Self-regulation in L2 listening: the role of teacher and learner self-efficacy and the mediating influence of metacognition

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Self-regulation in L2 listening: The role of teacher and learner self-efficacy and the mediating influence of metacognition

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ABSTRACT

Strong listening proficiency underpins many aspects of foreign language learning. Yet the role of teacher-related factors in its development and their interaction with learner variables is unclear and underexplored, particularly compared to linguistic factors such as aural vocabulary knowledge (AVK). This study investigated how far the listening proficiency of 186 university English as a Foreign Language learners was predicted by key aspects of self-regulation, namely teacher self-efficacy for teaching listening, learner self-efficacy for listening and learner metacognition. The predictive role of AVK was also investigated alongside these variables, before and after a metacognition and strategy-based intervention implemented by Intervention Group teachers who had been trained prior to the intervention. Data were collected using teacher and learner questionnaires as well as learner listening tests. We show, through sequential multiple regression and mediation analysis, that even after controlling for AVK, both teacher and learner self-efficacy were significant predictors at post-test for the Intervention Group only, while they had an indirect effect through metacognition at pre-test for the sample as a whole. These findings illuminate the complexity of the relationship between teacher and learner self-efficacy, and learner outcomes, as well as the impact teacher professional development may have on that relationship. They thus offer a novel perspective through which to understand L2 listening proficiency and the role of the teacher in its development.

Listening in a foreign language (henceforth, FL) is an intricate cognitive, psychological and social process that involves the interaction of several types of knowledge, linguistic and non-linguistic (Vandergrift & Goh, 2012). As such it poses something of a conundrum: on the one hand, it is a fundamental skill for language acquisition as a whole (Vandergrift & Goh, 2012); on the other, it is perceived by both learners (Graham, 2006) and by teachers (Graham et al., 2014) as a very difficult skill to improve. Hence both groups may be lacking in self-efficacy for listening, from a learning and teaching perspective. In turn, learner self-efficacy (LSE) has been established as a significant predictor of listening comprehension skills (henceforth, proficiency) (Du & Man, 2022b), alongside other important predictors such as vocabulary knowledge (Wallace, 2020) and metacognition (Vafaee & Suzuki, 2020). By contrast, the relationship between teacher self-efficacy (TSE) for listening instruction and LSE for listening and listening outcomes has not, to our knowledge, been explored, which seems surprising, given that TSE is believed to influence teachers' practices (Karlen et al., 2023) and also learners' motivational responses (Zee & Koomen, 2016). Overall, we have very little clarity about the relationship between teachers and learners as far as self-efficacy is concerned, with different strands of research that are relevant to each other developing

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separately (Wyatt, 2020). Reasons for that situation are hard to discern but may relate to researchers' interests in one group or the other rather than both, or to the complexity of the study design and analyses required to investigate both teacher and learner self-efficacy together.

That lack of clarity matters for at least three reasons. First, teachers are likely to have an important influence on learners' listening outcomes (Graham & Santos, 2015), given that they play a key role in determining what is listened to in the classroom and the kind of activities completed, decisions which are in turn related to their own self-efficacy for successfully improving learners' listening outcomes. Second, understanding the relationship between TSE and learning outcomes seems essential for untangling the mechanisms through which teacher professional development has any impact in the classroom. Third, and relatedly, TSE or the lack of it may help to explain why interventions for improving listening proficiency have been found in meta-analyses to be less successful when implemented by teachers than researchers (Dalman & Plonsky, 2022). To address this lack of clarity, this article aims to investigate empirically the contribution of both TSE and LSE to learners' listening proficiency, within the context of an intervention that targeted both TSE and learners' listening proficiency. In other words, rather than focusing on the effectiveness of a given teaching approach on learners' outcomes only, we set our study within the context of an intervention in order to gain clearer insights into the nature of the relationship between learner listening proficiency, TSE and LSE, while taking into account variables that previous research has found to important predictors, namely metacognition and aural vocabulary knowledge. We begin with a discussion of those last two factors, given the importance that has been attached to them in L2 listening research.

1. Metacognition, vocabulary and self-efficacy in FL listening

1.1. Metacognition and vocabulary knowledge as predictors of listening proficiency

Metacognition includes not only "awareness of the cognitive processes involved in comprehension", but also "the capacity to oversee, regulate, and direct these processes" (Vandergrift & Baker, 2015, p. 395). That capacity may include the use of metacognitive strategies (e.g., planning, monitoring and evaluating) and use of cognitive listening strategies (e.g., utilising prior knowledge) to decipher the meaning of the input (Vandergrift, 2003). While the terms metacognitive awareness (e.g., Wallace, 2020) and metacognitive knowledge (e.g., Vafaee & Suzuki, 2020) have been used in studies that specifically focus on learners' insight into the process of listening, in this study, the term "metacognition" is used to encompass both insight and regulatory capacity.

In studies that have explored the relationship between metacognition and listening proficiency using correlational analysis (e.g., Lau, 2017) or bivariate regression without controlling for other variables, (e.g., Goh & Hu, 2014; Vandergrift et al., 2006) a much stronger link has been established than when other factors that might be of equal or greater importance, such as vocabulary knowledge (aural or written) are included and analysed using methods such as Structural Equation Modelling (SEM). Indeed, vocabulary has emerged as the most important predictor of FL listening proficiency in several studies (e.g., Du & Man, 2022a, aural vocabulary; Wang & Treffers-Daller, 2017, written vocabulary). Thus Wallace (2020) showed that metacognitive awareness had only an indirect effect on FL listening through topical knowledge when its role was explored alongside aural vocabulary knowledge, attentional control, topical knowledge, and memory. That does not mean, however, that metacognition plays a negligible role in explaining how listening proficiency. For example, Vafaee and Suzuki (2020) established through SEM that metacognitive knowledge was the third strongest predictor of FL listening proficiency after aural vocabulary and syntactic knowledge.

1.2. Metacognition and learner self-efficacy as part of self-regulated learning

Understanding the role of metacognition in listening also requires an understanding of self-regulated learning (SRL) and how metacognition works in conjunction with self-efficacy. Self-efficacy is a central component in social cognitive theory (Bandura, 1986) and can be defined as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura, 1986, p. 391). It is thus a belief about one's abilities to marshal resources to perform specific tasks successfully and reach a particular goal. LSE has been found to be a significant predictor of language proficiency in general (Wang & Sun, 2020), most likely because it influences learners' perseverance when facing challenges (Bandura, 1997). The strength of its relationship with listening proficiency varies across studies (Raoofi et al., 2012), however, and its role is more clearly understood in relation to metacognition. Within SRL frameworks, self-efficacy is closely connected with the use of learning strategies as part of metacognition (Graham, 2022). To undertake a learning task, self-regulated learners activate motivational beliefs such as self-efficacy alongside planning to use different strategies that are monitored metacognitively during the task. After task completion, metacognitive evaluation and attributing outcomes to strategy use are likely to enhance self-efficacy as part of a virtuous circle, strengthening the individual's sense of agency (Graham, 2022). A series of recent studies have explored the relationship between FL outcomes, self-efficacy and metacognition with an SRL framework, with several finding that the self-efficacy-achievement link is mediated by aspects of metacognition, for example among young learners of English (Bai & Guo, 2018) and for English FL writing within an online context (Teng et al., 2021). The longitudinal aspect of the relationship in that online FL learning also emerged as important, as was established in a follow-up investigation (Teng & Yang, 2022) that found that Time 2 metacognition mediated the effects of Time 1 self-efficacy on Time 2 achievement.

Similar findings have been found in a small but growing number of studies that have investigated the interplay between metacognition, self-efficacy and FL listening outcomes. Recent examples are Zhang and Xu (2024) and Du and Man (2022b), who both found that for undergraduate learners of English in China, self-efficacy and metacognition had both direct and indirect effects on listening proficiency, mediated by metacognition. The interrelationship between metacognition, self-efficacy and listening outcomes is

further underscored by intervention studies in which metacognitive listening instruction not only improved learners' self-efficacy for listening but also their listening proficiency (Graham & Macaro, 2008). As outlined in the Introduction, however, the role of the teacher in that relationship has been largely overlooked, save to note that listening strategy interventions implemented by teachers tend to lead to smaller improvements in listening outcomes than those implemented by researchers (Dalman & Plonsky, 2022). That may, according to Dalman and Plonsky, be because teachers implement these interventions less faithfully than the researchers who have designed them. Teachers' more limited self-efficacy in implementing a new approach may, however, be an equally plausible explanation which has not hitherto been explored. That view is in part supported by Lawes and Santos (2007), who found that the positive outcomes for learners reported in Graham and Macaro (2008) were linked with increases in confidence and professional learning for the teachers who implemented the intervention, because of the teacher – university researcher collaborative approach that was adopted. In other words, interventions that also develop TSE may lead to improved LSE and learning outcomes as well. Further evidence to support that argument was provided in Mansouri (2020), where a metacognition and strategy-based listening intervention implemented by teachers whose own confidence in and knowledge about metacognition and listening increased led to significant gains in listening proficiency for English as a Foreign Language (EFL) university learners. While learner scores in the Intervention Group improved significantly between a pre and a post-test, ($p < .001$, $d = 0.3$), the Control Group deteriorated significantly ($p = .002$, $d = 0.2$). Whether and how the self-efficacy of the teachers involved in the study contributed to learners' improved listening outcomes is the central question that we consider in this present study, as an extension to Mansouri (2020) and an issue not previously explored in research.

1.3. Teacher Self-Efficacy

Teacher self-efficacy refers to teachers' beliefs regarding their ability to accomplish particular teaching tasks to support learning and to enable learners to transform their knowledge into practice (Wyatt & Dikilitaş, 2019). Just as LSE is usefully viewed within a self-regulation framework, so too is TSE. Doing so allows one to understand that teachers have both a "learner" and a "teacher" role as they reflect on and plan for classroom activities "for promoting students' proactive SRL" (Kramarski, 2017, p. 227). This implies that, when planning lessons, the self-efficacy of self-regulated teacher-learners comes into play as they select different strategies, which they then monitor metacognitively during instruction. As such, self-efficacious teachers are more likely to have higher expectations and to persist with learners, to be confident in implementing new teaching approaches, and to promote "a mastery goal orientation" (Karlen et al., 2023, p. 3) in the encouragement of the same SRL practices that they themselves apply to their own learning. Furthermore, in their questionnaire study of 280 teachers (18% of whom taught an FL), Karlen et al. (2023) found that teachers with higher levels of self-efficacy for promoting self-regulation were more likely to implement SRL-promoting teaching strategies. In turn, besides facilitating enactive mastery experiences in learners, self-efficacious and self-regulatory teachers may also boost LSE as well as academic outcomes by acting as self-regulatory role models (similar to offering "vicarious experiences", another source of self-efficacy, Bandura (1986)). They are also likely to offer "social persuasion" (Bandura, 1986) and thus nurture self-efficacy, by emphasising to learners that they have the skills to overcome perceived difficulties in challenging tasks.

All of this suggests that TSE should be a significant predictor of learning outcomes. Yet not only has that issue been overlooked with respect to L2 listening, but research in other curriculum areas has also produced conflicting results. For example, on the one hand, looking at various curriculum subjects (not second language) in a review article rather than a meta-analysis, Zee and Koomen (2016) analysed 165 studies spanning 40 years and reported that TSE predicted learner achievement to a moderate degree. On the other hand, examining TSE in the context of science and mathematics teaching, Jerrim et al. (2023) found no evidence of a relationship with learner outcomes when matched pupil-teacher data from 23 OECD countries (72,637 pupils) were analysed using OLS regression. In a systematic review of TSE in EFL, Hoang (2018) located only one study examining the issue, Rashidi and Moghadam (2014), exploring EFL learning in general rather than listening in particular. They found a small positive correlation between TSE and learner satisfaction which in turn was related to learner outcomes, suggesting an indirect effect of TSE, although the small sample size and study design make it hard to draw that conclusion firmly.

More reliable findings regarding TSE are provided by two relatively recent studies which however did not focus specifically on EFL teachers, nor on the triadic relationship between TSE, LSE and learning outcomes. The first (Karlen et al., 2024) recruited 167 high school teachers (some teaching languages) and their 2785 students to explore the connections between teachers' professional competencies (including their own SRL skills and self-efficacy), SRL promotion as reported by teachers and perceived by learners, and learners' SRL skills (metacognitive, motivational, and cognitive strategies, and metacognitive strategy knowledge). TSE was related to their reported promotion of SRL; in turn, SRL promotion was positively associated with learners' metacognitive, motivational, and cognitive strategies, though it was not linked to their metacognitive strategy knowledge. Furthermore, an analysis of indirect effects revealed that teachers' own SRL abilities and their self-efficacy as SRL facilitators were indirectly connected to learners' SRL through the promotion of SRL. In other words, TSE for SRL seems to have influenced teachers' promotion of SRL in their learners. Karlen et al. (2024) did not however examine any further relationship with learning outcomes.

Further evidence of a possible link between teacher variables and learning outcomes is provided by the second study, by Soodla et al. (2017). They investigated not TSE per se but the relationship between 34 language art teachers' metacognitive knowledge of reading strategies and their 534 learners' metacognitive knowledge and reading comprehension. They found that more knowledgeable and hence more confident teachers promoted greater knowledge and confidence in their learners. Learners' metacognitive knowledge of reading strategies was found to be related to their reading comprehension, but perhaps more interestingly, teachers' metacognitive knowledge of reading strategies was significantly related to their learners' metacognitive knowledge, but not to reading comprehension. Overall, this suggests an indirect impact of teacher metacognitive knowledge on learners' reading comprehension, because

the former has an impact on learners' metacognitive knowledge of reading strategies. Whether the same applies to TSE for imparting metacognitive knowledge remains a question to be answered.

Thus, we have a limited number of studies that have attempted to explore in any way the relationship between language teacher and learner self-efficacy, and thence with learning outcomes, and none that have examined it within the context of L2 listening. That gap matters because self-efficacy is recognised as being highly domain-specific; TSE, like LSE, is also task- and context-specific and needs to be considered in "specific performance situations" (Zimmerman & Schunk, 2008). Thus, it is essential to measure both LSE and TSE using domain-specific instruments. Hence the limited findings that we do have cannot be automatically extrapolated to the specific area of L2 listening. Studies of curriculum areas beyond L2 learning that have examined TSE for SRL, teacher metacognitive knowledge, and their relationship to the corresponding learner variables suggest, however, that there may be an indirect relationship at least: teachers who are more confident in and knowledgeable about SRL and its associated behaviour in learners are more likely to develop learners stronger in SRL who hence achieve better outcomes. Therefore, in this study, we examined TSE for implementing metacognition and SRL, strategy-based listening instruction.

In summary, the foregoing review has shown that social cognitive theory (Bandura, 1986), SRL frameworks and previous research indicate that L2 listening proficiency as an outcome may be predicted not only by LSE, but also by TSE. Yet conclusive evidence of that impact is lacking. Given the evidence that both learners and teachers lack self-efficacy in relation to listening, the absence of studies examining the impact of both TSE and LSE on listening proficiency is of concern. Any study that seeks to fill that significant gap must, however, also take into account the potential mediating role of metacognition (Du & Man, 2022b; Xu, 2017) and the contribution of aural vocabulary knowledge (henceforth, AVK), in view of convincing evidence of its centrality as a predictor of listening proficiency (Vafaee & Suzuki, 2020; Wallace, 2020). Finally, given existing evidence that strategy-based interventions can boost both self-efficacy and listening proficiency, and the link between self-efficacy, strategies and metacognition in self-regulated learning frameworks, it seems important to explore these areas within the context of a metacognition and strategy-based listening intervention. Doing so also facilitates an exploration of the role of the teacher in such interventions, which previous research has also tended to overlook.

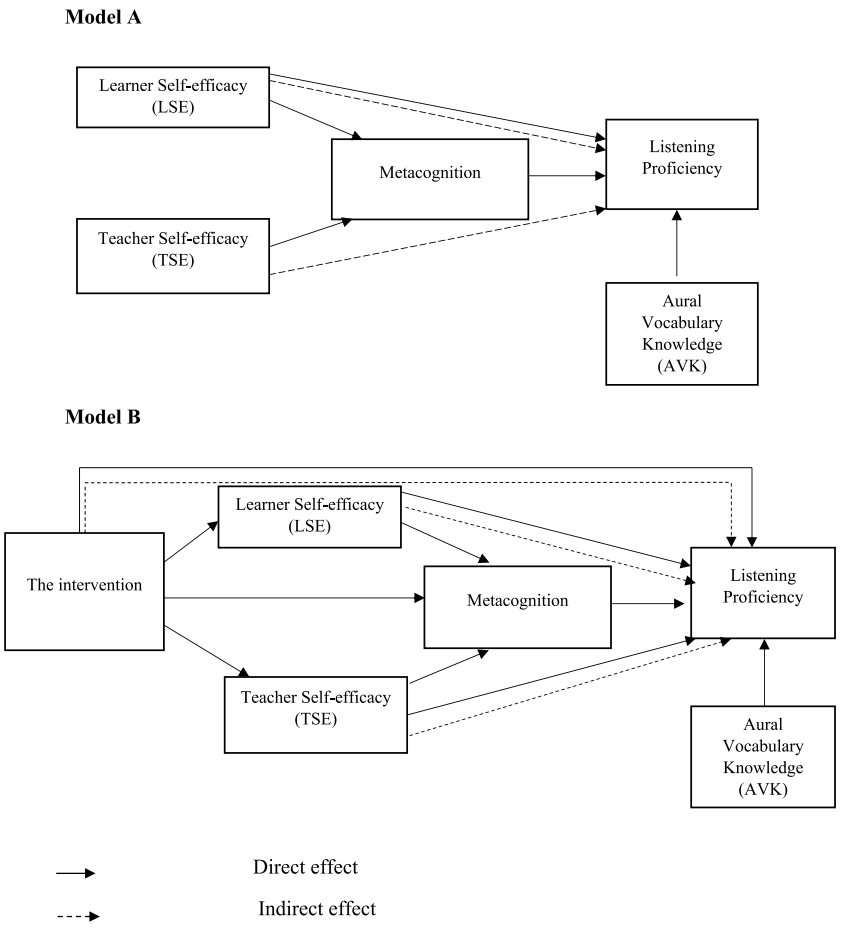


Fig. 1. Hypothesised models: Before (model A) and after (model B) intervention.

1.4. The hypothesised model

This study seeks to extend understanding of the role of self-efficacy in learner outcomes in FL listening, by looking beyond the simple relationship between either TSE or LSE and outcomes. It does so by including both forms of self-efficacy and other variables known to be important for listening outcomes, namely metacognition and AVK. Furthermore, it does so in the context of a classroom intervention design, an approach which to our knowledge has not been previously undertaken with TSE in FL.

We proposed two hypothesised models (Fig. 1) because we anticipated that the predictive role of the two constructs of self-efficacy (LSE and TSE) in learning outcomes and the mediating effect of metacognition would differ before and after an intervention, in which EFL teachers were firstly trained in metacognition and strategy-based listening instruction which they then implemented with their learners (see Methodology), with significantly higher levels of listening proficiency found for learners receiving the intervention than those in the Control Group (Mansouri, 2020). Measures of LSE, TSE, learner AVK, metacognition and listening proficiency were taken before and after the intervention. Before the intervention (Model A), we anticipated that LSE would have a direct effect on listening proficiency but also an indirect effect mediated by metacognition, as previous research has found (Du & Man, 2022b; Zhang & Xu, 2024). We expected that TSE would not, by contrast, have a direct effect on listening proficiency, given the lack of evidence of a clear link between TSE and learning outcomes (Jerrim et al., 2023), but that it would have an indirect through metacognition as indicated by studies in other contexts (Karlen et al., 2023, 2024; Soodla et al., 2017). For Model B, we anticipated that the intervention would change the nature of the relationship between TSE and listening outcomes, but only for teachers who had received training in metacognition and strategy-based instruction and who delivered the intervention. Drawing on the findings of Karlen et al. (2023), we anticipated that teachers with greater knowledge of and self-efficacy for SRL-promoting strategies would be more likely to develop the metacognition and strategy use of their learners, with expected benefits for LSE, metacognition and listening outcomes (Graham & Macaro, 2008). In other words, after the intervention, there would be both a direct predictive effect of TSE and LSE and an indirect effect through metacognition in the Intervention Group. For the Control Group, we anticipated that the relationship would remain as shown in Model A, namely that there would be no direct effect of TSE on listening proficiency. In both models, we expected AVK to have a significant direct effect on listening proficiency (Vafaee & Suzuki, 2020; Wallace, 2020) and included it to establish whether teacher and learner self-efficacy can still predict listening proficiency once a dominant predictor is controlled for. Finally, we sought to establish how both forms of self-efficacy work in conjunction with metacognition.

In light of the above, the following research questions were posed.

1. What is the relationship between listening proficiency, AVK, LSE, TSE and metacognition?
2. To what extent do learner and teacher self-efficacy predict learners' listening proficiency, before and after metacognition and strategy-based listening training, when both metacognition and AVK are also taken into account?

2. Method

2.1. Participants

Ten teachers (three male, seven female) in 10 classes, eight of whom had a Master's qualification (two with a Bachelor's degree), were selected to take part in the study through convenience sampling, used because of the time commitment required from all teachers but especially from those in the Intervention Group. Eight teachers had over 10 years' teaching experience. These ten teachers between them taught 186 English-major undergraduate Algerian learners (28 male, 158 female; mean age 19) who also took part in the study. All participants formed two groups, an Intervention Group and a Control Group, each consisting of five teachers and their learners. The allocation to groups occurred after a pre-test assessing TSE, to ensure the two groups were balanced in TSE before the intervention, measured as teachers' level of confidence in certain areas of listening instruction and given as a percentage score on a scale from 0 to 100 (Table 1; see also TSE Questionnaire, Appendix E). The study began four weeks into the academic year and spanned four months in total. Before collecting data, full informed consent for participation was obtained from the participants and ethical approval was gained from the researchers' university.

Table 1
Teacher participants' self-efficacy levels.

Group	TSE level at T1 (% confidence)	n
Intervention	30–65	3
	65–95	2
Control	30–65	3
	65–95	2

Note. TSE = Teacher self-efficacy; T1 = Time 1.

2.2. The intervention

After group allocation, the five Intervention Group teachers received 3 h of professional development to enable them to understand the principles of the metacognition and strategy-based instruction that formed the basis of the intervention and to equip them to deliver it. The professional development session followed three main stages: reviewing teachers' previous knowledge and understanding of listening, raising teacher awareness of the listening process, discussing and reflecting on listening research findings and their implications, and guiding them on how the intervention should be implemented, providing them with materials, examples and activities. These steps were taken to address gaps in teacher knowledge and pedagogy for listening identified in previous research (Graham & Santos, 2015) and to follow broadly a metacognitive instructional approach (Vandergrift & Goh, 2012).

Subsequently, over a period of six weeks, for 9 h in total, learners were taught using the instructional techniques that had been covered in the teacher professional development and that aimed to equip them to employ a range of listening strategies and to regulate their use effectively through metacognition. The intervention involved raising learners' awareness of listening strategies, teacher modelling of strategies, practice using them, teacher feedback on learners' strategy use, and lastly, learner evaluation and reflection on the effectiveness of the strategies during listening. Such a metacognitive approach aims to develop learners' listening holistically, through strategic actions, collaboration with peers, and individual reflection (Vandergrift & Goh, 2012). Teacher feedback, self-evaluation and peer discussion were strongly emphasized (Mansouri, 2020).

The Control Group was taught by the remaining five teachers. Observations and interviews (Mansouri, 2020) showed them to use the more conventional "comprehension approach" to teaching listening (Field, J., 2008), focusing on testing learners' aural understanding through comprehension questions.

2.3. Data collection and analysis procedures

Data were collected from both the two groups twice, once before (Time 1) and once after the intervention (Time 2) through five research tools: two listening tests to measure the dependent variable, listening proficiency; and an AVK test and two questionnaires, one for learners and another for teachers, as measures for the predictor variables of AVK, metacognition and self-efficacy. The order of data collection at Time 1 was: learners took the AVK test (10min) then the listening test (90min), and finally completed the questionnaire (15min) in one session. Teachers also completed the TSE questionnaire (15min). The same procedures were followed at Time 2 except the AVK test was omitted. All instruments (Appendices A – E) were piloted before use.

A different test of listening proficiency (Appendix B) was used at the two timepoints to avoid a practice effect. Tests were closely matched on the key indicators of length, words per minute, and vocabulary frequency levels (Appendix A). Each test comprised five sections, in which learners answered different types of questions (multiple choice, short answer, gap-fill, true/false), assessing different listening skills (identifying main idea, details, attitudes, arguments). Each test was scored out of 35, converted to percentage for analysis.

The AVK test (Appendix C) was adopted from Cheng and Matthews (2016), consisting of 63 spoken statements in English. Learners had to listen to each and fill in the one word missing from the written version of each statement. The target words were from three levels of word frequency: 0–2000, 2001–3000, and 3001–5000. AVK was assessed at Time 1 only. The 63 words were scored by assigning one point for each correctly answered word.

The learner questionnaire (Appendix D) included two sections: first, a section to assess learner metacognition that included some items adapted from previous studies (Vandergrift et al., 2006; Zoghlami, 2015), while others were developed by the researchers to fit the scope of the study. The metacognition section consisted of 24 items rated on two different scales that were standardised before the analysis: 12 items were rated on a scale from 1 (strongly disagree) to 6 (strongly agree); these aimed to explore learners' knowledge of listening and themselves as listeners (e.g., "I find it difficult to maintain my concentration while listening"). The other 12 items were rated on a scale from 1 (never) to 4 (always) to explore learners' frequency of using listening strategies (e.g., "Before listening, I have a plan for how I am going to listen"). Second, the LSE section investigated learners' efficacy beliefs about performing successfully certain activities related to listening (e.g., understanding details, understanding gist), consisting of 13 items on a scale from 0% to 100%. The scale and four items were adopted from Graham and Macaro (2008) and the remaining items were developed by the researchers to fit the context.

The TSE questionnaire (Appendix E) was developed from the general teacher self-efficacy literature (Bandura, undated; Dellinger et al., 2008; Tschannen-Moran & Hoy, 2001), as no pre-existing questionnaire on TSE for FL listening was found. It consisted of 23

Table 2
Cronbach's alpha for the research instruments.

Instrument	Section	Time 1	Time 2
Learner Questionnaire	Metacognition	.77	.83
	Learner Self-Efficacy	.83	.91
	Overall	.81	.87
Listening test	Overall	.90	.87
Aural vocabulary test	Overall	.93	–
Teacher Self-Efficacy Questionnaire	Overall	.95	.95

items rated on a scale from 0% to 100% investigating teachers' perceived ability to teach listening. It covered three aspects: listening classroom management (e.g., "Manage the listening session if unexpected student behaviour occurs"), metacognition and strategy-based instruction (e.g., "Develop students' effective use of listening strategies"), and learner-related factors such as motivation and achievement (e.g., "Maintain high levels of students' motivation and engagement in listening tasks").

2.4. Scoring and analysis

First, a sample of 30 tests from each time point were marked by the first author and a colleague, achieving an inter-rater reliability rate of .99 at Time 1 and .98 at Time 2 for the listening test and .99 for the AVK test. The remaining tests were then marked by the first author. The internal consistency values of each research instrument (using Cronbach's Alpha, Table 2) were judged to be acceptable (Hair et al., 2010).

To answer the research questions, Time 1 data were analysed with both groups taken together. This was followed by an analysis of Time 2 data for the Intervention and Control Group separately.

For RQ1, descriptive statistics and correlations were calculated for each variable in both groups. Then, for RQ2, a sequential multiple regression analysis (SMR) was conducted with learner listening proficiency as the dependent variable and the remaining learner and teacher variables in Table 2 as the independent variables. SMR can be used to identify the unique influence of each independent variable on a dependent variable (Keith, 2019), and it assumes a large sample size (for each predictor in the model 10 or 15 cases according to Field, A., 2018), normal distribution of data, absence of outliers, independence of residuals, linearity and absence of multicollinearity (Field, A., 2018). The assumptions were checked and met before analysing the data. Because of the small number of participants for the TSE variable, this latter was entered as a dummy variable with three levels: high, average and low based on Karas et al. (2024): scores $\geq$80% (high), scores $\leq$70% (low), and scores between these two, average. Teachers with a high self-efficacy level represent the reference group to which the other groups were compared. This is presented in the results section as "X1" which compares data from teachers with a high level to those with an average level, and as "X2" which compares data from teachers with a high level to those with a low level.

The order of entering the independent variables in the regression equation is important for SMR and should be based on actual or presumed time precedence logic, previous research, and perceived theoretical importance (Keith, 2019). Therefore, AVK was entered first (Model_1) because of its importance for listening (Vafaee & Suzuki, 2020; Vandergrift & Baker, 2015 and others). Metacognition was entered next (Model_2), because of its significant importance for listening but to a lesser extent than AVK (Vafaee & Suzuki, 2020). Metacognition was converted to Z-scores because it was measured through two different scales. LSE was entered third (Model_3) as the strength of the relationship between LSE and learner listening proficiency varies across studies (Raoofi et al., 2012). Finally, in Model_4, TSE was entered as well because some literature in general education suggests a relationship between TSE and learners' achievement (Zee & Koomen, 2016) but other studies do not (Jerrim et al., 2023).

After the SMR was conducted, mediation analysis using Hayes's (2018) PROCESS macros for SPSS was also conducted with data collected before and after the intervention. Mediation is a statistical method that expands the understanding of "*how* an effect comes about" (Keith, 2019, p. 179). It is also referred to as an indirect effect. The simplest mediation model contains a causal antecedent variable X (the independent) that is supposed to influence Y (the dependent) through M (the mediator). In this study two mediation models were executed; the first contained LSE as X, listening proficiency as Y, metacognition as M and AVK as the covariate. The second model differed from the first model only in X, TSE. Confidence interval (CI) 95% was reported for the first model, while CI 99% was reported for the second model as the independent variable TSE was a multi-categorical variable (Hayes & Preacher, 2014).

In the reporting of Results, the following terms are used, based on Hayes and Preacher (2014):

Total effect refers to "the amount by which two cases that differ by one unit on X are estimated to differ on Y through both the direct and indirect pathways" (p. 455); Relative indirect effect and relative direct effect, an analysis that seeks to "quantify the effect of being in one group (or set of groups) relative to some reference group or set of groups" (p. 456). Furthermore, a relative indirect effect is considered to be statistically significant only "if the CI does not straddle zero" (p. 462).

3. Results

Research Question 1: The relationship between listening proficiency (LP), AVK, LSE, TSE and metacognition (MC)

Descriptive statistics and correlations were calculated for each variable in both groups. Table 3 shows that, at both timepoints, mean listening scores were below 50% for both groups, while the mean scores for other variables exceeded 50%. At Time 2, for the Intervention Group, all means (excluding AVK) increased, whereas they decreased for the Control Group (except for TSE). Time 1 correlations with listening proficiency were strong for AVK, moderate for MC, weak for LSE, and non-significant for TSE (except for AVK, where the correlation was negative). Additionally, all variables were significantly correlated with each other. At Time 2, in the Intervention Group, TSE was positively correlated with all variables except LSE and there were positive associations between all other variables. In the Control Group, there was no significant and positive correlation between TSE and any variable, and indeed, as at Time 1, it was negatively correlated with learners' AVK. All other variables were positively correlated with each other. Overall, no multicollinearity was detected between the independent variables at either timepoint, however. Fig. 2 gives a graphical presentation of the relative strength of the correlation between LP and each variable at the two timepoints.

Table 3
Descriptive statistics and correlations (Pearson's), both groups, Time 1 and Time 2.

	Time 1						Time 2					
	Mean (SD)	Correlation					Group	Mean (SD)	Correlation			
		1	2	3	4	5			1	2	3	4	5
1 (LP)	41.14 (18.30)	1.00	.59**	.46**	.35**	.07	IG	46.98 (15.21)	1.00	.56**	.40**	.48**	.33**
						.	CG	36.25 (16.74)	1.00	.55**	.46**	.44**	−.19
2 (AVK)	59.81 (14.97)		1.00	.36**	.33**	−.15*	IG	59.95 (14.23)		1.00	.28**	.28**	.23**
							CG	59.65 (15.82)		1.00	.30**	.43**	−.25**
3 (MC)	.01 (1.61)			1.00	.59**	.09	IG	.06 (1.55)			1.00	.49**	.28**
							CG	−.67 (1.58)			1.00	.61**	.01
4 (LSE)	66.07 (15.33)				1.00	.05	IG	71.07 (12.87)				1.00	.16
							CG	61.33 (12.86)				1.00	.04
5 (TSE)	67.03 (12.83)					1.00	IG	68.01 (11.20)					1.00
							CG	70.26 (14.41)					1.00

Note: ** significant at .01. * significant at .05. IG= Intervention Group; CG= Control Group; LP = Listening Proficiency, AVK = Aural Vocabulary Knowledge; MC = Metacognition; LSE = Learner Self-Efficacy; TSE = Teacher Self-Efficacy.

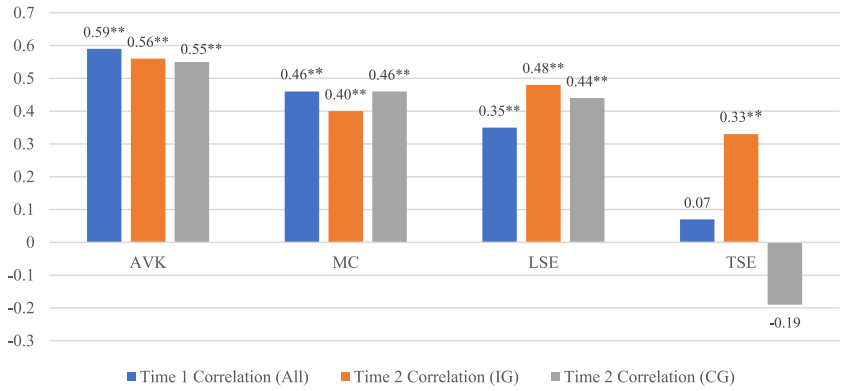


Fig. 2. Changes in correlations between listening proficiency and other variables, between Time 1 and Time 2, and across groups at time 2.

Research Question 2: Do learner and teacher self-efficacy predict learners' listening proficiency, before and after metacognition and strategy-based listening training, when both metacognition and AVK are also taken into account?

Time 1. Table 4 summarises the results of the SMR analysis for all participants at Time 1. AVK (see Appendix F for all full model results) contributed significantly to the model, F (1, 184) = 100.12, $p < .001$ and accounted for 35% of the variation in listening scores (Model_1); metacognition (Model_2) explained an additional 7% of variation in listening proficiency (after controlling for AVK) and the change in R^2 was significant, F (2, 183) = 66.84, $p < .001$. However, in Model_3, LSE did not contribute significantly ($p = .58$). Similarly, a non-significant contribution of TSE (Model_4) was found ($p = .49$). The mean listening score was 2.04 standard deviations lower in the average TSE group than in the high TSE group and 3.31 standard deviations lower in the low TSE group than in the high TSE group, but neither of these differences was statistically significant. In total, all the variables together explained 43% of the variance in listening proficiency and AVK made the largest contribution.

To further understand the relationship between LSE, TSE and listening proficiency, mediation analysis was conducted to estimate the indirect effect of, firstly, LSE on listening through metacognition and controlling for AVK (Table 4). Following the causal steps of Baron and Kenny (1986, in Keith, 2019), firstly, the total effect (direct and indirect) of LSE on listening, controlling for AVK, was measured and was found to be statistically significant ($p < .001$). Secondly, the direct effect of LSE on metacognition (mediator) was estimated and it was also statistically significant ($p < .001$). Thirdly, multiple regression with LSE and metacognition as predictive variables of listening was conducted. There was a statistically significant direct effect on listening proficiency of metacognition ($p < .001$) but not of LSE ($p = .58$). This suggests that LSE had an indirect effect on listening proficiency through metacognition. Thus, the latter seems to have mediated the effect of LSE on listening proficiency at Time 1.

To establish whether the indirect effect of LSE on listening through metacognition was statistically significant, bootstrapping was conducted using Hayes's (2018) PROCESS macros for SPSS. This analysis showed that the indirect effect of LSE on listening, through the mediator of metacognition, was statistically significant ($d = .16$, 95% CI [.07, .26]). This suggests that metacognition mediated the relationship between LSE and listening. Fig. 3 illustrates this mediation effect.

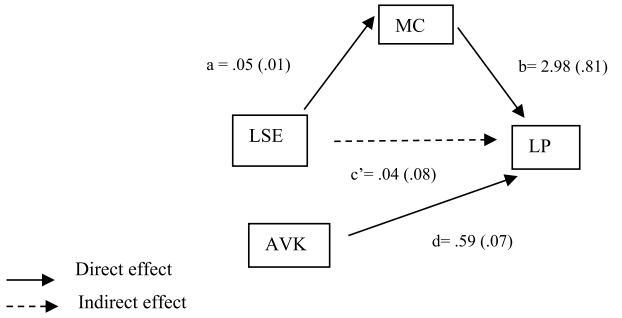
Similar procedures were then applied to analyse TSE. Two comparisons were made (Table 5): high vs. average TSE (X1) and high vs. low TSE (X2). Neither X1 nor X2 had a significant relative total effect on listening. Although X2 showed a p-value of .02, the confidence intervals crossed zero, indicating a lack of statistical significance. Likewise, when the mediator was introduced into the model with TSE as the predictor variable, neither X contrast showed a significant relative direct effect on listening. In other words, at Time 1, TSE did not directly predict learners' listening proficiency.

However, bootstrapping results revealed that TSE did have a significant indirect effect on learners' listening proficiency through

Table 4
Total and direct effects of LSE at Time 1.

Model	IV	DV		R^2	B	$SE\ \beta$	β	t	p
1	LSE	LP	Intercept	.38	−11.90	5.53		−2.15	.03
					CI (−.22.81, −.98)				
			LSE		.21 (.06, .35)	.07	.17	2.86	.004
			AVK		.65 (.50, .80)	.07	.53	8.68	< .001
2	LSE	MC	Intercept	.37	−4.81 (−5.77, −3.85)	.48		−9.86	< .001
			LSE		.05 (.04, .06)	.01	.52	8.48	< .001
			AVK		.01 (.01, .03)	.01	.18	2.97	.003
3	LSE	LP	Intercept	.42	2.46 (−10.60, 15.53)	6.62		.37	.001
	MC (Mediator)		LSE		.04 (−.11, .21)	.08	.03	.55	.58
			MC		2.98 (1.38, 4.58)	.81	.26	3.68	< .001
			AVK		.59 (.44, .74)	.07	.48	7.97	< .001

Note: IV = Independent Variable; DV = Dependent Variable; LP = Listening Proficiency, AVK = Aural Vocabulary Knowledge; MC = Metacognition; LSE = Learner Self-Efficacy.



'a' = estimated regression coefficient for LSE (predictor) on MC (mediator)

'b' = estimated regression coefficient for MC on LP (outcome)

'c'' = estimated regression coefficient for LSE on LP when MC is included in the model

'd' = estimated regression coefficient for AVK (covariate) on LP

Fig. 3. Time 1 Mediation illustrated. LSE affects LP, in part through MC.
'a' = estimated regression coefficient for LSE (predictor) on MC (mediator).
'b' = estimated regression coefficient for MC on LP (outcome).
'c'' = estimated regression coefficient for LSE on LP when MC is included in the model.
'd' = estimated regression coefficient for AVK (covariate) on LP.

metacognition. This relative indirect effect of TSE on listening through metacognition was statistically significant for both X1 ($d = -3.17$, 99% *CI* [−7.6, −.31]) and X2 ($d = -3.23$, 99% *CI* [−6.59, −.74]). This relationship is illustrated in Fig. 4.

Time 2. As indicated in the Analysis section, Time 2 data were analysed for the Intervention and Control Group separately, in order to investigate whether the relationships between the variables established at Time 1 still applied after one group of teachers and learners had experienced a metacognition and strategy-based intervention.

Intervention Group After the intervention, AVK remained a significant contributor to the model, F (1, 95) = 43.11, $p < .001$, accounting for 31% of the variation in listening proficiency — but 4% less than at Time 1 (see Appendix F for full model results). Metacognition explained an additional 6% of the variation (after controlling for AVK), and this change in R^2 was significant, F (2, 94) = 28.31, $p = .003$. This contribution was similar to the effect observed at Time 1.

Different from what was found at Time 1, where neither LSE nor TSE contributed directly to listening proficiency, LSE added a further 6% to the model, F (3, 93) = 24.22, $p = .002$ (Model_3). Similarly, in Model_4, TSE explained an additional 8% of the variation, F (5, 91) = 19.7, $p < .001$. The mean listening score at Time 2 was 12.2 standard deviations lower for the learners taught by the average TSE group compared to the high TSE group and 7.06 standard deviations lower for the low TSE group compared to the high TSE group. Both differences were statistically significant. Overall, the variables together explained 52% of the variance in Time 2 listening proficiency—9% more than in Time 1.

To further explore the relationship between LSE and listening proficiency, a mediation analysis was conducted using metacognition as the mediator, while controlling for AVK (Table 6). The results indicated that although the direct effect of LSE on listening proficiency

Table 5
Total and direct effects of TSE, Time 1.

Model	IV	DV		R^2	*B*	*SE β*	*β*	*t*	*p*
1	TSE	LP	Intercept	.37	2.39	4.89		.48	.62
					CI (−10.36, 15.14)				
			TSE (X1)		−5.32 (−14.37, 3.72)	3.47	−.29	−1.53	.12
			TSE (X2)		−6.61 (−14.06, .83)	2.86	−.36	−2.31	.02
			AVK		.73 (.54, .92)	.07	.60	10.19	< .001
2	TSE	MC	Intercept	.19	−1.48 (−2.75, −.21)	.48		−3.05	.003
			TSE (X1)		−1.05 (−1.95, −.15)	.34	−.65	−3.06	.003
			TSE (X2)		−1.07 (−1.81, −.33)	.28	−.67	−3.79	< .001
			AVK		.04 (.02, .05)	.01	.37	5.54	< .001
3	TSE	LP	Intercept	.43	6.84 (−5.67, 19.36)	4.8		1.42	.15
	MC (Mediator)		TSE (X1)		−2.15 (−11.03, 6.73)	3.41	−.11	−.63	.52
			TSE (X2)		−3.38 (−10.78, 4.02)	2.84	−.18	−1.19	.23
			MC		2.99 (1.13, 4.85)	.71	.26	4.19	< .001
			AVK		.61 (.42, .81)	.07	.50	8.26	< .001

LP = Listening Proficiency, AVK = Aural Vocabulary Knowledge; MC = Metacognition; TSE = Teacher Self-Efficacy.

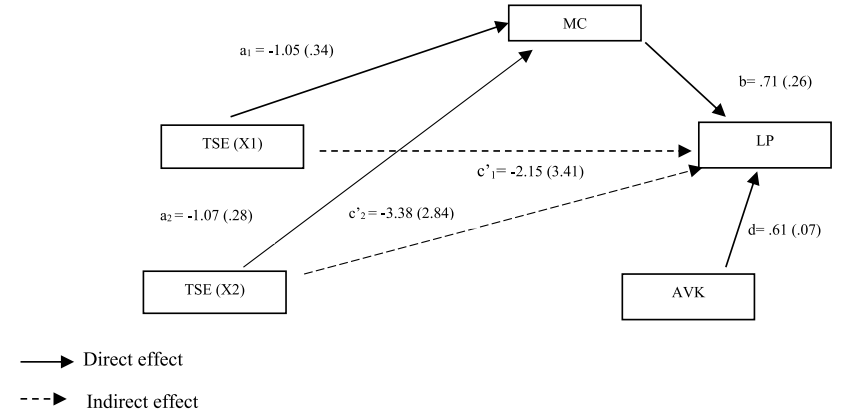


Fig. 4. Time 1 Mediation illustrated. TSE affects LP, in Part through MC.
X1 = high vs average TSE.
X2 = high vs low TSE.

Table 6
Total and direct effects of LSE at Time 2, Intervention Group.

Model	IV	DV		R^2	*B*	*SE β*	*β*	*t*	*p*
1	LSE	LP	Intercept	.43	−8.68	6.9		−1.25	.21
					CI (−22.4, 5.02)				
			LSE		.36 (.19, .53)	.08	.35	4.31	< .001
			AVK		.49 (.31, .66)	.08	.46	5.65	< .001
2	LSE	MC	Intercept	.26	−3.76 (−5.35, −2.18)	.79		−4.72	< .001
			LSE		.04 (.02, .06)	.01	.44	4.86	< .001
			AVK		.01 (−.01, .03)	.01	.14	1.62	.10
3	LSE	LP	Intercept	.44	−3.80 (−18.98, 11.36)	7.63		−.49	.61
	MC (Mediator)		LSE		.31 (.11, .49)	.09	.29	3.22	.001
			MK		1.29 (−.46, 3.06)	.88	.13	1.45	.14
			AVK		.47 (.29, .64)	.08	.44	5.37	< .001

LP = Listening Proficiency, AVK = Aural Vocabulary Knowledge; MC = Metacognition; LSE = Learner self-Efficacy.

Table 7
Total and direct effects of TSE, Time2.

Model	IV	DV		R^2	*B*	*SE β*	*β*	*t*	*p*
1	TSE	LP	Intercept	.44	23.93	6.32		3.78	< .001
					CI (7.29, 40.57)				
			TSE (X1)		−14.96 (−23.61, −6.32)	3.28	−.98	−4.55	< .001
			TSE (X2)		−9.65 (−18.47, −.83)	3.35	−.63	−2.87	.01
			AVK		.55 (.32, .77)	.08	.51	6.34	< .001
2	TSE	MC	Intercept	.12	−.16 (−2.27, 1.95)	.80		−.19	.84
			TSE (X1)		−.57 (−1.67, .52)	.41	−.37	−1.38	.17
			TSE (X2)		−.94 (−2.06, .17)	.42	−.61	−2.21	.03
			AVK		.02 (−.01, .05)	.01	.21	2.10	.04
3	TSE	LP	Intercept	.48	24.29 (8.24, 40.34)	6.10		3.98	< .001
	MC (Mediator)		TSE (X1)		−13.68 (−22.10, −5.26)	3.20	−.89	−4.27	< .001
			TSE (X2)		−7.55 (−16.27, 1.17)	3.31	−.49	−2.27	.02
			MC		2.22 (.16, 4.29)	.78	.22	2.83	.01
			AVK		.49 (.27, .72)	.08	.46	5.81	< .001

LP = Listening Proficiency, AVK = Aural Vocabulary Knowledge; MC = Metacognition; TSE = Teacher Self-Efficacy.

was reduced—suggesting a potential mediation effect of metacognition—the indirect effect of LSE on listening was not statistically significant (d = .06, 95% *CI* [-.02, .15]). These findings suggest that for the Intervention Group, LSE directly affected listening proficiency, with only a portion of its effect mediated by metacognition.

For TSE, both high vs. average and high vs. low TSE comparisons had a statistically significant relative total effect on listening when controlling for AVK (Table 7). However, when metacognition was introduced as a mediator into the model with TSE as the predictor variable, the relative direct effect was only significant for high versus average TSE levels (X1). For high versus low TSE levels (X2), the confidence intervals crossed zero, indicating a lack of statistical significance.

Furthermore, bootstrapping results revealed that neither X1 ($d = -1.28$, 99% *CI* [−4.55, 1.36]) nor X2 ($d = -2.10$, 99% *CI* [−6.10, .48]) had a statistically relative indirect effect on listening through metacognition. In other words, neither X1 nor X2 influenced listening proficiency via metacognition in the Intervention Group.

Control Group The SMR analysis for the Control Group's Time 2 scores (see Appendix F for full model results) demonstrated that AVK continued to contribute significantly to the model, $F\ (1, 87) = 37.53$, $p < .001$, accounting for 30% of the variation in listening scores, 5% less than observed at Time 1 for the entire sample. Metacognition explained an additional 10% of the variation in listening scores (after controlling for AVK), and this change in R^2 was significant, $F\ (2, 86) = 28.24$, $p <. 001$. Different from what was observed for the Intervention Group, LSE and TSE did not contribute significantly to the model, with p-values of .48 and .30 respectively. The mean listening score was 4.16 standard deviations lower in the average TSE group compared to the high TSE group, and .53 standard deviations higher in the low TSE group compared to the high TSE group; however, neither of these differences reached statistical significance. Overall, the combined variables explained 42% of the variance in learners' listening proficiency, which is 10% less than the variance explained for the Intervention Group.

To investigate whether LSE influenced listening proficiency through metacognition, a mediation analysis was conducted while controlling for AVK (Table 8). The total effect of LSE on listening was significant ($p = .01$), yet when the mediator was included, there was a decrease in the effect of LSE, and its direct effect became statistically insignificant ($p = .48$). This suggests that, at Time 2, for the Control Group, LSE had an indirect effect on listening proficiency through metacognition. This finding was similar to what was observed at Time 1 but differs from what was found for the Intervention Group.

In order to confirm these results, bootstrapping was undertaken and results demonstrated that the mediation effect was statistically significant ($d = .1$, 95% CI [.07, .36]) (Fig. 5), indicating that LSE had an indirect effect on listening proficiency through metacognition.

Turning to TSE, its relative total, direct, and indirect effects on listening proficiency were not statistically significant for either X1 or X2 (Table 9), indicating that no effect on listening proficiency was associated with TSE in the Control Group.

The study's findings can be summarised thus: all learner-related variables were positively correlated at Time 1, but TSE did not show any significant correlation with any of the other variables except for a weak negative relationship with AVK. At Time 2, TSE was positively correlated with learners' listening proficiency, AVK, and metacognition for the Intervention Group only. It was not significantly correlated with LSE, however. AVK and metacognition had significant direct effects on learners' listening proficiency,

Table 8
Total and direct effects of LSE at Time 2, Control Group.

Model	IV	DV		R^2	*B*	*SE β*	*β*	*t*	*p*
1	LSE	LP	Intercept	.35	−11.17 *CI* (−14.10, 17.18)	7.6		−1.46	.14
			LSE		.31 (.32, .82)	.12	.24	2.52	.01
			AVK		.46 (.26, .67)	.10	.44	4.60	< .001
2	LSE	MC	Intercept	.37	−5.37 (−6.78, −3.96)	.70		−7.58	< .001
			LSE		.07 (.04, .09)	.01	.58	6.13	< .001
			AVK		.01 (−.01, .02)	.01	.05	.51	.54
3	LSE	LP	Intercept	.40	4.89 (−13.98, 23.77)	9.49		.70	.60
	MC (Mediator)		LSE		.10 (−.18, .39)	.14	.07	2.10	.48
			MC		2.98 (.76, 5.21)	1.11	.28	2.67	.01
			AVK		.45 (.25, .65)	.09	.42	4.59	< .001

LP = Listening Proficiency, AVK = Aural Vocabulary Knowledge; MC = Metacognition; LSE = Learner Self-Efficacy.

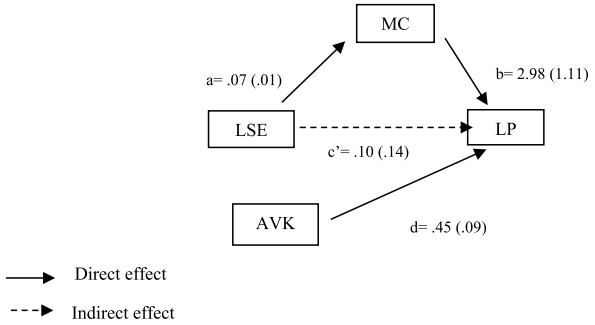


Fig. 5. Time 2 mediation illustrated, Control Group. LSE affects LP, in part through MC

Table 9
Total and direct effects of TSE, Time 2.

Model	IV	DV		R^2	*B*	*SE β*	*β*	*t*	*p*
1	TSE	LP	Intercept	.31	2.38	6.11		.39	.69
					CI (−13.72, 18.49)				
			TSE (X1)		−2.70 (−14.64, 9.23)	4.53	−.16	−.59	.55
			TSE (X2)		−.77 (−12.82, 11.28)	4.57	−.04	−.16	.86
			AVK		.59 (.32, .75)	.10	.56	5.85	< .001
2	TSE	MC	Intercept	.14	−2.6	.64		−4.03	< .001
					CI (−4.28, −.89)				
			TSE (X1)		.52 (−.73, 1.77)	.47	.32	1.09	.27
			TSE (X2)		−.21 (−1.48, 1.05)	.48	−.13	−.44	.66
			AVK		.03 (.01, .06)	.01	.30	2.82	.01
3	TSE	LP	Intercept	.41	12.14 (−4.09, 28.38)	6.16		1.97	.05
	MC (Mediator)		TSE (X1)		−4.66 (−15.77, 6.44)	4.21	−.28	−1.10	.27
			TSE (X2)		.02 (−11.12, 11.17)	4.23	.001	.01	.99
			MC		3.76 (1.25, 6.27)	.95	.35	3.95	< .001
			AVK		.47 (.22, .73)	.09	.45	4.9	< .001

LP = Listening Proficiency, AVK = Aural Vocabulary Knowledge; MC = Metacognition; TSE = Teacher Self-Efficacy.

with AVK making the largest contribution both pre- and post-intervention. LSE and TSE impacted listening proficiency indirectly through metacognition at Time 1. This indirect influence of TSE and LSE was maintained at Time 2 for the Control Group, but for the Intervention Group, both LSE and TSE also emerged as significant direct predictors of learners' listening proficiency as well as having a partially indirect effect through MC.

4. Discussion

This study aimed to shed light on the relationship between teacher and learner self-efficacy (TSE and LSE), metacognition and aural vocabulary knowledge (AVK) in predicting learner listening proficiency. No research to date has explored teacher and learner self-efficacy and L2 listening proficiency together. Additionally, previous research across different curriculum areas has provided inconsistent insights regarding the role of TSE in learner outcomes (Jerrim et al., 2023; Zee & Koomen, 2016). Furthermore, by exploring these relationships for the first time within a metacognition and strategy-based intervention, it sought to provide clearer insights into the role teachers play in such interventions, with the aim of elucidating how those delivered by teachers can be as effective as those delivered by researchers (Dalman & Plonsky, 2022). Finally, in a further innovation, the study explored the predictive role of TSE and LSE while accounting for a major predictor of L2 listening, namely AVK and also exploring how TSE and LSE function alongside metacognition.

The study's first research question examined the relationship between learners' listening proficiency, AVK, metacognition, LSE and TSE using correlational analyses. At Time 1, all learner-related variables were positively correlated, and AVK showed the strongest relationship with listening proficiency, followed by metacognition and LSE. By contrast, TSE did not show any significant positive correlation with any of these variables except for a weak negative relationship with AVK, perhaps because when the Time 1 data were collected early in the academic year, any effect of TSE had not yet started to fully emerged. At Time 2, TSE was positively correlated with learners' listening proficiency, AVK, and metacognition in the Intervention Group alone. No significant correlation was found between TSE and LSE, however. This suggests that while TSE is related to learners' cognitive outcomes, here listening proficiency and metacognition, it may not be directly related to their beliefs about their own listening abilities (LSE). In other words, even though the intervention improved TSE by giving teachers the necessary support, knowledge and understanding for enhancing learners' linguistic and cognitive skills, LSE seems to be linked more to what learners had directly experienced during the intervention, in the form of mastery experiences (Bandura, 1997). This may explain why at Time 2 LSE was correlated with listening proficiency, but not with TSE for the Intervention Group.

Exploring how far all these variables predicted learners' listening proficiency, before and after a metacognition and strategy-based intervention, Research Question 2 then provided more nuanced insights into these relationships. Prior to the intervention at Time 1, all variables combined explained a substantial amount of variance in listening proficiency across both the control and intervention groups. AVK was always the strongest predictor, however, underscoring its critical role in comprehending spoken input. Metacognition emerged as a weaker but significant predictor of listening proficiency, broadly in line with what previous research has found (Goh & Hu, 2014; Vandergrift et al., 2006; Wang & Treffers-Daller, 2017), although the first two of these studies examined metacognition's influence on listening using bivariate regression without controlling for other variables as the current study did. Turning to self-efficacy, the mediation analysis revealed that LSE influenced listening proficiency indirectly through metacognition, similar to what was found by Du and Man (2022b) and Xu (2017). The same was found for TSE at Time 1. Broadly in line with our hypothesised Model A, both findings lend weight to the perspectives of social cognitive and SRL theory, respectively that self-efficacy shapes learning outcomes because it affects other potential predictors, such as perseverance, and strategic thinking or metacognition (Bandura, 2006; Soodla et al., 2017), and that motivational and cognitive factors interact in predicting learning outcomes (Pintrich, 2004).

Importantly, and as largely predicted in our hypothesised Model B, the intervention experienced by both teachers and learners in the Intervention Group modified the relationships that emerged at Time 1. At Time 2, both LSE and TSE were found to be significant

direct predictors of Intervention Group learners' listening proficiency, even when the significant contributions of AVK and metacognition were taken into account. This suggests that focusing on the application of metacognitive-based strategies, planning and evaluation strengthened the effect of both forms of self-efficacy. Hence, the intervention with its metacognitive and strategic approach to listening equipped learners with a structured process of planning, monitoring, and evaluating their listening, which likely strengthened their self-efficacy, increased perseverance, and ultimately improved their listening scores.

The change in the role of TSE in learners' outcomes over time for the Intervention Group is particularly noteworthy. At Time 1, TSE did not directly predict listening proficiency but did at Time 2. The professional development experienced by teachers in the Intervention Group arguably enabled them to support learners through an interactive, collaborative, and reflective learning process, which contributed to learners' development and enhanced listening proficiency. At Time 2, learners taught by teachers with high TSE outperformed those taught by teachers in the average TSE group and the low TSE group, with the most marked differences between the high and the average TSE group. This last point indicates a complex interaction between TSE and learners' academic outcomes, in which other factors, such as LSE, may also mediate the effect of TSE on listening proficiency. Furthermore, although it is unclear whether the increased TSE resulted from the teacher professional development, the implementation of instructional techniques, or both, it seems likely that the nature of the professional development contributed to teachers' confidence, which in turn enhanced their learners' learning by strengthening metacognition and listening proficiency. This finding aligns with Kramarski's (2017) view of teachers' dual role in supporting self-regulated learning.

Similarly complex is the mediating role of metacognition in the relationship between self-efficacy and listening proficiency at Time 2. While the direct effects of LSE and TSE on listening proficiency decreased when metacognition was included as a mediator (controlling for AVK), the indirect effects were not statistically significant. In other words, metacognition unexpectedly only partially mediated the impact of self-efficacy on listening after the intervention, perhaps because the intervention developed LSE and TSE to such an extent that the contribution of metacognition was reduced ($\beta = .26$ at Time 1 to $\beta = .13$ and .22 at Time 2 for LSE and TSE, respectively). The intervention arguably directly enhanced both TSE and LSE to a point where teachers' and learners' confidence in their abilities was strong enough to influence listening proficiency directly. It also empowered learners with effective strategies, perhaps thereby reducing the indirect effect of metacognition.

Findings for the Control Group at Time 2 stand in some contrast to those relating to the Intervention Group. For the former, not only did AVK and metacognition remain as the sole significant direct predictors, scores for listening proficiency, LSE and metacognition also declined. Furthermore, the SMR analysis indicated that the decline in metacognition directly contributed to the decrease in listening proficiency. While the Control Group resembled the Intervention group at Time 2 in respect of a continued indirect effect of LSE on listening through metacognition, the two groups did diverge in respect of TSE. TSE did not predict listening proficiency in the Control Group, either directly or indirectly, even though TSE levels for the Control Group increased slightly at Time 2. Furthermore, a negative relationship between TSE and listening proficiency emerged at Time 2. These findings may relate to the type of listening instruction that the Control Group teachers were delivering and its long-term impact. Throughout the academic year, from Time 1 (start of the year) to Time 2 (end of the year), Control Group teachers adopted a "comprehension approach" (Field, J., 2008), as indicated by observations of their teaching. Teachers played audio recordings and asked learners to answer comprehension questions, which were then corrected without further discussion or reflection on how the answers were derived. This approach likely failed to create a meaningful link between TSE, the instructional materials, and learners' listening proficiency. In other words, while implementing their usual approach may have led Control Group teachers to feel confident in their ability to "teach" listening in a way they perceived as appropriate, this confidence did not translate into improved listening proficiency for their learners.

5. Limitations and conclusions

This study sought to examine the relationship between five variables: learner listening proficiency, AVK, metacognition, self-efficacy, and TSE. It explored the predictive roles of LSE and TSE on learners' listening proficiency, with metacognition as a mediator and AVK as a control variable. As such, to our knowledge, it is the first study to explore LSE and TSE together in the field of L2 listening, while also taking account of the two key variables, AVK and metacognition. Using a sequential multiple regression followed by mediation analysis, the study was conducted in two phases: before and after implementing a metacognition and strategy-based instruction for EFL listening. Through such a design, the study aimed not only to examine the relationship between TSE, LSE and learning outcomes, but also to illuminate the role of the teacher in metacognition and strategy-based interventions in a novel and nuanced manner.

Nevertheless, the study is not without limitations. First, the quasi-experimental design relied on convenience sampling, using intact classes taught by a small number of teachers which limits the generalizability of the results. However, the use of intact classes reflects the reality of many educational settings where random assignment is impractical. Further studies should aim to replicate this research with larger sample sizes and random sampling techniques to enhance the generalizability of the findings. Second, the study did not explore other variables that could affect listening proficiency, such as working memory and auditory discrimination. Future research should include additional variables to create a more comprehensive model. Third, the intervention was conducted over six weeks. It would be useful for longitudinal research to investigate the sustained impact of metacognition and strategy-based instruction on both learners' self-efficacy and listening proficiency, as well as the long-term effects on teachers' instructional practices and self-efficacy.

Despite these limitations, the study provides significant theoretical and pedagogical insights into the role of TSE and LSE in listening outcomes. The key findings reveal that AVK and metacognition had significant direct effects on learners' listening proficiency, with AVK making the largest contribution both pre- and post-intervention. Additionally, while the established indirect effect of LSE on listening proficiency through metacognition at Time 1 confirms the findings of others (Du & Man, 2022b; Xu, 2017), the study is

the first to also examine that route for TSE in relation to L2 listening.

Perhaps most importantly, at Time 2 both LSE and TSE were found to be significant direct predictors of learners' listening proficiency for the Intervention Group alone. As such the study also contributes to the understanding that successful listening interventions can be effectively implemented not only by researchers (Dalman & Plonsky, 2022), but also by teachers, given sufficient professional development. They thus have implications for how classroom listening interventions are designed and evaluated.

Pedagogically, the results highlight the value of incorporating metacognition and strategy-based training into L2 listening instruction. They support Bandura's (1997) notion that mastery experiences, where learners and teachers succeed through their own efforts, play a pivotal role in developing self-efficacy. In turn that highlights the necessity of designing instructional programmes that foster metacognition, strategy use, listening proficiency, and self-efficacy not only for learners but also for teachers. Overall, the study offers a novel perspective through which to understand L2 listening proficiency and the role of the teacher in its development, an area which for too long has not been fully acknowledged.

CRediT authorship contribution statement

Keltoum Mansouri: Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Suzanne Graham:** Writing – review & editing, Writing – original draft, Supervision.

Ethics approval statement

This research was approved by the Ethics Committee at the Institute of Education, University of Reading, UK.

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Declaration of competing interest

We have no conflict of interest to declare.

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Appendix A. Supplementary data

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References

Bai, B., & Guo, W. (2018). Influences of self-regulated learning strategy use on self-efficacy in primary school students' English writing in Hong Kong. *Reading & Writing Quarterly, 34*(6), 523–536. https://doi.org/10.1080/10573569.2018.1499058

Bandura, A. (n.d.). Bandura's instrument: Teacher self-efficacy scale. Retrieved 21 November, 2023, from https://cpb-us-w2.wpmucdn.com/u.osu.edu/dist/2/5604/files/2014/09/Bandura-Instr-1sdm5sg.pdf.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

Bandura, A. (1997). *Self-efficacy: The exercise of control*. Freeman.

Cheng, J., & Matthews, J. (2016). The relationship between three measures of L2 vocabulary knowledge and L2 listening and reading. *Language Testing, 35*(1), 3–25. https://doi.org/10.1177/0265532216676851

Dalman, M., & Plonsky, L. (2022). The effectiveness of second-language listening strategy instruction: A meta-analysis. *Language Teaching Research, 0*(0). https://doi.org/10.1177/13621688211072981

Dellinger, A. B., Bobbett, J. J., Olivier, D. F., & Ellett, C. D. (2008). Measuring teachers' self-efficacy beliefs: Development and use of the TEBS-Self. *Teaching and Teacher Education, 24*(3), 751–766. https://doi.org/10.1016/j.tate.2007.02.010

Du, G., & Man, D. (2022a). Person factors and strategic processing in L2 listening comprehension: Examining the role of vocabulary size, metacognitive knowledge, self-efficacy, and strategy use. *System, 107*, Article 102801. https://doi.org/10.1016/j.system.2022.102801

Du, G., & Man, D. (2022b). Mediating effect of metacognition on the relationship between listening self-efficacy and L2 listening comprehension. *The Asia-Pacific Education Researcher, 32*(5), 655–664. https://doi.org/10.1007/s40299-022-00684-z

Field, J. (2008). *Listening in the language classroom*. Cambridge University Press.

Field, A. (2018). *Discovering statistics using IBM SPSS statistics* (5th ed.). Sage.

Goh, C., & Hu, Y. (2014). Exploring the relationship between metacognitive awareness and listening performance with questionnaire data. *Language Awareness, 23*(3), 255–274. https://doi.org/10.1080/09658416.2013.769558

Graham, S. (2006). Listening comprehension: The learners' perspective. *System, 34*(2), 165–182. https://doi.org/10.1016/j.system.2005.11.00

Graham, S. (2022). Self-efficacy and language learning – what it is and what it isn't. *The Language Learning Journal, 50*(2), 186–207. https://doi.org/10.1080/09571736.2022.2045679
Graham, S., & Macaro, E. (2008). Strategy instruction in listening for lower-intermediate learners of French. *Language Learning, 58*(4), 747–783. https://doi.org/10.1111/j.1467-9922.2008.00478.x
Graham, S., & Santos, D. (2015). *Strategies for Second Language Listening: Current Scenarios and Improved Pedagogy*. Palgrave Macmillan.
Graham, S., Santos, D., & Francis-Brophy, E. (2014). Teacher beliefs about listening in a foreign language. *Teaching and Teacher Education, 40*, 44–60. https://doi.org/10.1016/j.tate.2014.01.007
Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis*. Pearson College Division.
Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression based approach* (2nd ed.). Guilford.
Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology, 67*(3), 451–470. https://doi.org/10.1111/bmsp.12028
Hoang, T. (2018). Teacher self-efficacy research in English as a foreign language contexts: A systematic review. *Asia TEFL, 15*(4), 976–990. https://doi.org/10.18823/asiatefl.2018.15.4.6.976
Jerrim, J., Sims, S., & Oliver, M. (2023). Teacher self-efficacy and pupil achievement: Much ado about nothing? International evidence from TIMSS. *Teachers and Teaching, 29*(2), 220–240. https://doi.org/10.1080/13540602.2022.2159365
Karas, M., Uchihara, T., & Faez, F. (2024). Language teacher self-efficacy surveys: What have we learned? Where are we going? In M. Wyatt, & F. Faez (Eds.), *Building the self-efficacy beliefs of English language learners and teachers: New perspectives for research, teaching and learning* (pp. 21–43). Routledge.
Karlen, Y., Hertel, S., Grob, U., Jud, J., & Hirt, C. N. (2024). Teachers matter: Linking teachers and students' self-regulated learning. *Research Papers in Education*. https://doi.org/10.1080/02671522.2024.2394059
Karlen, Y., Hirt, C. N., Jud, J., Rosenthal, A., & Eberli, T. D. (2023). Teachers as learners and agents of self-regulated learning: The importance of different teachers competence aspects for promoting metacognition. *Teaching and Teacher Education, 125*, Article 104055. https://doi.org/10.1016/j.tate.2023.104055
Keith, T. Z. (2019). *Multiple regression and beyond: An introduction to multiple regression and structural equation modeling* (third edition ed.). Routledge.
Kramarski, B. (2017). Teachers as agents in promoting students' SRL and performance: Applications for teachers' dual-role training program. In *Handbook of self-regulation of learning and performance* (pp. 223–239). Routledge.
Lau, K. L. (2017). Strategy use, listening problems, and motivation of high- and low proficiency Chinese listeners. *Journal of Educational Research, 110*(5), 503–514. https://doi.org/10.1080/00220671.2015.1134421
Lawes, S., & Santos, D. (2007). Teaching learning strategies: What do teachers learn? *The Language Learning Journal, 35*, 221–237. https://doi.org/10.1080/09571730701628101
Mansouri, K. (2020). *Research into practice: Implementing strategy and metacognition-based instruction in the teaching of EFL listening for Algerian university teachers and students*. University of Reading. Unpublished PhD dissertation.
Pintrich, P. R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review, 16*(4), 385–407. https://doi.org/10.1007/s10648-004-0006-x
Raoofi, S., Tan, B. H., & Chan, S. H. (2012). Self-efficacy in second/foreign language learning contexts. *English Language Teaching, 5*, 60–73. https://doi.org/10.5539/elt.v5n11p60
Rashidi, N., & Moghadam, M. (2014). The effect of teachers' beliefs and sense of self-efficacy on Iranian EFL learners' satisfaction and academic achievement. *Tesl-Ej, 18*(2), n2.
Soodla, P., Jogi, A. L., & Kikas, E. (2017). Relationship between teachers' metacognitive knowledge and students' metacognitive knowledge and reading achievement. *European Journal of Psychology of Education, 32*, 201–218. https://doi.org/10.1007/s10212-016-0293-x
Teng, F., Wang, C., & Zhang, L. J. (2021). Assessing self-regulatory writing strategies and their predictive effects on young EFL learners' writing performance. *Assessing Writing, 51*, Article 100573. https://doi.org/10.1016/j.asw.2021.100573
Teng, F., & Yang, Z. (2022). Metacognition, motivation, self-efficacy belief, and English learning achievement in online learning: Longitudinal mediation modeling approach. *Innovation in Language Learning and Teaching*, 1–17. https://doi.org/10.1080/17501229.2022.2144327
Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17*(7), 783–805. https://doi.org/10.1016/S0742-051X(01)00036-1
Vafaee, P., & Suzuki, Y. (2020). The relative significance of syntactic knowledge and vocabulary knowledge in second language listening ability. *Studies in Second Language Acquisition, 42*(2), 383–410. https://doi.org/10.1017/S0272263119000676
Vandergrift, L. (2003). Orchestrating strategy use: Toward a model of the skilled second language listener. *Language Learning, 53*, 463–496. https://doi.org/10.1111/1467-9922.00232
Vandergrift, L., & Baker, S. (2015). Learner variables in second language listening comprehension: An exploratory path analysis. *Language Learning, 65*(2), 390–416. https://doi.org/10.1111/lang.12105
Vandergrift, L., & Goh, C. C. (2012). *Teaching and learning second language listening: Metacognition in action*. Routledge.
Vandergrift, L., Goh, C. C. M., Mareschal, C. J., & Tafaghodtari, M. H. (2006). The metacognitive awareness listening questionnaire: Development and validation. *Language Learning, 56*(3), 431–462. https://doi.org/10.1111/j.1467-9922.2006.00373.x
Wallace, M. P. (2020). Individual differences in second language listening: Examining the role of knowledge, metacognitive awareness, memory, and attention. *Language Learning, 72*, 5–44. https://doi.org/10.1111/lang.12424
Wang, C., & Sun, T. (2020). Relationship between self-efficacy and language proficiency: A meta-analysis. *System, 95*, Article 102366. https://doi.org/10.1016/j.system.2020.102366
Wang, Y., & Treffers-Daller, J. (2017). Explaining listening comprehension among L2 learners of English: The contribution of general language proficiency, vocabulary knowledge and metacognitive awareness. *System, 65*, 139–150. https://doi.org/10.1016/j.system.2016.12.013
Wyatt, M. (2020). Research into second language learners' and teachers' self-efficacy beliefs: Making the connections. *Tesol Quarterly, 55*(1), 296–307. https://doi.org/10.1002/tesq.3010
Wyatt, M., & Dikilitaş, K. (2019). English language teachers' self-efficacy beliefs for grammar instruction: Implications for teacher educators. *The Language Learning Journal, 49*(5), 541–553. https://doi.org/10.1080/09571736.2019.1642943
Xu, J. (2017). The mediating effect of listening metacognitive awareness between test-taking motivation and listening test scores: An expectancy-value theory approach. *Frontiers in Psychology, 8*, 2201. https://doi.org/10.3389/fpsyg.2017.02201
Zee, M., & Koomen, H. M. Y. (2016). Teacher self-efficacy and its effects on classroom processes, student academic adjustment, and teacher well-being: A synthesis of 40 years of research. *Review of Educational Research, 86*(4), 981–1015. https://doi.org/10.3102/0034654315626801
Zhang, Y., & Xu, J. (2024). An investigation into self-efficacy, anxiety, and L2 listening comprehension: The mediation of metacognitive awareness. *International Journal of Listening*, 1–15. https://doi.org/10.1080/10904018.2024.2386290
Zimmerman, B., & Schunk, D. (2008). Motivation: An essential dimension of selfregulated learning. In D. Schunk, & B. Zimmerman (Eds.), *Motivation and self-regulated learning* (pp. 1–30). Lawrence Erlbaum Associates.
Zoghlami, N. (2015). *Foreign-language listening: Bottom-up and top-down processes– issues for EFL teaching and research(PhD)*. Paris, Retrieved from http://www.theses.fr/2015PA080041/document.