



Metacognitive Strategy Use and Academic Reading Achievement: Insights from a Chinese Context

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Abstract

It is known that metacognitive strategies are important for successful second/foreign language readers. This paper investigated the metacognitive strategies of English major students in academic reading at Guizhou University in China. All of the participants were third-year English majors. The data were collected by means of a Metacognitive Strategy Questionnaire (MSQ), a semi-structured interview and a reading comprehension test. The results revealed the overall metacognitive strategy use in academic reading comprehension of Chinese EFL (English as a Foreign Language) students with both high and low proficiency. The in-depth analysis of their differences was also illustrated. The results indicated that there was a significant positive correlation between metacognitive strategy use and English reading achievement. This study bears crucial pedagogical implications in the teaching of reading for EFL learners.

1 Introduction

In the digital world where information is easily accessed, the ability to read is critical. According to Eskey (2005), many EFL students may not need to speak English in their daily lives but they need to read it to access the richness of information in English. In particular for EFL college or university students, Levine, Ferenz, and Reves (2000) mentioned that the ability to read academic texts is one of the most important skills.

Specifically for academic reading, thorough comprehension has become essential because it is often associated with the requirement to perform identifiable cognitive and procedural tasks such as taking a test, writing a paper or giving a speech (Shih, 1992).

To be more specific for the situation of English learning in China, it is an EFL country with the largest population in the world. Its huge developmental potential as well as communicative needs with other countries in different fields indicates that English, precisely, English reading is playing a crucial role in this trend. Therefore, Chinese university students are required to learn reading in the classroom in order to successfully gain access to new information for academic purposes. Another reason is that EFL students at Chinese universities are required to take many kinds of tests which are of great importance for them to pursue a better position in their careers after graduation, such as CET 4, CET 6 (College English Test), TEM 4, TEM 8 (Test for English Majors). They are

nation-wide standardized proficiency tests in which academic reading comprehension accounts for a large proportion of the total score. With strengthened reading abilities, they will make greater progress and attain greater development in all the academic areas (Anderson, 2002). As a result, academic reading comprehension has become a major challenge. The Chinese learners' language skills and their reading proficiency need to be developed.

However, reading proficiency in an L2 does not develop as fully or easily as it apparently does in one's first language (L1). As the L2 reading process is very complex, Grabe and Stoller (2002) stressed that to become a highly proficient L2 reader is very difficult. Snow (2002) found that many learners have difficulties in understanding what they read especially academic texts. Also, academic second language readers, though they have adequate language competency, to some extent still have difficulties in comprehending those academic texts thoroughly (Eskey, 2005). For Chinese readers in particular, Wen (2003) asserts that they think a lack of grammar and vocabulary knowledge is the major cause of the difficulty of academic reading comprehension. In fact, these students lack proper metacognitive strategies to manage their own reading effectively. Students are uncertain of what metacognitive strategies are and how to use them (Wen, 2003). Poor readers, especially, do not know what methods are efficient for academic reading, nor do they know how to improve their reading ability (Young & Yoke, 2001). Markedly, in academic reading comprehension, if students lack metacognitive knowledge, they feel puzzled in adopting the appropriate reading methods and reading strategies (Shokrpour & Fotovatian, 2009). As a result, they cannot self-plan, self-monitor, self-regulate and self-evaluate their own reading skills properly. In Chinese classrooms, students still cannot read effectively and strategically by consciously using metacognitive strategies (Phan, 2006).

Metacognitive strategies have been defined by many scholars such as Chamot and O'Malley (1990), Oxford (1990), Ellis (1994) and Cohen (2005). In short, metacognitive strategies are regarded as high order executive skills that make use of knowledge of cognitive processes and constitute an attempt to regulate ones' own learning by means of planning, monitoring, and evaluating. In reading, metacognitive strategies are self-monitoring and self-regulating activities, focusing on both the process and the product of reading. They include the readers' awareness of whether or not they can comprehend what they read; their ability to judge the cognitive demands of reading task; and their knowledge of when and how to employ a specific cognitive reading strategy according to text difficulty, situational constraints, and the reader's own cognitive abilities (Baker & Brown, 1984; Gourgey, 2001; Hamdan, Ghafar, Sihes, & Atan, 2010). To put it simply, metacognitive strategies in reading are those strategies designed to increase readers' knowledge of awareness and control, to improve their reading comprehension, and to evaluate whether their attempt at comprehension has been achieved.

Metacognitive processes have been understood to play an essential part in achieving comprehension (Phan, 2006). The use of metacognitive strategies in the reading process has been generally supported as a valuable aid for its cognitive, social, linguistic benefits. Many studies (Carrell, 1995; Wenden, 2001; Chamot, 2005) have addressed the positive effects of utilizing metacognitive strategies in the reading process. They illustrate the positive relationship between the metacognitive strategies and reading comprehension. Research on metacognition and reading has shown that when faced with reading difficulties in reading comprehension, learners tend to use some metacognitive strategies to cope with these difficulties (Wen, 2003). Investigation and analysis of the metacognitive strategy use of Chinese English majors are scarce. These studies can provide us with in-depth insights into the complexity of reading process and give us ideas about how to help learners to develop their reading competence and how to assess their metacognitive strategy use. Since the metacognitive strategies are mental processes, the assessment of metacognitive strategies in reading comprehension is focusing on modeling the readers' cognitive processes by applying the approaches of think-aloud, self-report (survey), questionnaire and interview (Kendall, 1983). Meanwhile, the students' metacognitive strategy use is still dependent upon a host of factors, such as students' values and motives, their perceptions of task demands, and teaching (Pintrich, 1990). In addition, it is worth knowing whether the students' metacognitive strategy use has any relation-

ship with their reading comprehension achievement. The gap in literature leads to the exploration of the following research questions:

1. What metacognitive strategies do high and low proficiency third-year English majors use in achieving their academic reading comprehension?
2. Does the students' use of metacognitive strategies have any relationship with their English reading comprehension achievement?

2 Method

2.1 Participants

The present study was conducted with 33 third-year English majored undergraduate students who were taking an "Advanced English Course" at Guizhou University in southwest China. The scores of TEM4 (Test for English Majors) and the letter grades from two previous reading courses, that is, Basic Reading Comprehension and Comprehensive Reading Comprehension were used to classify participants into two groups: high proficiency students (HP) and low proficiency students (LP). The HP referred to the ones who got A (scores above 90) and B (scores of 81–90) grades and the score of the reading part of TEM4 was more than a median score of 14 out of 20 points. The LP referred to the ones with C (scores of 71–80) and D (scores of 61–70) grades from the aforementioned courses and the TEM4 reading score was less than the median score. As the study mainly focused on the metacognitive strategy use of high and low proficiency students, only 20 participants whose qualifications met the criteria were chosen and assigned as the high and low proficiency students.

2.2 Instruments

There were three main instruments used in the study: a Metacognitive Strategy Questionnaire (MSQ), a semi-structured interview and a reading comprehension test (RCT). First, the MSQ was composed of three main sections asking about the metacognitive strategies that the students actually used to plan, monitor, and evaluate their reading processes. The categories with detailed description were adapted from Chamot and O'Malley's (1990) classification which is widely accepted that it is comprehensive, detailed, and systematic in linking individual strategies as well as strategy groups with each of the four language skills (listening, reading, speaking, and writing). It is also in accordance with the information processing model as appeared in the main categories, i.e., metacognitive, cognitive and social mediation. However, this present study mainly focused on the metacognitive strategy in reading comprehension. Their classification is obviously far too general for its purpose. Thus modification was necessary.

In detail, the MSQ in this study measured three main categories of metacognitive strategies, namely planning, monitoring and evaluating and nine sub-categories that the students employed in carrying out four reading tasks. Table 1 below illustrates the modified classification and the details are as follows:

- a) The 6 items from the original version were modified into 4 for the Planning Strategy;
- b) The Monitoring (while reading), Comprehension Monitoring and Production Monitoring were newly developed to replace the Self-monitoring strategy in the original classification; and
- c) The Evaluating (post reading), Self-assessment, Self-evaluation and Self-reflection were developed, probing the depth of the metacognitive reading process (see Appendix A).

To establish its validity and reliability, the MSQ was sent to three experts for a content validity check and the Cronbach's coefficient α , the most appropriate reliability index, was calculated for the MSQ, yielding a reliability estimate of .836.

Table 1. Description of metacognitive strategies in reading comprehension process and number of items used in the MSQ

Metacognitive process & its sub-categories	Metacognitive strategies in the academic reading comprehension process	Number of items in the MSQ	
Planning (Pre-reading)	<i>Advance Organizer</i> Determine the nature of the reading task Set one's reading goals Plan the objectives of reading sub-tasks	Items 1–4	
	<i>Organizational Planning</i> Plan the content of each task, the parts of specific reading tasks Plan the strategies for completing the tasks Elaborate the prior knowledge connected with the reading tasks	Items 5–8	
	<i>Selective Attention</i> Focus on a specific task by sequencing the strategies to complete the tasks Select the appropriate reading strategies for the specific tasks	Items 9–10	
	<i>Self-Management</i> Apply one or more specific reading strategies relevant to the specific task Adjust reading strategies for achieving goals	Items 11–12	
	Monitoring (While reading)	<i>Comprehension Monitoring</i> Check one's understanding, accuracy and appropriateness of the over-all reading task/process Check one's own abilities and difficulties in each reading task	Items 13–24
		<i>Production Monitoring</i> Check whether the reading strategies learned from class can solve the comprehension problems Trace the selected reading strategies and adopt alternatives when it is not working	Items 25–30
		<i>Self-Assessment</i> Make an assessment of whether one succeeds in the reading goal	Items 31–34
	Evaluating (Post-reading)	<i>Self-Evaluation</i> Evaluate how well one learned to read Evaluate the reading strategy use	Items 35–37
		<i>Self-Reflection</i> Reflect one's own problems whether he/she needs to go back through the reading process for a better understanding	Items 38–40

Second, the semi-structured interview was used to obtain more in-depth data concerning the metacognitive strategy use in their reading process. It was conducted with 10 students (5 from the high and 5 from the low proficiency group). Only half of the participants were selected for the matter of practicality in dealing with the nature of qualitative data. However, in this paper, only quantitative analysis of data was reported to support the data from MSQ. The interviews were conducted in Chinese in order that the interviewees felt at ease to respond about the application of strategy use in their reading process.

Last, the Reading Comprehension Test (RCT) was employed to measure the reading ability of the participants. It consisted of six reading passages selected from the China Public English Test System (PETS 5, the highest level), which is a standardized test conducted by the Chinese Ministry of Education. The reason why the reading passages from PETS 5 were selected was that they were similar to the level of English majors when the students finish their two-year intensive studies at university (Zhang, 2003). All six expository passages were similar in length and level of

difficulty. The RCT contained 30 multiple choice questions. The content of the test was validated by 11 EFL teachers and experts and piloted before using and the reliability was .73.

2.3 Data collection

In order to address the first research question, the MSQ and the semi-structured interview were employed. Before the MSQ was administered, the participants were informed the purpose of it and there were no right or wrong answers to the MSQ. They were also informed that their responses would be confidential and would not affect their course grades. Then, the participants completed the questionnaire without discussion with others. Soon after that, the semi-structured interview was conducted individually. The interviews were tape-recorded, transcribed and translated into English for further analysis. To address the second research question concerning the relationship between students' strategy use and their English reading comprehension, the data from the reading test were processed by SPSS 15.0 for Pearson correlation analysis.

3 Results

3.1. Data from the MSQ

3.1.1 High proficiency students' metacognitive strategy use

The averages for metacognitive strategy use based on the SILL scale value by Oxford (1990) mentioned above were applied to indicate the level of usage for the nine sub-categories. The frequency scales of strategy use based on SILL (Oxford, 1990) and its interpretation are shown in Table 2 below:

Table 2. Frequency scales of strategy use (Oxford, 1990)

Mean Score	Frequency	Evaluation
4.5–5.0	High	Always or almost always used
3.5–4.49		Usually used
2.5–3.49	Medium	Sometimes used
1.5–2.49		Generally not used
1.0–1.49	Low	Never or almost never used

The high proficiency students' metacognitive strategy use in the reading comprehension was demonstrated in terms of the mean scores of the students' self reporting for nine sub-categories of metacognitive strategies. The mean scores, standard deviation, and level of use are presented in Table 3.

Table 3 shows the mean scores of nine metacognitive strategies used by the high proficiency students. With regard to the individual strategy items (40 items), the mean scores of the individual strategies ranged from a high of 3.51 to a low of 2.98 for the high proficiency students (overall mean = 3.27), indicating a medium overall use of seven sub-strategies and a high overall use of two strategies of metacognitive strategies in reading according to the established strategy usage criteria described above.

Table 3. Metacognitive strategies employed by the high proficiency students in reading comprehension

Metacognitive Strategies and Sub-categories	Mean	SD	Level
Selective Attention	3.51	.72	H
Self-Assessment	3.50	.48	H
Advance Organizer	3.43	.43	M
Organizational Planning	3.30	.51	M
Comprehension Monitoring	3.28	.20	M
Production Monitoring	3.26	.21	M
Self-Reflection	3.10	.41	M
Self-Management	3.05	.43	M
Self-Evaluation	2.98	.91	M
\bar{X}	3.27	.31	M

3.1.2 Low proficiency students' metacognitive strategy use

Table 4 illustrates the metacognitive strategy use by the low proficiency students in reading comprehension.

Table 4. Metacognitive strategies employed by the low proficiency students in reading comprehension

Metacognitive Strategies and Sub-categories	Mean	SD	Level
Selective Attention	3.25	.47	M
Self-Management	3.22	.36	M
Self-Assessment	3.18	.40	M
Organizational Planning	3.17	.36	M
Self-Reflection	3.15	.40	M
Advance Organizer	3.10	.38	M
Production Monitoring	3.05	.38	M
Self-Evaluation	3.00	.37	M
Comprehension Monitoring	2.96	.26	M
\bar{X}	3.12	.34	M

A further analysis of the results regarding the nine sub-categories of metacognitive strategies for the low proficiency students shown in Table 4 revealed the averages for the medium level strategy use for all the nine metacognitive strategies. Regarding the individual strategy items of the low proficiency students, the mean scores of the individual strategy ranged from a high of 3.25 to a low of 2.96 (overall mean = 3.12), indicating a moderate use of nine strategies. While the highest strategy use by the low proficiency students was Selective Attention, the least was Comprehension Monitoring. From the data, it clearly shows that the high and low students have similarities and differences in using metacognitive strategies. This difference led to the qualitative data analysis to further investigate how the strategies were used by the two different groups.

3.2 Data from the semi-structured interview

Data from the semi-structured interview were analyzed quantitatively. The frequencies of metacognitive strategy use of the high and low proficiency students were compared regarding the nine sub-strategies: Advance Organizer, Organizational Planning, Selective Attention, Self-Management, Comprehension Monitoring, Production Monitoring, Self-Assessment, Self-Evaluation, and Self-Reflection as well as individual strategies. Table 5 shows the frequencies, percentage, and the differences of strategy use identified in the high proficiency students' retrospective interview data.

Table 5. Frequencies of individual strategy use of the high and low proficiency students (N=10)

Metacognitive Strategies	Sub-strategies	Number of questions	Frequency (HP/LP)	Percentage (HP/LP)
Planning	Advance Organizer	3	15/7	50/23.33
	Organizational Planning	3	16/7	53.33/23.33
	Selective Attention	2	12/11	60/55
	Self-Management	2	11/7	55/35
Monitoring	Comprehension Monitoring	2	16/8	80/40
	Production Monitoring	2	16/9	80/45
Evaluating	Self-Assessment	1	5/4	50/40
	Self-Evaluation	2	9/5	45/25
	Self-Reflection	1	5/3	50/30
Total		18	93/51	52.33/31.67

To categorize the frequencies of metacognitive strategy use, criteria for determining the levels of use were established (Oxford, 1990). The range of use falling into 1–50% was considered to be low, the range of 51–70% was moderate, and the range of above 70% was considered to be high. The results of the descriptive statistics comparison showed that the high proficiency EFL learners from Guizhou University use the metacognitive strategies at a medium level (52.33%) while the low proficiency learners at a low level (31.67%). The details of high and low proficiency students' metacognitive strategy use have generated the interest for further discussion.

3.3 *The relationship between metacognitive strategy use and English reading comprehension achievement*

Pearson correlation analysis was first run to examine whether the participants' overall use of metacognitive strategies, planning strategies, monitoring strategies and evaluating strategies were correlated with their English reading comprehension scores, respectively. As demonstrated in Table 6, metacognitive strategy and the reading comprehension achievement were significantly and positively correlated ($r = .374^{**}$, $p = .005$). It means that the students who used more metacognitive strategies tended to score higher on the reading comprehension test, whereas the students who used fewer metacognitive strategies were likely to get low scores.

Table 6. Correlation between metacognitive strategy use and reading comprehension achievement

Metacognitive Strategies	Analyses	Reading Comprehension Achievement
Planning Strategy	Pearson Correlation	.341**
	Sig. (2-tailed)	.008
Monitoring Strategy	Pearson Correlation	.368**
	Sig. (2-tailed)	.006
Evaluating Strategy	Pearson Correlation	.335*
	Sig. (2-tailed)	.012
Overall Metacognitive Strategy	Pearson Correlation	.374**
	Sig. (2-tailed)	.005

** Correlation is significant at the .01 level (2-tailed)

* Correlation is significant at the .05 level (2-tailed)

All the three sub-metacognitive strategies were also positively correlated with reading achievement. Among them, monitoring strategy held the highest correlation with reading achievement at the significant level of .006 ($r = .368$), the planning strategy ranked the second ($r = .341$, $p = .008$) and evaluating was the last ($r = .335$, $p = .012$). Although the results produced by Pearson analysis demonstrated that metacognitive strategies had positive correlation with reading achievement, it cannot be told whether the three variables possessed power in predicting the read-

ing achievement. To seek the answer, multiple regression analyses were performed. As displayed in the Tables 7, 8, 9 and 10, the planning and monitoring strategy entered the regression model by the stepwise method, accounting for 11.6% and 13.5% variance respectively in reading achievement, with the F value being 8.021 at the significant level of .008 and 8.304 at the significant level of .006 respectively. The model, therefore, had statistical significance since the probability level of the F value was much smaller than .01. Results in Tables 8 and 10 demonstrated that planning and monitoring strategy was a powerful predictor with a Beta value of .341 and .368 respectively.

Table 7. Multiple regression: Model summary

Model	R	R ²	Adjusted R ²	R ² Change	F	Sig.
1	.341*	.116	.112	.116	8.021	.008 ^a

a. Predictors: (Constant), Planning Strategy

Table 8. Multiple regression: Coefficients

Model	B	β	t	Sig.
1 (Constant)	16.347		3.978	.000
Planning Strategy	3.284	.341	2.365	.008

Table 9. Multiple regression: Model summary

Model	R	R ²	Adjusted R ²	R ² Change	F	Sig.
1	.368*	.135	.119	.135	8.304	.006 ^a

a. Predictors: (Constant), Monitoring Strategy

Table 10. Multiple regression: Coefficients

Model	B	β	t	Sig.
1 (Constant)	18.362		5.334	.000
Monitoring Strategy	2.562	.368	2.882	.006

As shown in Table 11, the variable evaluating strategy was excluded from the model because the *t* value of its Beta value was 1.635, lower than 2. Both the values were close to 1. This illustrated that evaluating strategy was not linearly correlated, and that the estimated contribution of the independent variable to dependent variable was reliable. Evaluating strategy did not enter the regression model despite its correlation with reading comprehension achievement. This meant that the relationship between evaluating strategy use and reading achievement was not of a casual type.

Table 11. Multiple regression: Excluded variable

Model	β In	t	Collinearity Statistics	
			Tolerance	VIF
1 Evaluating Strategy	.224	1.635	.842	1.187

4 Discussion

4.1 Metacognitive strategy use of high and low proficiency students and their differences

For the similarities and differences in metacognitive strategy use, several salient points emerged from the data. First, it appeared that the Selective Attention strategy had substantially been used by both high and low proficiency students. The possible explanation for the high use of Selective Attention was to do with the nature of the metacognitive strategies. The three strategic

processes of metacognitive strategies are not linear but the recursive ones. The students might use the strategies only when it is necessary depending on the needs or demands of the tasks and the interaction between the task and the learner (Brantmeier, 2005). Selective Attention, as defined earlier, refers to the strategies used when readers “work directly with texts” and comprehension problems occur (Sheorey & Mokhtari, 2002, p. 4). Selective Attention was specifically useful because it helped them understand the complexities of the incoming reading task before reading, pinpoint the problem, and expand the learning task (Young & Yoke, 2001). Another reason could be that in reading in English, the students often encounter unfamiliar language and cultural references, so they consciously pay attention to the visual features of the text such as typographical features and notes to help them enhance the comprehension of the text. Chamot (2005) stated that choosing to focus on specific aspects of language or situational details will help perform the task.

Second, data from the students’ interview indicated that the low proficiency students seemed to avoid the Advance Organizer and Organizational Planning. The finding showed that the students did not often determine the nature of reading task, set one’s reading goal and plan the objectives of the reading tasks. One explanation for it was that the students preferred not to use the strategies that took time to do. They might realize that they did not have much time to stop and think while doing the test within the time given. They knew these strategies but preferred using them when there was no time pressure. However, during exams, when time was limited for them to find out correct answers, they might choose not to use them. A second possible explanation had to do with the familiarity of the strategies. Data from the students’ interview showed that they were not familiar with the Advance Organizer and Organizational Planning since they rarely used them before reading. This was compatible with research results of Aebersold and Mary (2006) who stated that readers had a tendency to rely on the strategies of familiarity.

Third, for monitoring strategies, data from both the MSQ and the interview showed that the high proficiency students use more monitoring strategies than low proficiency students. This echoed the previous research (Anderson, 2002; Dhieb-Henia, 2003; Dreyer & Nel, 2003; Eskey, 2005; Steinagel, 2005). These studies revealed that differences in strategy use between high and low proficiency students came from the fact that the low proficiency students had poor monitoring skills during reading which is vital for the reading achievement. The explanation for this could be the low proficiency students’ weak metacognitive awareness in applying the strategies and their poor linguistic knowledge which led to the further discussion in the following section.

Fourth, the other two least used strategies were Self-Reflection and Self-Evaluation. One reason could be drawn from the data from the interview. It displayed that the students did not know how to reflect or evaluate their reading process, since both strategies need the readers’ ability to recognize weaknesses in their work, to reflect whether they need to go back through the task, to decide whether they meet the goal, and to evaluate the effectiveness of the strategy use (Anderson, 2002). This strategy was considered new to both high and low proficiency students. This was especially the case for the low proficiency students who lacked the ability of finding their own problems and solving them with self-reflection and self-evaluation in the reading comprehension. These findings were in line with Anderson’s (2002) study which found that the poor students did not evaluate the success or failure of strategy use. Another possible reason may account for the cultural issue in China. Normally students just needed to submit their work for teachers’ evaluation and rarely self-evaluated. They got used to the way of teacher’s evaluation for their reading tasks. This finding agreed with the study of Gao (2003) for Chinese senior high school EFL students and Pan (2006) for Chinese non-English-major EFL undergraduates.

Fifth, high and low proficiency students exhibited different levels of metacognitive awareness. The findings revealed that the high proficiency students apparently possessed metacognitive awareness and were able to use some metacognitive strategies to enhance reading comprehension. They knew when they should use a particular strategy and when to change to another to facilitate reading comprehension. This accorded with the study of Cross and Paris (1988). Moreover, the high proficiency students also applied more metacognitive strategies to reading comprehension than those comparatively low proficiency students. Their metacognitive strategy awareness was

closely related to their reading ability. This research finding was consistent with the research results of others (Koda, 2005; Lehtonen, 2000; Mokhtari & Reichard, 2002).

Last, another difference found between the high and low proficiency students' metacognitive strategy use was the number of strategies. The low proficiency students used almost 50% fewer strategies than the high. This limitation might be caused by their limited linguistic knowledge bases. These research findings were consistent with Steinagel (2005). Anderson (2002) asserted that low proficiency students might know what strategy to use but they did not have sufficient linguistic knowledge to build their strategy upon. Evidences were seen from the interview that while reading, the low proficiency students tended to use fewer strategies required linguistic knowledge to execute them, for example, applying appropriate grammar rules, making interferences, and using rhetorical markers. It was possible that the insufficient knowledge, which resulted in the decrease of strategy use of the low proficiency students, was related to a drop in their comprehension scores.

4.2 Correlation between metacognitive strategy use and reading comprehension achievement

The significant positive correlation between the overall metacognitive strategy and the reading achievement was 0.374 ($p = .005$) indicated that metacognitive strategies played a very important role in students' reading comprehension, and further verified the feasibility of enhancing reading comprehension by improving these strategies. The more the students used metacognitive strategies, the more likely they were to obtain higher scores on the reading comprehension test. Readers with metacognitive strategies have definite reading goals and know how to accomplish them. They can insist on implementing their plans for reading activities and make appropriate adjustments when necessary, get timely feedback on their reading performance through self-assessment on their own initiative, and take remedial actions accordingly. Therefore, readers with metacognitive strategies are able to read effectively and metacognitive strategies constitute an important factor of reading efficiency.

The findings of the second research question confirmed the studies by Liu (2004), Phakiti (2003), Phan (2006), and Meneghetti, Carretti and De Beni (2006) in which the participants' global use of metacognitive strategies and their reading achievement were positively correlated. The result was however incongruent with Liu's (2004) study in one aspect. According to Liu's report, only Evaluating Strategy was significantly correlated with reading achievement, and the other two sub-metacognitive strategies bore no significant relationship with it. A possible explanation for such incongruence concerned the instrument for data collection. Although the questionnaire on metacognitive strategies adopted in Liu's study was mainly based on Chamot and O'Malley's (1990) classification framework as it was in the present study, different items were included in the scale and subscales, the validity of the scale remained unknown. Therefore, the result was unreliable. Since there is no standard questionnaire, researchers can design their instruments with reference to the acknowledged classification frameworks. As a consequence, the results from one study must be carefully used in other studies.

However, data from the MSQ showed that the mean score of the high and low proficiency students was close to each other but yielded different reading achievement. Data from the semi-structured interview provided us more insightful information and explanation for this. It may lie in the following aspects. Firstly, the amount of the metacognitive strategy use might not match the quality of it. The MSQ is a five-likert scale questionnaire; when students ticked their choice, their real effects of using it might not be considered, which possibly affected their reading achievement. This was further proved by the data from the semi-structured interview. The effectiveness of metacognitive strategy use depended on many factors, such as awareness, motivation, cognitive factors, linguistics competence, confidence, and so on. For the low proficiency students, more differences exist between their perceived metacognitive reading strategy use and their reported actual metacognitive reading strategy use. This is why the interview data displayed that high proficiency students used the metacognitive strategies at a medium level while the low proficiency at a low level. Secondly, not all the individual metacognitive strategies contributed to

reading comprehension in terms of reading achievement. In this study, evaluating strategy did not enter the regression model despite its correlation with reading comprehension achievement. This illustrated that English learning is a complex process in which a variety of factors contribute to or interfere and interact with each other, and that metacognitive strategies form only one of these factors. The same is true of L2 academic reading process.

5 Conclusion and implications

The results of this study led to a conclusion that sheds light on an issue of L2 reading development. The research findings can be summarized as follows. Firstly, the metacognitive strategy use of high and low proficiency students was at medium level. The use of Selective Attention had substantially used by the two groups, while the two least used strategies were Self-Reflection and Self-Evaluation. The high proficiency students used more monitoring strategies than the low proficiency students, and the low proficiency students seemed to avoid the Advance Organizer and Organizational Planning strategies. Secondly, metacognitive strategies and English reading achievement were closely related to each other ($r = .374^{**}$, $p = .005$) and metacognitive strategies played an important role in English majors' EFL reading. All the three sub-metacognitive strategies were also positively correlated with reading achievement. Among them, monitoring strategy held the highest correlation with reading achievement at the significant level of .006 ($r = .368$), and the planning strategy ranked the second ($r = .341$, $p = .008$) and evaluating was the last ($r = .335$, $p = .012$). The planning and monitoring strategies were a powerful predictor with a Beta value of .341 and .368 respectively in predicting the reading achievement, but the evaluating strategy did not enter the regression model despite its correlation with reading comprehension achievement.

Some practical implications for EFL teaching and learning for Chinese university students are proposed as follows. First, the findings reinforce and enrich the existing theories stating that metacognitive strategies have a positive role in second language reading (Lawrence, 2007; Pressley & Gaskin, 2006), and thus are important and helpful to enhance EFL reading comprehension.

Second, teachers can play a key role in making students aware of and fostering the acquisition of metacognitive strategies. So teachers are required to validate the discrepancy between students' views on the strategies and actual practice. Helping students develop metacognitive awareness in reading process is vital for helping students become strategic and self-regulated readers. Additionally, psychological factors such as perception, motivation, belief and confidence, etc. should be taken into consideration when conducting metacognitive strategy training to ensure the effective use of the strategies.

Third, the findings in this study lend support to the idea that EFL teachers in the classroom should integrate metacognitive strategy training into reading instruction. In sum, it was necessary that the low proficiency students obtain a command of language and reading strategy instruction (Bernhardt & Kamil, 1995; Kim, 1995). If the low proficiency students were equipped with sufficient linguistic knowledge, they would certainly have had a wider range of strategies to choose from and became more skillful in executing the strategies effectively and efficiently (Steinagel, 2005).

All in all, the study of metacognitive reading strategy training is still at an exploratory stage in China, and more theoretical and empirical studies should be done to develop teaching and learning of reading in English. Although metacognitive reading strategy training may not solve all the problems that Chinese university learner's have in English reading comprehension, it does have some impacts on students' metacognitive reading strategy awareness, and part of their reading ability. The results of this study provide a number of different areas such as listening and writing for future investigation.

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Appendix A: Metacognitive Strategy Questionnaire (MSQ) for reading

Directions: In this part, you will find the statements about reading. When you read a text, think about what kind of things you did *before*, *during*, and *after* reading. Take time to carefully examine each item and check the responses by ticking (√) in the box that best indicates how well the statement describes you.

- 1 = Never or almost never true
- 2 = Usually not true (less than 50%)
- 3 = Somewhat true (about 50%)
- 4 = Usually true (more than 50%)
- 5 = Always or almost always true

Example: Consider the following item and choose the response by ticking (√) in the box.

Item	Content	Never true 1	Usually not true 2	Somewhat true 3	Usually true 4	Always true 5
	Before beginning to read, I go to the library and surf the Internet to get information concerning the topic.					√

- If you go to the library or surf the Internet to get the information concerning the topic before you begin to read if you do it all the time or almost always, please **tick 5**.
- It is important to answer in terms of how well each statement describes you, NOT in terms of what you think you should do, or what other people do. **THIS IS NOT A TEST**. There is no right or wrong response to these statements. The score you obtain will not affect your grade.
- Depending on your language learning ability and proficiency, you may be using different types of strategies. The metacognitive reading strategies presented here are general. Not everyone needs the same kind of strategies. A "low" score does not mean you are a bad learner.

Part 1: The following statements tell what you did *before* you read the text.

Before I started reading an English text, ...

Items	Contents	Never true 1	Usually not true 2	Somewhat true 3	Usually true 4	Always true 5
1	I considered the previous success with the similar tasks and identify the purpose of the assigned tasks.					
2	I activated the background knowledge to get a general idea.					
3	I previewed the questions or the instructions, so I could understand what to do.					
4	I tried to predict the contents of the text from the title.					
5	I could come up with a list of reading strategies I would probably use.					
6	I scanned the text first and concentrated on what I will read.					
7	I read the task before reading the text.					
8	I read the text before I read the task.					
9	I determined the major points I would pay attention to, such as the headings and sub-headings, the topic sentence, and the text structure.					
10	I recalled my weak points in reading comprehension and tried to comprehend when reading began.					
11	I located the task questions in the specific paragraph of the text because I thought it was easier.					
12	I planned before I read because I think it was helpful.					

Part 2: The following statements tell what you did *during* reading the text.

While reading an English text, ...

Items	Contents	Never true 1	Usually not true 2	Somewhat true 3	Usually true 4	Always true 5
13	I first read for the general ideas of the text.					
14	I paid selective attention to the information predicted and required in the task.					
15	I verified my inference of the previous paragraph and predicted what would come in the next paragraph.					
16	I could find ways to overcome the problems when I got stuck with difficult vocabulary.					
17	I could find ways to concentrate on my reading even when there were many distractions around me.					

18	I could refocus my concentration on reading though the text and task I'm reading and doing are difficult.					
19	I underlined the difficult sentences and words and tried to understand them.					
20	I skipped words or sentences I did not understand.					
21	I translated sentence by sentence while reading.					
22	I focused on one specific goal at a time. For example, first I concerned with the general ideas of the text. Next, I read for the key words or implied meaning of the sentences.					
23	I kept reading even I had difficulty and constantly checked my understanding of the text.					
24	I regulated my reading speed according to the given time and length of the text.					
25	I could use reading strategies to help me comprehend the text better.					
26	I searched for the answers for the task questions.					
27	I could think of ways to solve my reading problems even they are very difficult.					
28	I considered whether I understood the beginning and the ending of the text correctly.					
29	I could choose appropriate reading strategies to solve my immediate reading problems.					
30	I changed the strategies if they could not help me in accomplishing the reading comprehension task.					

Part 3: The following statements tell what you did to help improve your reading *after* you read it.

After reading an English text, ...

Items	Contents	Never true 1	Usually not true 2	Some-what true 3	Usually true 4	Always true 5
31	I realized that my major concern is coming with the better understanding by accomplishing the task.					
32	I checked to see if my reading strategies were helpful for the text comprehension.					
33	I enjoyed discussing with my classmates for the difficult points and exchanging the reading experience to get a more effective reading method to achieve my goal.					
34	I used my own reading plan for judging how well I read.					
35	I referred to the reading goal to evaluate if I achieve it.					

36	I set a higher reading goal such as comprehension level for next time based on what worked best this time and what I think I should keep or change.					
37	I could be able to use the characteristics of a good reader as criteria to evaluate my own reading.					
38	I spent time to motivate myself to improve the reading even I found that I do a poor job.					
39	I spent time reflecting on my reading performance.					
40	I recalled and summarized the reading strategies to see what might I keep or change to make an improvement on my reading next time.					