).

The assumptions for regression analysis were supported by model diagnostics. The variance inflation factors (VIFs) for MLS_total, FLLA_total, and SE_total were 1.345, 1.388, and 1.635, respectively, which were all less than the recommended value of 5. The Durbin-Watson statistic was 1.958, which suggests there was no indication of residual autocorrelation (Field, 2013). These results supported the subsequent mediation analysis.

4.5.3 Mediation Analysis

Mediation was evaluated on composite scores using bias-corrected bootstrapping with 5,000 resamples (equivalent to PROCESS Model 4; Hayes, 2018). Indirect effects were treated as statistically significant when the bootstrap confidence interval excluded zero, whereas a statistically significant direct effect (c') alongside a significant indirect effect was interpreted as partial mediation (Baron & Kenny, 1986).

4.5.4 Common Method Bias Assessment

Harman's single-factor test was performed to examine the potential presence of common method bias. All items from the MLS, FLLA, and SE self-report questionnaires were simultaneously entered into an unrotated principal component analysis using SPSS. The results indicated that the first unrotated factor had an eigenvalue of 23.232 and accounted for 40.758% of the total variance, which was below the recommended threshold of 50%. These findings suggest that a single factor did not account for the majority of covariance among the measurement items, indicating that common method bias was not a serious concern in this study.

5. Data Analysis and Results

5.1 Data Screening

Data from 408 participants were screened in SPSS version 27. Missing values accounted for less than 1%, and were handled using listwise deletion. We also checked for common data quality issues. Straight-lining was absent across the questionnaires. For univariate outliers, no cases exceeded the critical Z-score threshold of ±3.29. Multivariate outliers were assessed using Mahalanobis distance and none proved significant. In the end, all the data were retained for subsequent analyses.

5.2 Descriptive Statistics and Normality Tests

Table 1. Descriptive Statistics (N = 408)

Variable	Sample Size (N)	Minimum	Maximum	Mean	Standard Deviation (SD)	Median
MLS_total	408	1.00	5.00	3.074	0.921	3.095
FLLA_total	408	1.05	5.00	3.053	0.993	3.05
SE_total	408	1.00	5.00	3.023	1.130	3.062
LC_total	408	0.00	25	12.797	6.815	13

As shown in Table 1, MLS_total averaged 3.074 (SD=0.921), FLLA_total 3.053 (SD=0.993), and SE_total 3.023 (SD=1.130). All centering around the midpoint of 3 with relatively tight spreads, suggesting neither extreme highs nor lows in strategy use, anxiety, or confidence. LC_total, scored out of 25, had a mean of 12.797 (SD=6.815), roughly halfway and consistent with CET-4 level performance in a non-major sample. Median values were close to the corresponding means, indicating approximately symmetric distributions.

Table 2. Normality Tests (Kolmogorov-Smirnov)

Variable	Sample Size	Skewness	Kurtosis	Kolmogorov-Smirnov Test	
				Statistic (D value)	p
MLS_total	408	-0.079	-0.719	0.042	0.458
FLLA_total	408	0.032	-0.878	0.051	0.240
SE_total	408	-0.044	-1.031	0.066	0.054
LC_total	408	-0.084	-1.032	0.084	0.006**

As shown in Table 2, MLS_total (KS D=0.042, p=.458), FLLA_total (D=0.051, p=.240), and SE_total (D=0.066, p=.054) all passed with $p > .05$, confirming normality suitable for parametric analysis. which could be expected due to its quasi-continuous scoring based on binary items. Its skewness (-0.084, far below the absolute value of 3) and kurtosis (-1.032, far below the absolute value of 10) were considered acceptable with regard to the use of large samples.These values were considered within acceptable values for large samples (Kline, 2015; Field, 2013).

5.3 Reliability Analysis

Table 3. Scale Reliabilities

Scale	No. of Items	Cronbach's α
Metacognitive Listening Strategies (MLS)	21	.965
Foreign Language Listening Anxiety (FLLA)	20	.971
Self-Efficacy (SE)	16	.973

Note. All of the coefficients were well above .70, indicating sufficient internal consistency.

As shown in Table 3, The Cronbach's alpha coefficients for MLS, FLLA, and SE were all above .70 (Nunnally, 1978). Item-total correlations were all higher than .69, and α was not substantially changed by the deletion of any single item ($\Delta\alpha < .005$). These results show good internal consistency.

5.4 Correlation Analysis

Table 4: Pearson Correlations (N = 408)

Variable	Mean	SD	1	2	3	4
MLS_total	3.074	0.921	1			
FLLA_total	3.053	0.993	-.338***	1		
SE_total	3.023	1.130	.498***	-.521**	1	
LC_total	12.797	6.815	.435***	-.488**	.560**	1

* p<0.05 ** p<0.01.N = 408.

As shown in Table 4, The most robust association was between SE_total and LC_total (r = .560***), pointing to self-efficacy as the strongest correlate of comprehension-a relationship that is medium to large according to practical significance (Cohen, 1988). MLS_total was positively associated with LC_total (r=.435***) and SE_total (r=.498***), and negatively associated with FLLA_total (r=-.338***). FLLA_total showed negative correlations with both SE_total (r=-.521***) and LC_total (r=-.488***). All correlation coefficients were less than .60 in absolute value, suggesting that there was no sign of strong multicollinearity. The general pattern of correlations was in line with the proposed relations among study variables and justified further analyses.

5.5 Measurement Model Assessment

Table 5: CFA Model Fit Indices (N = 408)

Index	Value	Threshold
χ^2 (df)	3602.31 (3233)	—
p-value	<.001	—
Comparative Fit Index (CFI)	.983	>.90
Tucker-Lewis Index (TLI)	.982	>.90
Incremental Fit Index (IFI)	.983	>.90
Root Mean Square Error of Approximation (RMSEA)	.017	<.08
Standardized Root Mean Square Residual (SRMR)	.038	<.08
Goodness-of-Fit Index (GFI)	.832	>.80
Adjusted Goodness-of-Fit Index (AGFI)	.823	>.80

As shown in Table 5, The measurement model indicated an acceptable overall fit. The chi-square statistic was significant, $\chi^2(3233) = 3602.31$, $p < .001$. Because of the large sample size as well as complexity of the model with 82 indicators, more focus was given to the other fit indices. The χ^2/df was below a cutoff value of 5. The incremental fit indices were also found to be acceptable, CFI = .983, TLI = .982, IFI = .983, all these values were above .90. Furthermore, the absolute fit indexes showed a good model fit. The RMSEA was .017 (90% CI [.015, .019]), which was well below the recommended value of .08, and SRMR was .038, also below .08, which was in agreement with the suggested criteria by Hu and Bentler (1999). Absolute indices like GFI (.832) and AGFI (.823) hovered just above .80, reasonable given the model's degrees of freedom and item count (Kline, 2015). Absolute measures such as GFI (.832) and AGFI (.823) were all slightly above the threshold of 0.8 which is acceptable by considering the high degree of freedom of the model and item count (Kline, 2015).

Table 6. Composite Reliability (CR), Average Variance Extracted (AVE) and Discriminant Validity

Latent Construct	Items	Composite Reliabilit (CR)	Average Variance Extracted (AVE)	√AVE	Max. Inter-Corr
Metacognitive Listening Strategies (MLS)	21	.965	.570	.755	.498
Foreign Language Listening Anxiety (FLLA)	20	.971	.627	.792	.521
Self-Efficacy (SE)	16	.973	.689	.830	.560
Listening Comprehension (LC)	25	.902	.271	.520	.488

Note. A CR value > .70 and AVE value > .50 suggest that the construct demonstrates sufficient reliability and convergent validity. Although the LC AVE (.271) was lower than the suggested value, its composite reliability (.902) and KR-20 reliability (.90) were above the accepted value. Based on Forner & Larcker (1981) the LC construct was retained since high reliability outweighs smaller AVEs (especially for dichotomously scored achievement measures).

As shown in Table 6, Validity metrics supported this as well. Composite reliability (CR) was excellent in all cases: .965 for MLS, .971 for FLLA, .973 for SE, and also .902 for LC, all above the .70 standard. Average variance extracted (AVE) exceeded .50 for MLS (.570), FLLA (.627), and SE (.689), confirming convergent validity as items converged reliably on their latent factors (Fornell & Larcker, 1981). LC's AVE decreased to .271, probably due to the binary scoring system of the 25 listening questions, but the high CR compensated for this. Consistent with Fornell and Larcker (1981), convergent validity can be accepted if CR is high even though AVE is less. Discriminant validity was also established as the square root of each AVE was greater than the highest inter-construct correlation, indicating the constructs were well differentiated

5.6 Structural Model Evaluation

Table 7: Direct Path Coefficients (OLS Regression) (N = 408)

Predictor	**B**	**β**	**SE**	**t**	**p**	**VIF**
(Constant)	7.741	—	1.753	4.415	< .001	—
MLS_total	1.338	.181	0.333	4.017	< .001	1.345
FLLA_total	–1.717	–.250	0.314	–5.466	< .001	1.388
SE_total	2.046	.339	0.299	6.833	< .001	1.635

Model fit: R^2= .391; Adjusted R^2= .386; F(3, 404) = 86.357, p < .001; Durbin-Watson = 1.958. Note. B = unstandardized b; β = standardized β. VIF < 5 = no multicollinearity.

As shown in Table 7, the regression model explained 39.1% of the variance in listening comprehension (R^2= .391; adjusted R^2= .386). The overall model was statistically significant, F(3, 404) = 86.357, p < .001. All three predictors were statistically significant. SE_total had the largest standardized regression coefficient (B = 2.046, β = .339, t = 6.833, p < .001). MLS_total was positively associated with listening comprehension (B = 1.338, β = .181, t = 4.017, p < .001), whereas FLLA_total showed a negative association (B = −1.717, β = −.250, t = −5.466, p < .001). The intercept was 7.741 (t = 4.415, p < .001).

Model diagnostics indicated that the assumptions of the regression analysis were satisfied. Variance inflation factors (VIFs) ranged from 1.345 to 1.635, all below the recommended threshold of 5. The Durbin-Watson statistic was 1.958, indicating no evidence of autocorrelation in the residuals (Field, 2013). These results supported the subsequent mediation analysis.

Table 8. Mediation Analysis Results (Bootstrapped; N = 408)

Pathway	**Total Effect (c)**	**SE**	**p**	**Direct Effect (c')**	**SE**	**p**	**Indirect Effect (ab)**	**Boot SE**	**95% Boot CI [LL, UL]**	**Mediation Type**
MLS→SE→LC	3.214***	—	< .001	1.531***	—	< .001	1.678***	0.206	[1.289, 2.093]	Partial
FLLA→SE→LC	-3.352***	—	< .001	-1.851***	—	< .001	-1.501***	0.209	[-1.929, -1.117]	Partial

Note. **p < .001. SE = standard error; Boot CI = bias-corrected bootstrap confidence interval (excludes 0 for significant indirect effects); Mediation type: Partial (direct effect remains significant after including mediator). Unstandardized coefficients reported. Analysis based on Hayes' PROCESS

As shown in Table 8, to examine whether self-efficacy statistically mediated the relationships among the study variables, we ran bootstrapped analyses equivalent to Hayes' PROCESS Model 4 (5,000 resamples, bias-corrected 95% CIs; Table 8). Both pathways demonstrated significant indirect associations through self-efficacy. For MLS to LC, the total effect was 3.214*** (p<.001), direct effect c'=1.531*** persisted, but the indirect effect via SE was significant at ab=1.678*** (Boot SE=0.206, 95% CI [1.289, 2.093] excluding 0). Similarly, FLLA to LC had a total effect of –3.352***, direct c'=–1.851***, and indirect ab=–1.501*** (Boot SE=0.209, CI [–1.929, –1.117]). These findings suggest that self-efficacy was statistically associated with part of the relationship between MLS and listening comprehension, and between FLLA and listening comprehension, while significant direct associations remained.

6. Discussion

6.1 Discussion of Findings

Grounded in Social Cognitive Theory, this study provides empirical evidence for associations among cognitive, affective, and motivational factors on L2 listening comprehension. Metacognitive listening strategies (MLS) and self-efficacy (SE) were both positively associated with listening comprehension (LC). By comparison, foreign language listening anxiety (FLLA) was negatively associated with LC. Among the three predictors, self-efficacy demonstrated the strongest relationship with listening comprehension.

The positive relationship between MLS and LC agrees with earlier research. Listeners who plan, monitor, and evaluate their listening process actively tend to have better listening comprehension. This result might reflect a difference in the efficiency of learner processing of spoken input. The effect of these differences might be more obvious in stressful testing situations, such as the College English Test. The inverse relationship between FLLA and LC is also consistent with previous results. EFL learners who were more anxious in listening

tended to have poorer listening performance. Such association could be particularly significant in the Chinese EFL context. Performance in listening is often evaluated by way of high-stakes test such as the CET. Classroom teaching is frequently determined by examination needs. Consequently, there is a possibility that the students will have more stress to perform well. Given the situation, the use of strategies becomes more critical, and the effect of listening anxiety may be enhanced as well.

A significant result from the current study was the detection of SE as a meaningful statistical mediator.This finding is in line with the SCT. Self-efficacy was related to the relationships of strategy use, anxiety, and listening comprehension. Higher SE learners also tended to show a higher use of metacognitive strategies and a lower level of listening anxiety. SE was most strongly associated with listening comprehension among the variables investigated. This may be because of its central place in self-regulation of learners. In contrast to strategy use or anxiety, self-efficacy reflects the learners' perception of their ability to successfully complete listening tasks, not of particular behavioural or emotional components.Such beliefs may affect how learners react to challenges, how long they persist when faced with difficulty, and how they use strategies at their disposal. In general, SE seems to be a key psychological factor that links cognition, affect, and the results of listening. The Chinese educational system might also enhance the significance of learners' efficacy beliefs. Test scores are usually associated with significant academic consequences, so it is particularly important to be confident in one's listening competence. Students with higher self-efficacy are more likely to feel confident when facing difficult listening tasks. By contrast, those with lower self-efficacy may be more susceptible to anxiety-related impairments.

The mediation findings provide additional understanding of self-regulation in L2 listening. Strategy use and listening anxiety seem not to be separate phenomena. Rather, they both relate to listening performance via learners' self-confidence.This suggests that cognitive and affective influences are more potent among learners who have high self-efficacy beliefs. In this sense, self-efficacy may serve as an important psychological resource that helps learners interpret and respond to listening challenges. The direct effects remained significant after self-efficacy was included in the model. This indicates that self-efficacy explains only part of these relationships. Other factors, such as learner engagement or motivation, may also contribute to listening performance.

Earlier research has typically investigated these factors in isolation. The current study, by including them in the same model, offers a more integrated perspective of L2 listening.The relatively high explanatory power of the model supports the value of examining multiple interacting factors together. This approach provides a more comprehensive understanding of listening performance.These results also extend Social Cognitive Theory to L2 listening. They show how personal beliefs, emotional states, and strategic behaviours can be understood within a common framework. More specifically, self-efficacy seems to be an essential factor connecting cognitive and affective processes to listening results.. These results underline the importance of examining multiple interacting factors together instead of treating strategy use, anxiety, and self-efficacy as separate predictors of L2 learning. The finding highlights the need to investigate related factors in interaction, rather than consider strategy use, anxiety, and self-efficacy as independent predictors of L2 learning. Future research should also take learner background variables into account to examine whether these relationships are consistent for learners with different profiles.

6.2 Pedagogical Implications

The findings of the current study are meaningful to EFL listening instruction, particularly under the exam-oriented context such as in Chinese universities. In the current study, metacognitive listening strategies, self-efficacy, and listening anxiety were significantly related to listening comprehension. Thus, the teaching of listening needs to consider cognitive and affective elements.

First, teachers are supposed to integrate metacognitive strategy training at various stages of listening tasks. For example, learners may be prompted to set listening goals and make predictions about content before listening. While listening, they can assess their own understanding. After the activity, reflection or discussion can facilitate an evaluation of how well they applied different approaches to thinking. Second, self-efficacy was found to be a significant predictor of listening comprehension in this study. Teachers should, therefore, make learners success-oriented. The listening tasks can be organized into three levels, ranging from the easiest to the most difficult. Learning portfolios and peer-sharing activities can also contribute to students' awareness of their development and bolster their confidence in listening. Third, classroom practices should contribute to alleviating excessive listening anxiety. Unpressured listening tasks, cooperative activities and positive feedback make students feel more comfortable and motivated. These approaches could also contribute to students' tendency to perceive listening problems as a normal phenomenon in the process of learning.

7. Conclusion

The current research revealed that metacognitive listening strategies, foreign language listening anxiety, and self-efficacy were significantly related to the listening comprehension of EFL learners. Among these factors, self-efficacy was instrumental as a direct predictor and also served as a mediator. The findings highlight that cognitive strategies should not be the only target for intervention, but learners' beliefs and affective experiences in language learning should also be taken into consideration. Therefore, it is necessary to incorporate explicit metacognitive strategy training into EFL teaching and at the same time facilitate learners' self-efficacy. Teachers can enhance learners' SE by providing them with guided support, positive feedback, and chances to successfully accomplish listening tasks. Supportive classroom practices may also make learners less anxious but more confidence when listening. Collectively, these instructional methodologies can contribute to increasing the learners' confidence, independence and perseverance.

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Author contributions

Conceptualization: J.X. and M.N.C.; Methodology: K.A. and W.S.W.N.; Software: R.S.A.; Validation: J.X., M.N.C., and C.X.; Formal analysis: K.A. and R.S.A.; Investigation: J.X. and W.S.W.N.; Resources: M.N.C. and C.X.; Data curation: R.S.A. and K.A.; Writing – original draft: J.X. and M.N.C.; Writing – review & editing: K.A., W.S.W.N., and C.X.; Visualization: R.S.A.; Supervision: M.N.C. and C.X.; Project administration: J.X.; Funding acquisition: Not applicable. All authors have read and agreed to the published version of the manuscript.

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Obtained.

Ethics approval

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data are available.

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