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Research Article

The Effect of Listening Metacognitive Training for Different Motivation Level Students in EFL Context

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ABSTRACT

This study is a quasi-experimental study to explore the effects of listening metacognitive strategy training for students in different motivation groups. It merges previous research findings on motivation and metacognition to assess the effectiveness of a metacognitive training model in enhancing students' capabilities and to determine if there exists a connection between the enhancement of metacognitive abilities and students' motivational levels for foreign language learning. Eighty-nine students from two intact classes of Zhejiang Ocean University participated in the study: one class of 44 students served as the experimental group receiving metacognitive training of listening, the other class of 45 students served as the controlled class receiving the traditional instruction. The quantitative research design was employed, and two questionnaires were served as the research instruments. After a semester of teaching experiment, data analysis revealed that significant differences existed in metacognitive abilities among students in different motivation groups. Notably, students' learning motivation exhibited a strong positive correlation with their listening metacognitive abilities. Furthermore, the metacognitive training implemented in the experimental group positively influenced students' ability to regulate metacognitive strategies and their awareness of listening processes. Finally, the study observed variations in the enhancement of metacognitive abilities across different motivation groups. Students with moderate motivational levels demonstrated greater improvements in their metacognitive abilities compared to the other two groups. These findings provide valuable insights into the intricate relationship between motivation and the effectiveness of metacognitive strategy training in enhancing students' language learning outcomes.

Key Words : metacognition; metacognitive knowledge; metacognitive strategies; learning motivation; listening ability.

1 Introduction

Among the four fundamental skills in English — listening, speaking, reading, and writing — listening appears to be the primary channel through which all incoming ideas and information are absorbed. This skill has a profound impact on our capacity to make informed decisions, our appreciation of the world that surrounds us, and the quality of our personal relationships. Effective communication begins with listening and listening comprehension carries about 80 percent of the responsibility in the interaction. Whether one is at home, in school, or in the workplace, effective listening holds utmost importance for fostering and nurturing healthy relationships. Consequently, it is crucial for teachers and researchers to have a profound understanding of learners' comprehension of the art of listening. In comparison to other linguistic abilities, there exists a paucity of insights regarding the intricate process of listening and how it is acquired. While many research show that listening plays an important role in the development of a learner's second language (Long, 1985). In view of this, listening certainly merits further investigation.

In the past several decades of English teaching and learning, a series of models have been applied to improve students' listening skill. Students improved in many aspects while it is still a skill which needs further instructions. The results of the Chinese national English tests such as Test for English Majors (TEM) Band 4 and 8, and College English Test (CET) Band 4 and 8 indicate listening is the biggest hinder. The primary reason for their challenges lies in their inability to effectively apply metacognitive knowledge and skills to monitor and regulate their learning activities during the listening process. Additionally, learning motivation is identified as a crucial factor that influences the success of listening comprehension. With the shift from a teacher-centered approach to a learner-centered one, researchers are increasingly examining the role of learners' affective and cognitive factors, which are two essential variables in language learning.

Many researchers have conducted studies on the theory of metacognition and metacognitive training. Some studies have investigated the relationships between metacognitive strategies and language proficiency, some have explored the correlation between metacognition and learning strategy use, and still others have concerned with the effects of metacognitive training on students' improvement of strategy use, metacognitive ability, and academic achievement. However, relatively few studies take the learner factors such as motivation into consideration when they try to train students' metacognitive abilit y. Many researchers neglect the link between emotion and cognition while motivation and metacognition are closely related and inseparable.

To bridge this gap and provide some statistical proof for this topic, the present study is carried out to prove the fact that motivation intensity is closely related to metacognitive ability and has great influence on the efficiency of metacognitive training. The study can benefit language teachers, learners, and researchers, and offer further statistical proof to the relationship between motivation and metacognition. Thus, it is of great significance to carry out such a study.

2 Literature Review

2.1 Studies on Motivation and Language Acquisition Skills

Motivation in the English language learning presents a complex and unique nature. Most scholars agree that "motivation provides the primary impetus to initiate the English language learning, and it is the driving force to sustain the long and tedious learning process" (Dörnyei, 1998). The relevant literature on motivation is quite extensive and a series of theories and models have been proposed: Gardner's Social-Educational Model, Deci and Ryan's Self-determination Theory, Crookes and Schmidt's Extended Framework, Williams and Burden's Extended Framework, Dörnyei's Extended Framework, and Tremblay and Gardner's Extended Framework. Based on these models, many studies have been conducted to explore the relationship between motivation and other areas in second language acquisition. To be specific, the present studies mainly focus on the following three aspects: the correlation studies between motivation and other learner factors (Williams, et al.， 2001); the studies on interactive relationships between motivation and classroom activities (Smit, 2002); the studies on interactive relationships between motivation and learning strategies (Dörnyei, 2003). Among these studies, the relationship between motivation and listening skill has become a recent focus in the second language acquisition field. Hsu (2006) explored the effects of motivation on college students' listening comprehension skill based on Taiwan English teaching context. Du & Man (2024) employed the expectancy-value theory to explore the relationship between motivational beliefs and varying degrees of strategic processing in listening among Chinese tertiary students studying English. Muhammad Ajmal and Tribhuwan (2020) applied the research method of cased study to identify the impact of motivation on students' listening skills and found a positive correlation between motivation and listening in Pakistan context.

These studies show that motivation is an important learner factor which helps to determine the level of language proficiency achieved by different learners, but the social context in which learning takes place plays an important role in the language learners' motivation. Students in Chinese English listening context is the one that needs more attention, very few studies in recent decade have been carried out.

2.2 Metacognitive Strategy Training and Listening Comprehension

Metacognition is awareness and control of one's learning (Baker & Brown, 1984). Since it is first brought forward in developmental psychology in the 1970s, it has aroused many researchers' great interest. Previous accounts of metacognition have distinguished between two major components, including knowledge about cognition and regulation of cognition (Brown, 1987; Flavell, 1987; Carrell, et al., 1998). In the field of FL/SL learning, evidence have pointed to the powerful role of metacognitive knowledge in learning and the potential for greater use of metacognitive strategies to foster success in L2 listening (Oxford, 1990; O'Malley & Chamot, 1990; Vandergrift, 1997b; 2002). From 1980s, researchers of SLA began to show great interest in metacognitive strategies which plays important roles in students' language learning, just as Oxford stated, "Students without meta-approaches are essentially learners without direction or opportunity to plan their learning, to monitor their process, or to review their accomplishment and further learning directions" (Oxford, 1990: 154). For the skill of listening, metacognitive strategies have special points to note. Vandergrift (1999) cited O'Malley and Chamot's idea in his article *Facilitating Second Language Listening Comprehension: Acquiring Successful Strategies* that metacognitive strategies had a potential role to promote foreign language

(FL) listening comprehension (O'Malley and Chamot, 1990: 210). In listening instruction, metacognitive strategies are important because they are higher order executive skills that may entail monitoring, regulating, or instructing the success of listening activity and process. These metacognitive strategies like planning, monitoring, evaluating, and compensating, involve an ability to consciously use metacognitive knowledge to plan, arrange, monitor, regulate and evaluate the learning and involve the consideration of FL listening comprehension and listening process. In listening strategy instruction, it is not enough only to have knowledge on the definition and characteristics of learning strategy. The key point is how learners decide when, where and how to use appropriate strategies. Among the various related studies, the listening metacognitive strategy study of Vandergrift is the representative. Vandergrift (1996) proposed pedagogy for encouraging use of metacognitive strategies at all levels of listening proficiency. The training strategies include planning, selective attention, and monitoring, which were consistent with the recommendation of O'Malley, Charmot and Kupper (1989). Then he did a study on the differences in listening metacognitive strategy use between successful and unsuccessful learners, which pointed to the potential role of metacognitive strategies for enhancing success in SLA (Vandergrift, 1999). Later, he did two investigations using this teaching sequence proposed in 1996, which indicated both beginner-level elementary school students (Vandergrift, 2002) and beginner-level university students of French (Vandergrift, 2003a) exposed to such an approach found it motivating to learn to understand rapid and authentic-type texts in listening practice. Other scholars also did some recent studies, Biriandi and Hossein (2012) investigated the effect of metacognitive strategy instruction on the listening performance of EFL students. Bozorgian (2014) explored the role of metacognition in the development of EFL learners' listening skill. Rahimirad and Shams (2014) studied the effect of activating metacognitive strategies on listening performance and metacognitive awareness of EFL students. From the above review, it can be easily concluded that nearly all the training courses have brought about positive results. However, metacognitive strategy training as far as its scope and number are concerned is still at an initial stage. Therefore, there is still much work to be done in the field.

2.3 Relationship between motivation and metacognition in listening

The relationship between motivation and metacognition in listening has become the recent research focus in the educational field. Borkowski (1992) thought motivation played the role of "energizing" in metacognition and it could activate self-regulating and executive skills. There has been plenty of research exploring the relationships between motivational factors and metacognition. For motivation, researchers often define it in two different perspectives: One is that motivation is the basic power to activate and to sustain learning activities and this is the common understanding for motivation, which emphasized the level of this power. The other is that motivation is a complex, multi-faceted construct (Gardner, 1985; Williams and Burden, 2000). It includes a lot of sub-systems and in each subsystem, there are several factors such as value, expectancy, self-efficacy, and attributions, which are defined as motivational factors in educational psychology, are equally important in sustaining self-regulated learning. In this study, the first perspective of motivation is adopted, that is motivational intensity. In recent decades, there have been several studies exploring the relationship between motivational factors and metacognition. Vandergrift (2005a) explored the potential relationships between motivation orientation and metacognition, with reference to the cognitive and metacognitive strategies students use in L2 listening comprehension. The results showed that students reporting a greater use of metacognitive strategies also reported more motivational intensity, with some evidence of a self-determination continuum evident in the response patterns. However, correlations with intrinsic and extrinsic motivation were not as high as participated. This study intends to provide empirical support for the hypothesized links between self-determination theory, self-regulated learning, learner autonomy and metacognition. Nezhad et. al (2013) studied the relationship between motivation, cognitive and metacognitive strategy used between two task types in listening skill. Kassaian, and Ghadiri (2011) took Iranian EFL as the case context and made an investigation of the relationship between motivation and metacognitive awareness strategies in listening comprehension. Harputlu & Ceylan (2014) explored the effects of motivation and metacognitive strategy use on EFL listening proficiency. In China, there are also some typical studies with different results. Wang Ling et al. (2005) explored the interactive relationship between motivation and metacognition systematically and interactively by using the complex statistical method of path analysis. Wang and Treffers-Daller (2017) explored the important factors contributing to listening proficiency and attained different results. Their study found that metacognitive awareness played a less vital role compared with vocabulary size and general language proficiency.

These previous studies indicate that metacognition and its influence factors have close positive correlations. These nonintellectual factors are mainly motivation factors, and they have effects on one's metacognitive ability and its development. But in the recent Chinese English listening teaching context, very few studies discussed these variables' impact on metacognitive level and the agreements of the results have not been reached. This issue is still an essential topic for teachers, students, and researchers to concern. It deserves our attention to further explore.

Based on the above literature review, the current research intends to answer the following questions:

(1) How closely does learners' listening metacognitive strategy use correlate with their English learning motivation?

(2) Are there any significant differences among students in experimental class and controlled class in terms of metacognitive ability after the metacognitive training?
(3) After training, are there any significant differences in the metacognitive ability improvement among listeners of different motivation levels in the experimental class?

3 Methods

3.1 Participants

The participants of the study were 89 students from Zhejiang Ocean University in China. They were from two intact classes and have similar social and linguistic backgrounds. One class of 44 comprised of the experimental class and received metacognitive instruction. Another class of 45 served as the controlled class, receiving traditional listening instruction. Both the classes were taught by the researcher and the author of the paper. Before training, students in the experimental class were divided into three groups according to their motivation level: high, middle and low motivation groups. The top one third students (14 students) in the survey results of Questionnaire of English Learning Motivation were categorized as high motivation group, the bottom one third students (15 students) were categorized as low motivation group and the left students (15 students) were categorized as middle motivation group.

3.2 Instruments

The research instruments of the study are two questionnaires: one is the Questionnaire of English Learning Motivation (QELM), adapted from Huang Hong'an (2005), in which twenty questions concerning motivational behaviors were adapted. According to Tremblay & Gardner (1995:506), motivational behaviors refer to effort, attention, and persistence. The score of motivational intensity represents the degree of effort expended to study a language, for example, "I really work hard to learn French". To better reflect a learner's motivational behaviors, they designed 14 items (1-14) with respect to the "effort degree", 3 items (15-l7) with respect to "attention" and 3 items (18-20) with respect to "persistence". Before the administration of the survey in the present study, a pilot study was conducted and the discrimination correlation analysis was used to test its reliability and validity. The result showed that the questionnaire had high reliability and validity. The reliability of the total questionnaire was 0.8579 with the reliabilities of effort, attention and persistence being 0.7709,
0.7162 and 0.6700 respectively. A 2-tailed Pearson Correlation test between each part and the whole questionnaire was also carried out with effort degree, attention, persistence, and the whole questionnaire being $r = 0.968$, $r = 0.759$ and $r= 0.809$ respectively. All these results showed that the correlation coefficients were above 0.7 ($p<0.01$), indicating good validity of the questionnaire. For the 20 items, students rate the statements on a five-point Likert scale from 1 = "strongly disagree" to 5 = "strongly agree". Among them, Items 1, 3, 4, 9, 10, 11, 13, 18 are negative ratings.

The other questionnaire is Metacognitive Awareness on Listening Comprehension Questionnaire (MALCQ) adapted from Wang Yongli (2003), which was adapted from previous similar studies on related matters (O'Malley, et al., 1989; Oxford, 1990; Carrell, 1989; Vandergrift, 1999). It was to detect the metacognitive ability while finishing the listening tasks. The MALCQ had 36 statements concerning metacognitive awareness related to listening comprehension. The present study applied it to refer to students' metacognitive ability, because it contained both the items for metacognitive knowledge and metacognitive strategies. In the questionnaire, 8 statements were related to person knowledge (PK), such as learners' personality, self-assessments on their listening ability, expectation in listening training, etc.; another 8 statements were related to task knowledge (TK), including attention and listening strategies allotted according to various tasks; and the rest 20 statements related to strategic knowledge (SK) including both the knowledge and the ability to use the metacognitive strategies. Within the list of strategic knowledge, there were 5 statements for planning, 5 for monitoring, 6 for evaluating and 4 for revising. Students also responded on a five-point Likert scale from 1 = "This statement is completely or almost completely never true of me" to 5 = "This statement is completely or almost completely true of me" to indicate the frequency with which they used metacognitive knowledge and metacognitive strategy implied in the statement. A pilot study was also conducted, and the discrimination correlation analysis was applied to test its reliability and validity. Finally, 35 items are kept, Item 12 in the variable of task knowledge is deleted for it seriously influences the total reliability, thus the total scores of the questionnaire range from 35 to 175. The reliability of the questionnaire is 0.9109 with the reliability of PK, TK and SK being 0.7290, 0.7135 and 0.8593 respectively. In SK, the reliability of each component was also high with planning, monitoring, evaluating, and revising being 0.7784, 0.6959, 0.6120 and 0.7504 respectively. The 2-tailed Pearson Correlation coefficients between each part and the whole questionnaire were all above 0.8 ($p<0.01$), which ensured the validity of the questionnaire.

3.3 Experimental Instruction and Research Procedure

The experimental teaching instruction lasted from March to June in 2023 at a frequency of once a week, 2 class periods (90 minutes). The experimental class was provided with 16 weeks of metacognitive training while the controlled class did not receive any metacognitive training either in or outside their listening classes. To

help raise students' metacognitive awareness of the task requirement and of the connection between strategy uses and learning, the present study adapted O'Malley and Chamot's (1990) CALLA training model and designed the following metacognitive operational framework as shown in the following model:

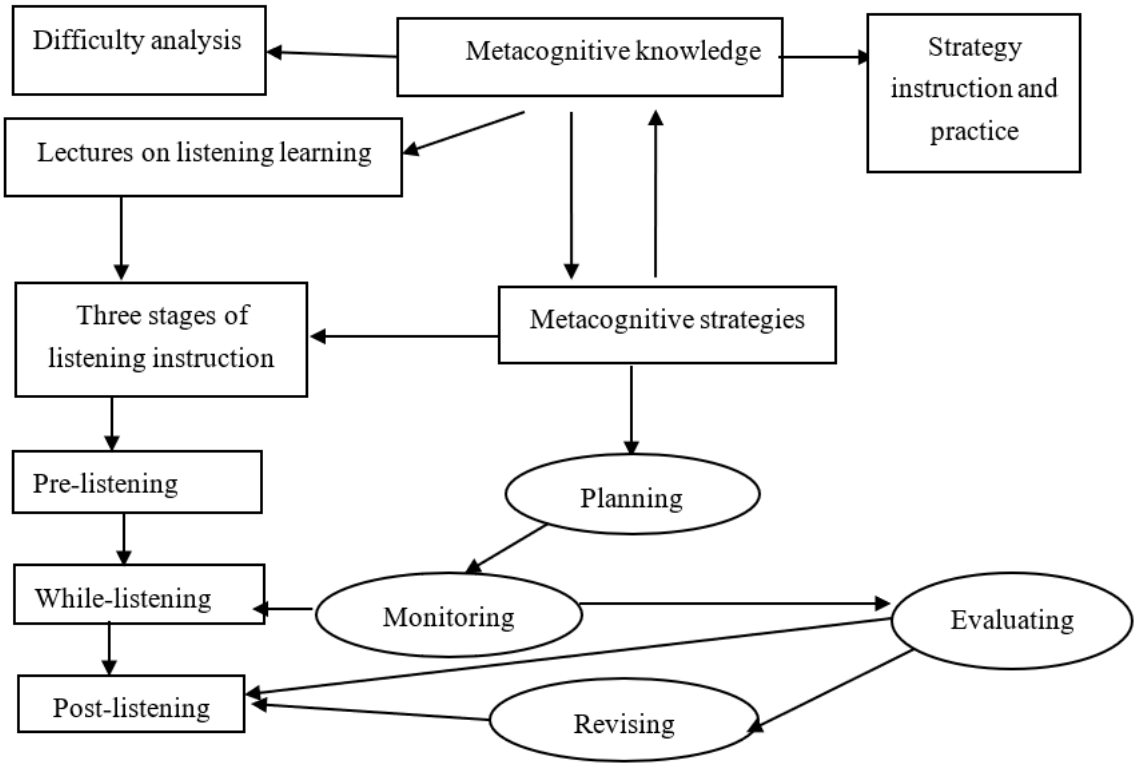

Figure 1: The metacognitive training model.

The training instruction for the experimental class was divided into 2 parts, the first part was to increase listeners' metacognitive knowledge and the second part was the metacognitive strategy instruction. For metacognitive knowledge, students were asked to complete the metacognitive awareness questionnaire before the training, which helped them to reflect on their own learning styles, their personalities and their current listening levels to train their general awareness. Then some specific measures were adopted to help foster each of the three types of metacognitive knowledge. For person knowledge, a survey of students' listening problems was conducted to help students be aware of their potential setbacks and to take active actions to overcome these problems. Then delivering lectures was the main method of enriching listeners' task knowledge. At the beginning weeks of the term, the researcher gave several lectures on the importance of listening in EFL learning, the goals of the listening course, the tasks in the course book, the nature of listening, the efficient listening process, and some possible purposes for listening to increase participants' task knowledge. To train the usage of learning strategies systematically, the present study followed the strategy training steps in the course textbook *Viewing, Listening and Speaking (III),* which is compiled according to the listening strategies with one type of strategy training in each week. The teaching material has 8 units in total, with two strategies practiced in each unit in two weeks. The specific teaching sequence is shown in table 1.

Table 1 Listening Strategy Training sequence

Week	Listening strategy	Teaching material
Week 1	Identify main points and story examples	Unit 1 Bringing dreams to life
Week 2	Follow the chronological order in listening	
Week3	Listen for explanations of words and terms	Unit 2 Say it to your way
Week 4	Listen for definitions or explanations	
Week 5	Ask questions while listening	Unit 3 To the rescue
Week 6	Listen for rhetoric questions	
Week 7	Recognize repetition of key points	Unit 4 Beyond limits

Week 8	Listen for story examples	
Week 9	Listen for cause and effect	Unit 5 Stress: friend or foe
Week10	Listen for advantages and disadvantages	
Week 11	Recognize a speaker's tone	Unit 6 Treasured places
Week 12	Listen for repeated words or phrases	
Week 13	Recognize a speaker's tone	Unit 7 Live and learn
Week 14	Listen for repeated words or phrases	
Week 15	Understand content-rich material	Unit 8 DIY: do it yourself
Week 16	Listen for steps of doing things	

The second part of training was the in-class metacognitive strategy instruction. The training procedure followed the principle of being student-centered and task-based. During the regular listening classes, the teacher conducted the teaching in the framework of the metacognitive training model. As to the listening tasks, the researcher followed the pedagogical sequence of pre-listening, while-listening, and post-listening activities (Underwood, 1989), demonstrating strategies that might be appropriate to students and alternative strategies students could use. In each stage, some teaching activities were designed. By consistently using this approach, the researcher intended to guide students through the mental processes for successful listening comprehension, to enhance the acquisition of metacognitive strategies in three categories: planning, monitoring and evaluating (Vandergrift, 1999), and to promote their metacognitive awareness. To ensure students' acquisition and deepen their understanding of the strategy instruction, students in the experimental class were required to fill in a selfmonitoring checklist (see Appendix C) and a self-evaluation checklist (see Appendix D) after each time of training.

4 Results

4.1 Pre-test results

4.1.1 The pre-test learning motivation and listening metacognitive knowledge

Table 2 Descriptive statistics of LM and LMK

	N	Minimum	Maximum	Mean	Std. Deviation
LM	89	2.15	4.85	3.8262	0.48978
LMK	89	2.14	4.83	3.3715	0.48697
PK	89	1.63	5.00	3.6414	0.56164
TK	89	1.86	4.86	3.4403	0.59388
SK	89	2.05	4.80	3.2143	0.48846

Note: LM = learning motivation; LMK = listening metacognitive knowledge; PK = person knowledge; TK = task knowledge; SK = strategy knowledge.

The questionnaire is a five-point Likert Scale. Oxford's interpretation of averages was applied to evaluate students' metacognitive ability and language learning motivation. If the average score is above 3.5, it means students have a high level of metacognitive ability and language learning motivation; if it is between 2.5 and 3.5, the level is moderate; and if it is below 2.5, the level is quite low.

Table 2 indicated that students' language learning motivation level was comparatively high with the mean being 3.8262, above 3.5. Before the teaching instruction, the level of students' metacognitive ability was moderate with the mean being 3.3715, which was between 2.5 and 3.5. Among the three aspects of metacognitive knowledge, person knowledge was the highest with the mean being 3.6414 (above 3.5). The means of task knowledge and strategy knowledge were between 2.5 and 3.5, with the means being 3.4403 and 3.2143 respectively, which indicated that their levels of these two factors were moderate. The above results showed that the level of students' metacognitive ability was not high, and especially their knowledge of the various strategies was at the comparatively low level. This is attributed to their limited listening experience before college and their lack of guidance on how to listen effectively, thus their mechanic listening practice seemed to be time-consuming and inefficient. And they also have common problems in making appropriate plans, short-term or long-term, for their listening practice, in motoring their strategy use, and in evaluating their listening and in revising their choice of listening strategies, which indicated that their listening metacognitive ability needed further improvements.

4. 1.2 The pre-test independent-samples t-test

Before the training, all the participants in both classes were required to finish a questionnaire on the listening metacognitive awareness questionnaire. The descriptive statistics table showed that the means of the experimental and controlled classes were 119.3929 and 125.0714, and Standard Deviation were14.80378 and 18.74521 respectively.

Table 3 Descriptive statistics of pre-test for experimental class and controlled class

	EC			CC		
	N	Mean	Std. Deviation	N	Mean	Std. Deviation
LMK	44	118.4167	14.80378	45	124.2000	18.74521

Note: LMK = listening metacognitive knowledge; EC = Experimental class; CC = Controlled class.

These data showed that these two classes' metacognitive ability was at the same level or at significantly different levels. In order to testify whether there was any significant difference between the two intact classes, the independent samples t-test was used to compare the mean scores of the two classes' initial investigating results, which was shown in Table 4.

Table 4 Independent samples t-test in pre-test

	F	Sig.	t	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
LMK of EC & CC	2.650	.106	-1.872	.064	-5.7833	3.0900	-11.9023	.3357

Note: *p<0.05, EC = Experimental class; CC = Controlled class

Table 4 indicated that there was no significant difference between the experimental class and the control class in the pre-test (t = -1.872, p = 0.064>0.05) in terms of listening metacognitive ability. This result revealed that the two intact classes were at the same metacognitive level and were suitable to design the metacognitive instruction and to ensure that if the experimental class had any improvement in their metacognitive ability, it was because they had received the metacognitive instruction. After the instruction, students' listening metacognitive ability in the two classes will be tested again by the same questionnaire, and the independent samples t-test and paired-samples t-test were employed in the posttest to find whether the instruction was effective.

4.1.3 One-way ANVOA analysis of high-, middle- and low-motivation groups

Students in the experimental class were divided into three groups according to their motivation level: high, middle and low motivation groups. The top one third students in the motivation intensity questionnaire survey were categorized as high motivation group, whose total language motivation questionnaire scores above 80; the bottom one third students were categorized as low motivation group, whose total scores were below 70 and including 70; and the rest were categorized as middle motivation group. To find out the differences among different motivation groups in terms of metacognitive ability, the one-way ANVOA analysis was used to test the differences and the results were shown in the following table.

Table 5 One way ANVOA pre-test analysis of three motivation groups

	Groups	N	Mean	Std. Deviation	F	Sig.
LMK	H	14	3.7210	.30431	21.353	.000
	M	15	3.4137	.34158		
	L	15	2.9691	.31873		
PK	H	14	3.8015	.50401	6.644	.003
	M	15	3.6594	.42782		
	L	15	3.2583	.36738		

	H	14	3.7059	.41794		
TK	L	15	3.4022	.55219	14.887	.000
	M	15	2.8000	.36938		
	H	14	3.6941	.31716		
SK	M	15	3.3196	.35729	21.181	.000
	L	15	2.9121	.32758		

Note: *p<0.05, H = high motivation group; M = middle motivation group; L= low motivation group.

The above table showed that the significant value for the total listening metacognitive knowledge was 0.000, which indicated that there were significant differences in the three groups in terms of metacognitive ability. And for its three aspects, that is, person knowledge, task knowledge and strategic knowledge, there were also significant differences for all the three significance values were all below 0.05. The total metacognitive ability in the high motivation group was the highest (mean = 3.7210, 0.30431>3.5), which indicated that the high motivation group had much knowledge on listening, listeners themselves and the use of different strategies. And they especially knew much about how human beings learn and process information, as well as individual knowledge of one's own learning processes, for the mean of person knowledge is 3.8015, which was the highest score in these data. For the next two motivation groups, their levels were lower than that of the high motivation group and were at the moderate level for the means were between 2.5 and 3.5 (mean1 = 3.4137, SD = 0.34158; mean2 = 2.9691, SD = 0.31873 respectively), and the level of the low motivation group was lower than that of the middle motivation group. These indicated that students in these two motivation groups needed improvements in their metacognitive knowledge and metacognitive strategy use.

4.1.4 Correlation analysis before the instruction

To solve the question on the correlation between the learning motivation and metacognitive ability, a correlation analysis was implemented between students' average scores of QELM and QMALC.

Table 6 Correlations between learning motivation and metacognitive ability

		LMK Total	PK	TK	SK
LM in EC & CC	Pearson Correlation	.677(**)	.602(**)	.584(**)	.657(**)
	Sig. (2-tailed)	.000	.000	.000	.000
	N	89	89	89	89

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

Based on the results of the Pearson Correlation analysis of table 6, the figures showed that students' learning motivation were positively and highly correlated with their listening metacognitive knowledge and its three factors: person knowledge, task knowledge and strategic knowledge, with correlation coefficients being 0.667, 0.602, 0.584 and 0.657 respectively. This indicated that motivation had impact on the development of one's metacognitive ability.

4.2 Post-test results

4.2.1 Independent and paired samples t-test of the two classes after the instruction

Table 7: Paired-samples t-test between pre-test and post-test of the two classes

		Mean		Std. Deviation		Paired-samples test	
		Post-test	Pre-test	Post-test	Pre-test	t	Sig.(2-tailed)
PK	EC	3.7375	3.5994	.54301	.47721	2.065	. 043
	CC	3.6695	3.6504	.63261	.57661	.179	.858
TK	EC	3.6119	3.3377	.60271	57777	3.492	.001
	CC	3.5278	3.4911	.59036.	.47592	.370	.713
SK	EC	3.5949	3.3239	.50991	.44020	4.637	.000
	CC	3.4997	3.4083	.52341	.50620	.893	.375
LMK	EC	3.6311	3.3896	.49239	.42367	4.399	.000
	CC	3.5443	3.4809	.53398	.47446	.652	.517

Note: *p<0.05

After the training instruction, the statistical analysis methods of independent-samples t-test and pairedsamples t-test were used to analyze the post-test data. The paired-samples t-test was to measure the

intragroup differences in pre- and post-tests, and the independent-samples t-test was used to measure the intergroup differences. As the data from table 7 illustrated, the metacognitive listening instruction had significant effects on increasing students' metacognitive awareness.

Students in the experimental class raised their average mean from 3.3896 to 3.6311, over 3.5, which indicated they were at the high metacognitive level in the posttest, and the paired-samples test results showed that the experimental class made significant progress in the post-test in comparison with its pre-test level (t = 0.652, p=. 000<0.05). The above table also showed that the program had significant effect on experimental class's command of all the three aspects of metacognitive awareness, especially in their strategic knowledge (mean = 3.5949, t = 4.637, p=. 000<0.05). That is to say, the instruction produced significant effect on the acquisition of cognitive and metacognitive strategies. Most of the learners in the experimental class could set goals for themselves, and design practical strategies for the fulfillment of their goals (mean = 4.16 > 3.5). And they could concentrate on the key information and take an active part in the activities (Mean = 4.20 > 3.5). They could also make the best use of pair work and group work for language and strategy practice. The learners in the experimental class also learned to notice their mistakes and conduct regular assessment of their progress (Mean = 4.00 > 3.5). More learners in the experimental class could do autonomous self-evaluation at the end of a task. But in the controlled class, although students had slight improvements in these aspects, the improvements were not significant. This means they still had vague ideas about how to make plans before listening, how to monitor their strategy use while listening and how to evaluate the listening process after listening, which the students in the experimental class are now quite familiar with. Besides, the instruction also contributed to enriching the subjects' person knowledge and task knowledge, with the mean of person knowledge changing from 3.5994 to 3.7375 (p<0.05) and the mean of task knowledge changing from 3.3377 to 3.6119 (p<0.05). The students in the experimental class, who had a higher degree of metacognitive awareness, seemed to be better able to control and to manage their learning in terms of understanding and storing new information, and also were better to know their own learning problems and to find proper ways to improve their listening ability.

In addition, the independent-samples test was used to further explore whether there were significant different between experimental class and controlled class in post-test.

Table 8: Independent-samples t-test in post-test

	F	Sig.	t	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
PK	.539	.464	3.191	.002	.3128	.09802	.11864	.50687
TK	3.184	.077	2.807	.006	.2729	.09722	.08038	.46546
SK	.613	.435	4.288	.011	.3629	.08464	.19527	.53050
LMK	1.183	.279	3.811	.005	.3156	.08281	.15159	.47958

Note: *p<0.05

Table 8 indicated that the differences of listening metacognitive knowledge, person knowledge, task knowledge, strategy knowledge between the experimental class and controlled class after the instruction were significant, with all the four significance values being below the significant level of 0.05, but as mentioned previously, there were no significant differences in the pre-test. From table 7 and 8, it can be concluded that in the post-test, the experimental class had made significant progress in their listening metacognitive ability. The reason why there was only a slight difference between the two classes before training, while significant difference existed after one term's study is that the two classes received different kinds of trainings. The experimental class received training on metacognitive instruction, while the controlled class just received normal teaching instruction without metacognitive components.

To conclude, the findings of the questionnaires suggest that the experimental class showed significant improvement in their metacognitive ability. The metacognitive strategy-based training allowed them to take a metacognition-oriented view towards their listening process. They were clearer about when and how to employ different strategies during the listening process. Because they were apt to consider comprehension at a macro level, they were also more capable of dominating the employment of the strategies.

4.2.2 Comparison between different motivation groups after the instruction

Table 9 The post-test One-way ANVOA analysis of three motivation groups

Groups	ANVOA	LMK	PK	TK	SK
HML	F	24.062	21.608	16.808	17.948
	Sig.	.000	.000	.000	.000

Note: *p<0.05

After the instruction, the metacognitive ability of the three motivation groups was compared again. The oneway ANVOA analysis showed that after the instruction, the three groups of students had significant differences in their listening metacognitive knowledge (F = 24.062, p = .000), and for its three subcomponents: person knowledge, task knowledge and strategic knowledge, the three groups also had significant differences for all three significance values were below the significant level 0.05. But this result did not show whether each motivation group's metacognitive ability had improved or how much each group had improved. It needs further exploration. In order to have a clear idea of the level of metacognitive ability improvement, the paired samples t-test was adopted to compare the data of each group in pre-test and post-test.

Table 10 Paired-samples t-test between pre-test and post-test among three groups

		Post-test (mean)	(SD)	Pre-test (mean)	(SD)	t	Sig. (2-tailed)
LMK	H	4.0643	.44066	3.7210	.30431	2.635	.018
	M	3.6214	.36020	3.4137	.34158	2.759	.010
	L	3.1581	.28609	2.9691	.31873	2.225	.043
PK	H	4.1176	.43855	3.8015	.50401	2.216	.041
	M	3.8125	.44161	3.6594	.42782	1.774	.087
	L	3.1667	.33296	3.2583	.36738	-.728	.478
TK	H	4.1345	.55666	3.7059	.41794	2.297	.013
	M	3.5408	.42478	3.4022	.55219	1.142	.264
	L	3.1524	.51072	2.8000	.36938	2.828	.013
SK	H	4.0173	.48708	3.6941	.31716	2.373	.031
	M	3.5732	.39358	3.3196	.35729	3.042	.005
	L	3.1567	.32008	2.9121	.32758	2.695	.017

Note: * p<0.05

Table 10 showed that the significance value of listening metacognitive knowledge for the high motivation group between post-test and pre-test was 0.018; for the middle motivation group, the significance value was 0.010; the low motivation group's significance value was 0.043. All the groups' improvements had reached the significant level of 0.05 (0.018<0.05, 0.010<0.05, 0.043<0.05). However, comparing the significance values of the three groups, more differences lie in the middle motivation group, for the significant value 0.010 was the smallest one among the three values. The smaller the significance value, the bigger the difference between posttest and pre-test was. This indicated that the middle motivation group's metacognitive ability had the greatest improvement in the training program, the high motivation group's improvement was in the middle rank and the low motivation group also made some progress but did not reach the high level as the previous two groups.
That is to say, the metacognitive training was most effective for the middle motivation group.

5 Discussion

This study explored how the metacognitive training model promotes students' metacognitive ability and investigated the significant differences in the improvements of metacognitive ability among students in different motivation groups after the instruction. The above results can be explained from the following aspects:

5.1 Students' listening metacognitive ability can be promoted effectively with an effective training model.

The above results indicate that the training of the two metacognitive components is quite effective. After 16 weeks' metacognitive training, the experimental class made great progress in their listening metacognitive knowledge and all the three motivation groups in the experimental class benefited a lot and made significant improvements in their metacognitive ability. Metacognitive strategies are the key to independent listening, they can enable individuals to bridge the gap between knowing what and knowing how, to better understand the listening task, to determine weaknesses that can be overcome by constructing new listening strategies.

After one-term training, students in the experimental group become more goal-oriented, self-directed, and efficient in their listening learning. They become to understand the whole process of listening and begin to apply more metacognitive strategies. They can arrange what they are supposed to achieve in terms of planning, monitoring and self-evaluating, and they are also efficient in orchestrating appropriate strategies in each of the listening phases. With the help of abundant metacognitive knowledge, students practice listening more frequently and have also gained self-confidence in listening learning. The findings of the study indicate that the metacognitive training is the key to learning success and points to us the way to effective classroom instruction. Thus, it can be asserted that the present model applied in the study to train metacognitive strategies can strengthen students' metacognitive knowledge. It proves to be a practical and useful one.

5.2 Motivation provides the learners with the primary impetus to initiate learning.

Spolsky (2000) proposes that motivation is one condition for learner to be willing to invest time and energy necessary to learn a language. Without motivation, learning will not be initiated, let alone successful learning. Learning motivation is the basic source to promote and maintain the learning activities. It is hard to imagine that a student without learning motives and being unwilling to study will behave actively in learning, paying close attention to the cognitive activities and to regulate their learning immediately, appropriately and effectively. Successful learners are more autonomous learners, who have higher metacognitive abilities. This result corresponds to the conclusions drawn by many researchers (Paris & Winograd, 1990； Zimmerman, 1990; Schunk, 2001； Winne, 1995; Wang Ling, 2003; Jiang Yingjie et al., 2006).

The findings of previous studies show that motivation stimulates students to find and learn effective ways or strategies to improve their language learning, to find the features of good learners and to analyze the learning tasks. The correlation analysis results of the present proves that motivation and metacognition have high and positive correlative relationship. That means students with higher motivation made more efforts to find and learn effective ways or strategies to improve their language learning, to find the features of good learners and to analyze the learning tasks. While students with lower motivation are reluctant to find their cause of language learning failures, hold negative attitudes towards their learning and pay less attention to the effective ways of language learning. In other words, students without appropriate motivation levels are reluctant to find their cause of language learning failures, thus they tend to hold negative attitudes towards their learning and to pay little attention to the effective ways of language learning. Thus, it can be concluded that motivation is the primary impetus for students to initiate learning.

5.3 Appropriate level of motivation facilitates students' learning most.

Motivation is an essential factor to push students to learn, but that does not mean the higher the motivation is, the better their improvement in their learning or strategy use is, especially metacognitive strategy use. The results of the study indicated that students with middle had the biggest progress in every aspect of the training program. This pattern of correlations between the motivational intensity and the reported increase of metacognitive ability, especially the ability to use metacognitive strategies, are somewhat consistent with the hypothesis of the Yerkes-Dodson Law (cited from Guo Dejun, 2006), which predicts a U-shaped function between arousal (motivation) and performance**.** According to the law, both low and high levels of arousal (motivation) produce minimum performance whereas a moderate level of arousal (motivation) results in maximum performance in a task. This suggests that too little or too much stimulation tends to be ignored by individuals. If the motivation is too high, students will have too much pressure. They will feel nervous in their study and cannot know themselves well and find suitable strategies to improve their learning either. However, students with too low motivation do not have the impetus to learn the strategies or learning methods, and some of them were even less aware of the processes, most probably due to their failure to persist in applying the model long enough. Hence in the training program, students with middle motivation level have the best effects and their metacognitive ability improves most.

Besides, Motivation exerts different effects on different aspects of metacognitive knowledge. In this study, three aspects of metacognitive knowledge including person knowledge, task knowledge and task knowledge were investigated. For each component of three aspects, the training effects are different for each motivation group. Firstly, for person knowledge, only the high motivation group has significant difference between posttest and pre-test, the other two group don't have significant improvements. This is because high motivation students are willing to learn, they try their best to find their learning drawbacks and advantages. Secondly, for task knowledge, both the high and low motivation groups have significant improvements, but the middle motivation group do not have many differences between post-test and pre-test. Lastly, for strategic knowledge, all the three motivation groups have significant improvement, but the middle motivation group improves most. This is just as discussed above; middle motivation group students have the best performance and the best ability to use and learn the various learning strategies.

6. Conclusion and implications

This study researched the application of metacognition in listening. By applying the quantitative analysis of two questionnaires, the study explored the metacognitive training effects for students at different motivation intensity. The study found that firstly students' learning motivation was positively and highly correlated with their listening metacognitive ability. Then the present metacognitive training had a significant effect on promoting students' metacognitive ability. Finally, some differences among different motivation groups are found in their improvements of metacognitive ability. Students with a middle level of motivation achieved the greater improvement of metacognitive ability than the other two groups.

The findings of the present research have implications for learners, teacher and educators in the realm of teaching English as a foreign language in particular and education in general. The first implication drawn from this study is that students should be aware that the achievement in listening does not only come from the intensive practice in class. They should also have regular access to various types of listening on their own or with peers. To make better use of the tasks, they should know when, why and how to use the specific strategies to enhance their listening comprehension. The second implication is that students must sustain their effort or persist in their metacognitive training to make their metacognitive processes automatic. This demands an important role of the teacher in arousing and maintaining students' motivation in EFL learning. If students are aware of the value attached to the long-term application of metacognition in learning, they will be more likely to be motivated to perform it. The third implication is that since the metacognitive training has greater effect on middle motivation listeners and less effect on lower motivation listeners, the teachers and educators should pay more attention to the students whose desire to learn is low and who have more problems in persistence of listening learning.

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