Metacognitive Strategy Use for EFL Readers: Differences in Gender and Reading Ability

Matthew P. Wallace
University of Macau
<mpwallace@um.edu.mo>

Vina Meilin Li
University of Macau
<vinalml713@gmail.com>

Tracy Cuishi Huang
University of Macau
<wongchoic98@gmail.com>

Nicole Cuiyu He
University of Macau
<nicoleab715894@gmail.com>

Abstract

Using metacognitive strategies to enhance EFL reading comprehension is well-established, but it remains unclear how strategy use may differ according to individual reader characteristics like gender and reading ability. To address this limitation in the literature, 137 Chinese EFL university students completed a reading comprehension task and the Metacognitive Awareness of Reading Strategies Inventory (MARSI). The MARSI measured the use of global strategies (for global analysis of a text), problem-solving strategies (to cope with challenging texts), and support strategies (to support comprehension). Results from a within-group analysis of variance showed that the participants used problem-solving strategies with high frequency and used them significantly more than global and support strategies, which were used moderately. Global strategies were used significantly more than support strategies. Results from t-tests showed no differences in strategy use between genders and results from a between-groups analysis of variance showed that high ability readers used significantly fewer support strategies than low ability readers, but the effect size was small. No differences were found among the other strategy types across the ability levels. These findings suggest that gender differences did not affect strategy use and that when reading ability increased, the participants were less reliant on support strategies.

Keywords*: reading comprehension, metacognitive strategies, EFL, gender, reading ability*

It is well known that reading comprehension is aided by strategy use. Of the many types of strategies available to readers (e.g., cognitive, metacognitive, socio-affective), metacognitive strategies have been found to be especially effective in helping to understand the content of a text (Williams & Atkins, 2009). Metacognitive strategies include planning a task or activity, monitoring comprehension and or the awareness of task performance, and evaluating comprehension afterwards. Research on metacognitive strategies in second language (L2) reading comprehension have utilized correlational designs to examine how individual differences in strategy use may influence reading performance. These studies have reported mixed findings, with some showing that strategy use shares a positive relationship with reading (Guo, 2018; Phakiti, 2003b; Tavakoli, 2014), while others report no relationship at all (Purpura, 1998). Another approach to researching reading strategies has been to examine how strategy use differs according to characteristics of the individual learners. For example, it has been shown that strategies may be used differently according to gender (Al-Mekhlafi, 2018; Bećirović et al., 2017; Phakiti, 2003a), reading ability (Phakiti, 2003b; Talebi et al., 2020; Tavakoli, 2014), or language proficiency level (Guo, 2018; Tavakoli, 2014; Zhang & Wu, 2009). The current study follows this latter trend to examine how metacognitive strategy use differs according to characteristics of the English as a foreign language (EFL) learners.

Reading Comprehension

Comprehension involves two levels of understanding: understanding of information explicitly provided in a text and understanding of inferences made from information provided within the text (Wagner, 2004). To arrive at these two levels of understanding, readers extract and formulate meaning from written texts based on the interaction among three components: reader characteristics, referring to the person's knowledge, capacities, and memory; the text, referring to the different representations and features of a text; and the activity, referring to the reading goal to be accomplished and the purpose of reading (Snow, 2002). When the knowledge and skills of the reader match the characteristics of the text and activity, then comprehension can be accurate. However, comprehension may suffer when there is a mismatch (i.e., when the text characteristics are beyond the knowledge and skills of the reader or when the task demands are beyond the capabilities of the reader). Regardless of the degree of mismatch, readers make use of reading strategies for comprehension. Stronger readers use strategies to enrich their understanding of a text, while weaker readers use them to compensate for their shortcomings (Field, 2008).

Metacognition and Reading

Metacognition refers to thinking about one's own thinking processes (Flavell, 1979) to observe and evaluate what we are doing. It can be divided into two components: Metacognitive knowledge and metacognitive strategies (also referred to as regulations). Flavell (1979) explained that metacognitive knowledge involves the interaction among three categories of variables: Person knowledge, task knowledge, and strategy knowledge. Person knowledge encompasses what we know about ourselves, including our understanding of our own skills and abilities. Task knowledge involves understanding of how to complete communicative or pedagogical activities. Strategy knowledge concerns knowing how strategies may be used to achieve our communicative or learning goals. As defined above, metacognitive strategies

include planning a task or activity, monitoring comprehension and task performance, and evaluating comprehension and task performance.

Metacognition is especially important for reading comprehension. Baker and Brown (1984) note that skilled readers tend to be aware of and direct their cognitive abilities as they engage with written texts. Brown (1980) identified metacognitive strategies that skilled readers use: (a) understanding the explicit and implicit purposes of reading tasks; (b) distinguishing among important aspects of information; (c) distributing attention and bringing focus to the major content and details efficiently; (d) monitoring and evaluating whether the ongoing reading behavior is beneficial to the completion of the reading goal; (e) revising interpretations when misunderstandings arise while comprehending the text. Not doing these things or not doing them well may harm comprehension accuracy.

Measuring Metacognitive Reading Strategies

A popular instrument that has been adopted in multiple studies to measure metacognitive strategy use is the Metacognitive Awareness of Reading Strategies Inventory (MARSI; Mokhtari & Reichard, 2002). The MARSI measures three types of strategies: Global Strategies, Problem-Solving Strategies, and Support Strategies. Global Strategies (13 items) involve the global analysis of a text, including the use of prior knowledge, contextual clues, and textual features (e.g., bolded terms) to aid in comprehension. Strategies under this heading also include what readers engage in as they plan, monitor, and evaluate their comprehension and task performance. Problem-Solving Strategies (8 items) include strategies that readers use when facing difficult texts (e.g., re-read text, guess unrecognized words, adjust reading speed). Finally, Support Strategies (9 items) represent the practical strategies that readers may use to support their reading comprehension, including notetaking, using reference materials, and asking for assistance.

The MARSI was originally intended to measure strategy use in first language contexts. It was developed together with the Survey of Reading Strategies (SORS) for the additional language learning context by Sheorey and Mokhtari (2001), who removed two items deemed unnecessary for foreign language learners (i.e., summarizing what was read and discussing content with others to confirm understanding). Despite the SORS being oriented towards the type of participants examined in the current study, the two items removed from the original were considered important reading strategies that the learners in this study's sample may utilize. Therefore, the MARSI was preferred over the SORS. The MARSI underwent another recent revision (MARSI-R; Mokhtari et al., 2018) to eliminate items eliciting strategy use. However, that version solely examines the perceived awareness of the three strategy types. Because the goal of the current study is to examine strategy use, the original is deemed more appropriate for the current study's aims.

Empirical Studies

Empirical studies that have used the MARSI/SORS to examine reading strategy use have reported a range of frequencies in varied contexts. For example, Zhang and Wu (2009) reported that problem-solving and global strategies were used with high frequency, but they support strategies were used moderately for Chinese senior high school EFL students. The authors

reasoned that the participants' high strategy use was likely due to either the consistent use of a comprehension-testing model approach to teaching reading (i.e., students read a passage and answer comprehension questions) or because participants used their L1 reading strategies when reading L2 texts. Guo (2018) also reported that Chinese university EFL learners used problem-solving and global strategies with high frequency and support strategies moderately when reading in English. Supporting Zhang and Wu's contention for L1 to L2 strategy transfer, Guo further reported that L1 Chinese and L2 English strategy use variables (global, problem solving, and support) all loaded highly onto a common strategies latent variable. This suggests that items on the SORS measured a reading strategy use variable that did not differ greatly by first or second language. Different results have been reported in the Iranian university context, where Tavakoli (2014) and Talebi et al. (2020) showed that none of the three strategy types measured by the MARSI were used with high frequency by university language learners. The English learners in Tavakoli's (2014) study and the English, Russian, and Arabic learners in Talebi et al.'s (2020) study reported using support strategies at a moderate frequency, but that global and problem-solving strategies were used with low frequency. Talebi et al. (2014) echoes Zhang and Wu's explanation that the pedagogical focus in the learning contexts may have influenced how frequently students used the reading strategies. It appears that students learning in the Chinese context may have developed more problem-solving strategies than global or support strategies from instruction, while the Iranian language learners used more support strategies than global or problem-solving to aid their comprehension. An alternative explanation may be that the reading tasks that the participants in the Iranian studies completed were beyond their capability, so they focused on making sense of the content instead of using strategies to aid in their comprehension.

Consistent with the results from the strategy types, the most frequently reported individual strategies measured by the MARSI/SORS were global and problem-solving strategies and the support strategies were reportedly the least frequently used. In the six studies that reported individual strategy use, seven strategies were identified as the five most frequently used by at least half of the studies, and three strategies were identified as the five least frequently used by at least half of the studies (see Table 1). The most frequently reported strategy across the studies is the general strategy of using prior knowledge to aid in understanding a text (Al-Mekhlafi, 2018; Tavakoli, 2014; Talebi et al., 2020; Zhang & Wu, 2009). This suggests that second language learners in varied contexts use what they know to help them understand what they are reading. The other two global strategies frequently reported are reading with a purpose and previewing the reading before engaging the text. The most frequently reported problem-solving strategies involved overcoming obstacles, either pre-emptively (reading slowly and carefully to ensure comprehension) or after they arose while reading (re-reading texts when it is difficult, guessing the meaning of unknown language when it is encountered, and regaining attentional focus if it is lost while reading). The three common least frequently reported strategies are the global strategy to critically analyze and evaluate the information presented in the text, and two support strategies: reading aloud when the text becomes difficult and reading back and forth through the text to identify relationships among the ideas presented.

Table 1. Most and least frequently reported reading strategies by study.

	Martinez (2008)	Zhang & Wu (2009)	Tavakoli (2014)	Al-Mekhlafi (2018)	Daguay-James & Bulusan (2020)	Talebi et al. (2020)
Most frequently used						
GL: I use prior knowledge to understand the reading.		✓	✓	✓		✓
GL: I read with a purpose.			✓	✓		✓
GL: Before reading the text, I preview what it's about.		✓	✓			✓
PS: When I lose concentration, I try to look back on the text.	✓	✓			✓	
PS: To ensure I understand what I'm reading, I read slowly and carefully.	✓			✓	✓	
PS: I re-read to increase my understanding when the text is difficult.	✓	✓			✓	
PS: When I encounter unrecognized words or phrases, I try to guess the meaning.	✓	✓	✓			
Least frequently used						
GL: I critically analyse and evaluate the presented information in the text.	✓	✓		✓		
SU: I read aloud to help understand when the text becomes difficult.	✓	✓	✓			
SU: I find relationships among ideas by reading back and forth in the text.		✓	✓			✓

Notes. GL = Global strategy; PS = Problem-solving strategy; SU = Support strategy

Gender and Strategy Use

Research examining the frequency of reading strategy use has shown that females tend to use more strategies than males (Al-Mekhlafi, 2018; Bećirović et al., 2017; Chambers-Cantrell & Carter, 2009; Martinez, 2008), though this finding has been inconsistent. For example, Al-Mekhlafi (2018) reported that female university EFL students in Oman reported using more metacognitive strategies than male students. Using the SORS, Al-Mekhlafi further found that females used more problem-solving and support strategies than their male counterparts, but that there was no difference in how the genders used global strategies. Examining the differences in use of individual strategies on the MARSI, Martinez (2008) found that the only difference between male and female EFL students in the Philippines was that females used three support strategies—taking notes, summarizing what was read, and underlining key parts of the text—more than the males. In the L1 context, Chambers-Cantrell and Carter (2009) found that females used all three strategy types—global, problem-solving, and support—more than males. These results seem to suggest that females may be more strategic in their approach to reading than males, but this result has not been uniform. Phakiti (2003a) reported that male EFL university learners in Thailand used more metacognitive strategies than female learners. However, no differences were found between the genders at the same reading ability level, suggesting that those differences may have been more related to ability level than gender. Finally, Tavakoli (2014) reported no differences in strategy use on the SORS between male and female Iranian EFL students. Taken altogether, it remains unclear whether gender may actually affect the use of metacognitive reading strategies.

Reading Ability and Strategy Use

It has been consistently shown in the literature that stronger readers use more metacognitive strategies than weaker readers. For example, Phakiti (2003b) found that for Thai EFL students, more skilled readers used more metacognitive strategies than less skilled readers. When he compared strategy use based on reading ability, Phakiti (2003b) reported that metacognitive strategies were used most frequently by highly skilled readers, followed by intermediate-level readers, and the least number of strategies were used by less-skilled readers. Similarly, Tavakoli (2014) reported that reading strategy variables measured by the SORS shared a moderate positive relationship with a reading comprehension variable for Iranian university EFL students. Of the three strategy types, global and support strategies both shared a moderate correlation with reading, but the relationship with problem-solving strategies was weak. This finding suggests that using strategies to globally analyze a text and support comprehension was more important for reading than using strategies in response to problems that readers may experience as they read. These results differ from those reported in the L1 context. Chambers-Cantrell and Carter (2009) used the MARSI to show that as reading ability increased for adolescent readers in the United States (11 and 15 year olds), more global and problem-solving strategies were used, and less support strategies were used. The authors offered the results as support for stronger readers being better able to plan and use strategies to globally analyze a text and to overcome difficulties as they arise than weaker readers, who instead favored support strategies to assist in their understanding. These contradictory findings in the literature may be explained by Tavakoli's (2014) participants being of varied levels of language proficiency, while Chambers-Cantrell and Carter's participants were all homogenous native language users. To address these contradictory results in the literature, the current study examined how strategy use may differ according to reading ability for EFL readers.

Research Questions

To address the limitations in the existing literature, the current study aimed to answer the following research questions.

1. How frequently do Chinese university EFL learners use the reading strategies measured on the MARSI?

2. Which individual reading strategies measured on the MARSI are used most and least frequently?

3. Does metacognitive strategy use differ based on gender or reading ability?

Methodology

Participants

This study was conducted at a university in Macau. The language of instruction at the university is English, meaning that English is the language used on campus and in class. Despite this, many of the students struggle to cope with the language demands of their courses. To support the students, the university requires them to attend supplementary English language courses focusing on the four-skills development for up to six hours per week until they are able to reach the Common European Framework of Reference for Languages level B2 (high-intermediate).

After receiving ethical clearance from the university, participants were recruited via convenience sampling by word of mouth and use of social media (e.g., WeChat). In total, 137 (49 male; 88 female) undergraduate EFL students participated in the study. In terms of English proficiency, the participants' self-reported language ability ranged from Common European Framework of Reference for Languages levels A1 (low beginner) to B2 (high-intermediate). Because a majority of the participants were third (20) and fourth year (83) students, it was estimated that most of the participants were around the B2 level after having spent at least three years in an English-speaking university environment. The reading ability of the participants was determined by their performance on the reading measurement (described below).

Instrumentation

Reading comprehension task. Reading comprehension was measured using two reading passages extracted from a practice version of a standardized reading test. This test was selected because it has shown to be a valid and reliable measurement of reading ability for the language proficiency levels of our intended participants. Both passages were expository texts, with one easier ($M = 2.84$ out of 5.0) about a class project and one more challenging ($M = 2.29$ out of 5.0) about a physical education class activity. The texts were analyzed for vocabulary level using Compleat Lexical Tutor vocabulary profiler (Cobb, 2002). The profiler categorizes the words in the text according to the frequency with which they occur in the English language: 1) K1 words (the most frequent words of English, 1-1000) 2) K2 words (the second most frequent words of English, 1001-2000), 3) AWL words (the 500 frequent academic words of English,), and 4) Off-list words (the remaining words that could not be found on the other mentioned lists). The characteristics of the reading task passages are listed below in Table 2.

Table 2. Characteristics of the Reading Tasks.

Items	Passage A	Passage B
Total words	185	207
Topic	Class project	Sports activity
Vocabulary level		
K1 Words (1-1000)	88 %	80 %
K2 Words (1001-2000)	3 %	7 %
AWL Words	5 %	5%
Off-List Words	4%	8%

The reading comprehension questions were in multiple choice response format and intended to examine the students' ability to understand information provided in a text (5 items) and to understand inferences made from details provided within a text (3 items). Four questions were asked of each reading passage and they were presented below the texts on the screen. Participants could scroll up and down to review the text and questions.

Metacognitive awareness of reading strategies inventory (MARSI). Metacognitive strategy use was measured utilizing the MARSI (see Appendix B). It is a 30-item instrument that elicits the reader's use of Global, Problem-Solving, and Support reading strategies (described above). Participants indicated their agreement with each statement using a 5-point Likert scale. The questionnaire was translated into Chinese, the first language of the participants, in order to ensure understanding of each item. The strategy types and their associated items are presented in Table 3.

Table 3. Reading Strategies Categorization, Description and Item Number on the MARSI.

Category	Description	Item Number
Global Reading Strategies (GL)	Strategies for global analysis of a text and the planning, monitoring, and evaluating of comprehension and task performance.	1, 2, 3, 6, 7, 8, 9, 11, 13, 16, 19, 27, 29
Problem-Solving Strategies (PS)	Strategies used when facing difficult texts	4, 12, 14, 15, 17, 22, 23 24
Support Reading Strategies (SU)	The practical strategies to support reading comprehension	5, 10, 18, 20, 21, 25, 26, 28, 30

To determine the levels of metacognitive strategy use, the current study followed the procedures described in the MARSI instrument development and validation study (Mokhtari &

Reichard, 2002). The average scores for each strategy type and the questionnaire overall were calculated. Average scores between 3.5 and 5.0 would indicate high amount of use. Scores between 2.50 and 3.49 would indicate moderate use, and scores between 1.0 and 2.49 indicate low level of use.

Procedure

All participants were required to complete the informed consent form prior to filling out the questionnaire. The questionnaire and reading tasks were presented in electronic format. First, participants indicated their demographic information (e.g., gender and year of study). Next, participants completed the reading comprehension tasks. The reading texts were presented on screen and the questions were below each passage. After answering the comprehension questions, the participants completed the MARSI questionnaire. The questionnaire was done after the reading tasks to best capture the reading strategies that the participants used to comprehend the texts. The entire procedure of the tasks and questionnaire required approximately 15 minutes to complete.

Data Analyses

The internal consistency reliability was first examined for the reading comprehension items, items for the MARSI questionnaire overall, and for each variable (i.e., strategy type) measured on the MARSI questionnaire. Cronbach's alpha values above 0.70 would suggest an acceptable level of reliability. Five composite variables were then created by totalling the scores of the reading questions (Reading Comprehension) and by averaging the scores of the items for each of the variables on the questionnaire (Global Strategies, Problem-Solving Strategies, and Support Strategies) and the questionnaire overall (Strategies Overall). Descriptive statistics were calculated for each variable. Skewness and kurtosis values were inspected to verify univariate normality of the variables. Values within the absolute value of 2.0 would indicate that the variables were approximately normally distributed (Field, 2009).

To answer research question one, the descriptive statistics of the composite variables were inspected. To determine intrapersonal differences among the strategy types, a one-way within-subjects analysis of variance (ANOVA) was conducted. To answer research question two, the descriptive statistics for individual items under each strategy type on the MARSI were inspected. To answer research question three, the overall sample was divided into two groups based on gender—males (49) and females (88). Then an independent-samples t-test was calculated to examine differences among the variables between genders. For reading ability, the sample was divided into three levels. Participants who scored 0-3 out of 8 were considered as low-level readers (31 participants), 4-6 were intermediate-level readers (55 participants), and 7-8 were considered high-level readers (51 participants). A one-way ANOVA with Bonferroni post-hoc comparisons was then conducted to examine differences among the three reading ability levels. Statistically significant differences among the three would indicate distinct differences in ability among them. Finally, a one-way ANOVA with Bonferroni post-hoc comparisons was conducted to examine the differences among the strategy variables within and across the three reading ability levels.

Results

Results from the reliability analysis in Table 4 show that the reading comprehension items (α = 0.76), items on the MARSI questionnaire overall (α = 0.91), and items for the Global Strategies variable (α = 0.84), Problem-solving Strategies variable (α = 0.73), and the Support Strategies variable (α = 0.76) were internally consistent. The descriptive statistics further show that the skewness and kurtosis values were all within the absolute value of 2.0, suggesting the data was approximately normally distributed.

Table 4. Descriptive statistics and reliability estimates of the metacognitive strategy variables.

Variable (Total Items)	Mean	SD	Skewness	Kurtosis	Alpha
Reading Comprehension (8)	5.13	2.27	-0.533	-0.813	0.76
Global Strategies (13)	3.45	0.62	-0.439	0.985	0.84
Problem-Solving Strategies (8)	3.69	0.61	-0.290	1.618	0.73
Support Strategies (9)	3.11	0.67	-0.156	0.930	0.76
Strategies Overall (30)	3.41	0.57	-0.233	1.081	0.91

Addressing the first research question, the results show that the only metacognitive reading strategies variable considered to be high (above 3.50) was the Problem-Solving Strategies variable (M = 3.69, SD = 0.61). The Global Strategies variable (M = 3.45, SD = 0.62) and Support Strategies variable (M = 3.11, SD = 0.67) were reportedly moderately used. To examine the intrapersonal differences among the strategy types on the questionnaire, a one-way within-subjects analysis of variance was conducted on the Strategies Overall variable. The Maulchy's test statistic showed that the assumption of sphericity was violated, χ^2 (2) = 11.52, p <.01. Therefore, the Greenhouse-Geisser correction was used to adjust the degrees of freedom. The results of the ANOVA revealed a significant difference F (1.85) = 91.20, p < .001, η_p^2 = 0.40. The post-hoc Bonferroni comparisons showed that the Problem-Solving Strategies variable was significantly higher than the Global Strategies variable and the Support Strategies variable. The Global Strategies variable was significantly higher than the Support Strategies variable.

For the second research question, the mean scores for the individual strategies on the questionnaire were calculated to indicate how frequently the participants used each strategy on the questionnaire. The results presented in Appendix A show that the six strategies most frequently used were:

- Problem-Solving 7: I re-read to increase my understanding of the text.
- Problem-Solving 2: When I lose concentration, I try to look back on the text.
- Problem-Solving 8: When I encounter unrecognized words or phrases, I try to guess the meaning.

- Problem-Solving 1: I pay closer attention when the text is difficult.
- Global 10: When I come across conflicting information, I check my understanding of the text.
- Global 12: I use prior knowledge to understand the reading.

The least used strategies reported by the participants were:

- Support 3: I read aloud to help understand when the text becomes difficult.
- Support 1: I take notes to help understand the text I read.
- Global 13: I come up with a mind map to increase my understanding of the text.
- Support 2: I ask myself questions and answer them as I read
- Support 9: I check my understanding of the text by discussing it with others.
- Global 11: To identify key information I use typographical aids.

Addressing the third research question, the independent-samples t-test results for gender showed no statistically significant differences between the genders for the Reading Comprehension variable, $t(135) = -.977$, $p = .330$. For the strategy variables, the descriptive results showed that the Problem-Solving Strategies variable was high for both males ($M = 3.59$, $SD = 0.67$) and females ($M = 3.74$, $SD = 0.58$) and that only the females scored highly for the Global Strategies variable ($M = 3.50$, $SD = 0.60$). The Support Strategies variable was moderate for both males ($M = 3.01$, $SD = 0.75$) and females ($M = 3.16$, $SD = 0.63$), as was the Strategies Overall variable (Males: $M = 3.31$, $SD = 0.61$; Females: $M = 3.46$, $SD = 0.54$). Results from an independent samples t-test examining differences in strategy use according to gender shows that there were no significant differences between females and males among the variables. In general, the females scored higher than the males on each of the strategy variables on the study, but the differences were not statistically significant (see Table 5).

Table 5. Means and Standard Deviations for The MARSI Variables and Reading Comprehension by Gender and Reading Ability Level.

	Gender		Ability level		
	Males[a]	Females[b]	Low[c]	Intermediate[d]	High[e]
Reading Comprehension	4.88 (2.33)	5.27 (2.23)	1.72 (0.90)	4.96 (0.84)	7.39 (0.49)
Global Strategies	3.35 (0.66)	3.50 (0.60)	3.35 (0.68)	3.55 (0.50)	3.39 (0.70)
Problem-Solving Strategies	3.59 (0.67)	3.74 (0.58)	3.46 (0.64)	3.70 (0.59)	3.76 (0.60)
Support Strategies	3.01 (0.75)	3.16 (0.63)	3.33 (0.68)	3.14 (0.59)	2.93 (0.72)
Strategies Overall	3.31 (0.61)	3.46 (0.54)	3.37 (0.62)	3.48 (0.49)	3.35 (0.62)

Notes. [a]$n = 49$; [b]$n = 88$; [c]$n = 31$; [d]$n = 55$; [e]$n = 51$

Regarding ability level, the within-groups ANOVA results show that there were statistically significant differences among the ability levels for the Reading Comprehension variable, $F(2,$

134) = 562.445, $p < .001$. A Bonferroni post hoc test revealed that the high ability group ($M =$ 7.39, $SD = 0.49$) scored higher than the intermediate-ability ($M = 4.96$, $SD = 0.84$) and low-ability group ($M = 1.72$, $SD = 0.90$) and that the intermediate ability group scored higher than the low-ability group.

For the strategy use, the results show that the Global Strategies variable was high for only the intermediate-ability group ($M = 3.55$, $SD = 0.50$). The Problem-Solving Strategy variable was high for both the intermediate-ability group ($M = 3.70$, $SD = 0.59$) and high-ability group ($M =$ 3.76, $SD = 0.60$). The Support Strategies variable was moderate for all three groups. To examine the intrapersonal differences in strategy use according to reading ability level, a one-way within-subjects ANOVA was conducted. The results showed no significant differences in scores for the three strategy types for the low-ability group, $F(2, 29) = 1.523$, $p = 0.278$). There were significant differences among the strategy type scores for the intermediate-level group, $F(2, 60) = 53.067$, $p < .001$ and the high-level group $F(1.79, 89.62) = 66.155$, $p < .001$. Post-hoc comparisons using Bonferroni correction showed that for both intermediate and high-ability groups, the Problem-Solving Strategies variable was significantly higher than the Global Strategies variable and that both the Problem-Solving and Global Strategies variables were significantly higher than the Support Strategies variable.

The results from the one-way between-subjects ANOVA show that the Support Strategies variable was significantly lower for the high ability group than the low-ability group, $F(2, 134) = 1.582$, $p = .029$ and the effect size was small ($\eta^2_p = 0.05$). There were no other statistically significant differences across the ability groups for the variables in the study. The results are presented in Table 5.

Discussion

The findings shown in Table 4 indicate that Chinese EFL undergraduate students in Macau used metacognitive reading strategies with moderate frequency. Among the three strategy types, problem-solving strategies were used with high frequency and the global and support strategies were used moderately. This means that the undergraduate students in this study were strategic in their approach to reading English texts, and were particularly strategic when they encountered problems or difficulties while reading. This result is similar to two studies conducted in the Chinese EFL context by Zhang and Wu (2009) and Guo (2018), who reported that problem-solving strategies were highly used for Chinese senior high school and undergraduate students, respectively. Participants in those studies reported using global strategies with high frequency and supporting strategies less so, but it is unclear if there were significant differences among the strategy types used. The participants in the current study used global strategies and support strategies to a moderate degree, but did so significantly less frequently than the problem-solving strategies. This pattern of results differs from Al-Mekhlafi's (2018) and Talebi et al.'s (2020) findings for EFL learners in Oman and Iran, respectively, who reported moderate strategy use for all three strategy types. This trend of reported strategy use being similar among the studies for Chinese EFL learners provides some support for Zhang and Wu's claims that differences in strategies used in different contexts may be due to differences in instructional foci. Pedagogical focus for Chinese EFL learners appear to help students develop strategic competence in addressing problems as they emerge while reading and less on performing global analysis of a text or using aids to support their

understanding. It is encouraging to find that undergraduate students could work on and deal with reading problems independently because one of the goals of language teaching is develop autonomy in learners so that they can acquire the target language without the need for structured instruction.

Most and Least used Strategies

The second research question inquired about the most and least frequently reported individual strategies on the MARSI. The strategies most frequently used appear to be for three distinct purposes, though four are classified as problem-solving strategies and two are global strategies according to the MARSI. Two strategies aid in facilitating understanding of a text by applying what the reader already knows of a text and re-reading it. These are two very commonly taught strategies in the language learning classroom (Brown & Lee, 2015; Grabe, 2009), so it is unsurprising that these two strategies would be used frequently. Two other strategies relate to controlling attentional focus by regaining concentration if it is lost and narrowing focus to pay close attention to a text when it becomes difficult. These strategies are employed when readers monitor their comprehension and notice that their attention is insufficient to adequately comprehend a text. To resolve this issue, the readers direct their attentional resources back to the text to aid their understanding. The third purpose of these strategies relates to how readers overcome meaning-based challenges while reading. Again, readers monitor their comprehension, but they may come across unfamiliar language or realize that conflicting information may be presented in a text. To address these issues and facilitate understanding, readers may guess the meaning of unknown language from context or stop and check their understanding of the text. Four of these strategies have also been reported as the most frequently used by other studies using the MARSI/SORS in EFL contexts—re-reading, regaining concentration (Daguay-James & Bulusan, 2020; Martinez, 2008; Zhang & Wu, 2009), guessing the meaning of unfamiliar language (Martinez, 2008; Tavakoli, 2014; Zhang & Wu, 2009), and using prior knowledge to aid understanding (Al-Mekhlafi, 2018; Tavakoli, 2014; Talebi et al., 2020; Zhang & Wu, 2009). This suggests that there may be some consistency with the individual strategies that readers frequently employ across learning contexts.

Four of the six least frequently used strategies are support strategies and the other two are global strategies. Three of these strategies involve transforming how the information in a text is represented into a different medium. Of these strategies, two involve representing the ideas in written or visual form by taking notes or generating a mind-map of the ideas in a text. These are commonly used strategies for facilitating reading comprehension (Brown & Lee, 2015), so it is interesting that they were not frequently used. The third strategy involves reading the text aloud, aiming to make an audio-visual connection of the text content through dual-input channels (spoken and written). Two other low frequency strategies were related to how readers may evaluate their comprehension. One strategy is to ask oneself questions of the content provided in the text and the other is to check comprehension by discussing the content with others. This latter strategy may be more commonly used in language learning settings, as opposed to the more laboratory-like setting similar to that of this research study where readers were not supposed to discuss their understanding with others. The final strategy related to using textual cues to help identify specific information. Perhaps one reason for these strategies not being used frequently is because the reading task given to the participants just before the MARSI questionnaire did not allow for these strategies to be used. Participants were unable to

take notes, generate mind maps, or discuss the task with others, and the texts were uniform in terms of their font. Overall, these findings are consistent with other studies that have reported individual strategy use on the MARSI in that there is very little overlap among the least frequently used strategies reported across the studies. The only infrequently used strategy that was reported by more than two other studies was reading aloud (Martinez, 2008; Zhang & Wu, 2009). Altogether, this suggests that, in contrast to the most frequently used strategies, the strategies reportedly least frequently used may differ widely from context to context.

Gender

With respect to gender, the results show (Table 5) that female participants reportedly used all three types of strategies more frequently than males, however, the differences were not statistically significant. This means that there was no difference in the frequency of strategy use between male and female students. The strategies used by both genders generally followed the trend of the overall sample—problem-solving strategies were used with high frequency and global and support strategies were used moderately. Our results are similar to Tavakoli (2014), who also reported no differences in strategy use between genders for Iranian university EFL students. However, these findings contradict what has been consistently reported in the literature, that females use more reading strategies than males do in L1 (Chambers-Cantrell & Carter, 2009) and L2 contexts (Al-Mekhlafi, 2018; Bećirović et al., 2017). An explanation for this may be that differences in strategy use by gender may only differ if there are differences in reading ability as well. Phakiti (2003a) reported that males used more metacognitive strategies overall than females. However, there were no differences between genders of the same reading ability level in his study. There were no differences in reading comprehension performance between the genders in this study, $t(135) = -.977$, $p = 0.33$), suggesting that the males and females were around the same reading ability. This may explain why strategy use was similar for both genders. Had there been differences in reading ability between genders, then we may have seen differences in strategy use.

Reading Ability

For reading ability, the results show that the low-level group used all three strategy types to a moderate degree and there were no significant differences among the strategies used. This suggests that the weaker readers used strategies to overcome difficulties they experienced as frequently as they used strategies to perform global analysis of a text or practical strategies to aid their comprehension. This may have been due to those readers having insufficient linguistic resources needed to cope with understanding the text and applying any strategy that would help them to comprehend what they read. In contrast, the intermediate and high-level reading groups favored problem-solving strategies when reading and used their global and support strategies to a lesser degree. This result supports Chambers-Cantrell and Carter's (2009) claims that as readers become more skilled, they rely more on strategies to overcome obstacles they experience as they read than strategies to perform global analysis of a text or to support comprehension practically. The intermediate-level group used global strategies with high frequency, but the high-level groups used them with moderate frequency. This difference, though not statistically significant, shows that the use of global strategies did not necessarily increase as reading ability increased. An explanation for this may be that the higher-level groups did not need to use the global strategies to analyze the texts because they were able to

understand the content without them. By contrast, intermediate-level groups needed the global strategies to help them comprehend.

Across the groups, the results show that strategy use only differed for support strategies, where high-level readers used significantly *less* strategies than low-level readers. This finding supports Chambers-Cantrell and Carter (2009) claim that support strategies decrease in use as reading ability increases. This is likely due to the higher-level readers being able to understand the content without the need for practical strategies to support them and the weaker readers relying on them for help in comprehension.

The statistically equal use of the strategies overall, both problem-solving and global strategies, across the reading ability levels suggests that strategy use was not affected by reading proficiency. These results differ from those reported by Phakiti (2003b), who found that higher-level Thai university EFL readers used more metacognitive strategies than intermediate and lower-level readers. The lack of differences among the reading ability levels in the current study may then be attributed less to the number of strategies used and more to efficiency in strategy use. It would have been expected for the stronger, intermediate, and weaker readers to achieve a similar level of understanding if the number of strategies were used equally or near equally for both groups, but this was not found. Another explanation may be that the language proficiency levels differed among the three reading ability groups. Participants with higher overall language proficiency may have read better, but this may not have affected their strategy use. Language proficiency was not estimated in the current study, so this should be understood as a limitation. Despite this, the results provide support for future research to consider examining efficiency of strategy use in addition to total number of different strategies used by L2 readers.

Conclusion

This study makes several important contributions to the literature. The general finding that the frequent use of problem-solving strategies and the less frequent use of support strategies for higher ability readers highlights which type of strategy may deserve attention in the language learning classroom. Classrooms utilizing a strategy-based approach to teaching reading may focus on developing the use of problem-solving strategies in their learners, while minimizing their dependence upon practical strategies to aid in their comprehension. The current study also found no differences in the frequency of strategy use by gender, providing rebuttal evidence to claims that females use more strategies than males when reading. A final contribution the study makes is that it supports the claim that language learners from a similar learning context use strategies to a similar degree regardless of their gender or reading ability level. Moderate to high strategy use was reported for the Chinese EFL learners in this study, who had similar learning experiences to those reported in other studies. Therefore, it is possible that their use of strategies, not being attributed to gender or reading ability level, may have been due to this shared language learning experience.

The study is not without its limitations. One limitation is the lack of a separate language proficiency measure. This would have allowed for us to observe if strategy use differed by proficiency level. Future studies are encouraged to also include this variable when examining strategy use. Another limitation is the narrow context of the study. The participants were all

Chinese university EFL students in Macau who had shared learning experiences. This was certainly a benefit in that the homogeneity of the sample allowed for us to identify specific sources of variance contributing to strategy use, but it limited the degree to which the results can be generalized to the broader learner population. Future studies are encouraged to collect data from more varied learner populations. The use of cross-sectional quantitative design to examine the phenomena is also a limitation. Future studies may consider incorporating a qualitative aspect to their research to gather individual variation data. Finally, the texts used in the study were primarily expository. To provide a more comprehensive picture of reading strategy use, future studies may also consider incorporating different text types (e.g., argumentative or compare-contrast) and elicit what types of strategies are used. Despite these limitations, this study provides useful empirical evidence for the use of metacognitive reading strategies for L2 reading comprehension.

About the Authors

Matthew P. Wallace is an Assistant Professor in the Department of English at the University of Macau. His current research interests include second language comprehension, language assessment fairness, and learner motivation.

Vina Meilin Li is a research assistant at the University of Macau. Her current research interests involve second language acquisition, language learning strategies, and learner motivation.

Tracy Cuishi Huang is a research assistant at the University of Macau. Her current research interests include foreign language learning and second language acquisition.

Nicole Cuiyu He is a research assistant at the University of Macau. Her current research interests involve language learning strategies, and second language acquisition.

To cite this article:

References

Al-Mekhlafi, A. M. (2018). EFL learners' metacognitive awareness of reading strategies. *International Journal of Instruction*, *11*(2), 297-308. http://doi.org/10.12973/iji.2018.11220a

Baker, L. & Brown, A. L. (1984). Metacognitive Skills and Reading. In P. D. Pearson, R. Barr, M. L. Kamil, & P. Mosenthal (Eds.). *Handbook of reading research* (pp. 353 – 394). Longman.

Bećirović, S., Brdarević-Čeljo, A., & Sinanović, J. (2017). The use of metacognitive reading strategies among students at International Burch University: A case study. *European Journal of Contemporary Education, 6*, 645-655. http://doi.org/10.13187/ejced.2017.4.645

Brown, A. L. (1980) Metacognitive development and reading. In R. J. Spiro, B. Bruce, & W. Brewer (Eds.), *Theoretical issues in reading comprehension* (pp. 453-482). Lawrence Erlbaum Associates.

Brown, H.D., & Lee, H. (2015). *Teaching by principles: An interactive approach to language pedagogy*. Pearson.

Chambers Cantrell, S. & and Carter, J. (2009). Relationships among learner characteristics and adolescents' perceptions about reading strategy use. *Reading Psychology 30*, 195-224. http://doi.org/10.1080/02702710802275397

Cobb, T. (2002). Web Vocabprofile. An adaptation of Heatley, Nation & Coxhead's (2002) Range. UQAB Canada. http://www.lextutor.ca/vp

Daguay-James, H., & Bulusan, F. (2020). Metacognitive strategies on reading English texts of ESL freshman: A sequential explanatory mixed design. *TESOL International Journal 2, 15*(1), 20-30.

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

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist, 34*(10), 906-911. http://doi.org/10.1037/0003-066X.34.10.906

Grabe, W. (2009). *Reading in a second language: Moving from theory to practice*. Cambridge University Press.

Guo, L. (2018). Modeling the relationship of metacognitive knowledge, L1 reading ability, L2 language proficiency and L2 reading. *Reading in a Foreign Language, 30*(2), 209-231.

Martinez, A.C.L. (2008). Analysis of ESP university students' reading strategy awareness. *Iberica*, *15*, 165-176.

Mokhtari, K., & Reichard, C. A. (2002). Assessing students' metacognitive awareness of reading strategies. *Journal of Educational Psychology, 94*(2), 249-259. http://doi.org/10.1037/0022-0663.94.2.249

Mokhtari, K., Dimitrov, D. M., & Reichard, C. A. (2018). Revising the Metacognitive Awareness of Reading Strategies Inventory (MARSI) and testing for factorial invariance. *Studies in Second Language Learning and Teaching*, *8*(2), 219-246. http://doi.org/10.14746/ssllt.2018.8.2.3

Phakiti, A. (2003a). A closer look at gender and strategy use in L2 reading. *Language Learning*, *53*, 649-702. http://doi.org/10.1046/j.1467-9922.2003.00239.x

Phakiti, A. (2003b). A closer look at the relationship of cognitive and metacognitive strategy use to EFL reading achievement test performance. *Language Testing 20*, 26-56. http://doi.org/10.1191/0265532203lt243oa

Purpura, J. (1998). Investigating the effects of strategy use and second language test performance with high- and low-ability test takers: A structural equation modeling approach. *Language Testing*, *15*, 333-379. http://doi.org/10.1177/026553229801500303

Sheorey, R., & Mokhtari, K. (2001). Differences in the metacognitive awareness of reading strategies among native and non-native readers. *System 29*, 431-449. http://doi.org/10.1016/S0346-251X(01)00039-2

Snow, C. E. (2002). Defining comprehension. In C. E. Snow (Ed.). *Reading for understanding: Toward an R & D program in reading comprehension* (pp. 11-17). Rand Corporation.

Talebi, S. H., Maghsoudi, M., & Khodamoraki, A. (2020). Perceived reading strategy awareness and use (RSAU) and reading ability across foreign language disciplines at the university level. *Journal of College Reading and Learning*, *50*(3), 173-192. http://doi.org/10.1080/10790195.2020.1786480

Tavakoli, H. (2014). The effectiveness of metacognitive strategy awareness in reading comprehension: The case of Iranian university EFL students. *The Reading Matrix*, 14, 314-336.

Wagner, E. (2004). A construct validation study of the extended listening sections of the ECPE 707 and MELAB. *Spaan Fellow Working Papers in Second or Foreign Language* 708 *Assessment, 2*, 1-26.

William, J. P., & Atkins, J. G. (2009). The role of metacognition in teaching reading comprehension to primary students. In D. J. Hacker, J. Dunlosky, & A. C. Graesser (Eds.), *Handbook of metacognition in education* (pp. 26-43). Routledge.

Zhang, L. J., & Wu, A. (2009). Chinese senior high school EFL students' metacognitive awareness and reading-strategy use. *Reading in a Foreign Language 21*, 37-59. http://hdl.handle.net/10125/66635

Appendices

Appendix A. Item level mean scores for strategies on the MARSI overall, by gender, and by reading ability

Strategy Types	Overall	Males	Females	Low	Mod	High
Global strategies						
1. Firstly, I skim the text and pay attention to the length and organization of the text.	3.23	3.08	3.31	3.35	3.27	3.10
2. Before reading the text, I preview what it's about.	3.25	3.14	3.15	3.03	3.47	2.86
3. I consider the content of the text while reading.	**3.64**	**3.57**	**3.68**	3.26	**3.69**	**3.82**
4. I read with a purpose.	3.47	**3.57**	3.41	3.19	**3.64**	3.45
5. When I read the text, I try to guess what the material is about.	**3.73**	**3.65**	**3.77**	3.42	**3.93**	**3.71**
6. I decide the content which should be read closely, and which should be ignored.	3.47	**3.63**	3.39	3.26	**3.55**	**3.53**
7. I analyse and evaluate the presented information in the text.	3.47	3.22	**3.61**	3.13	**3.58**	**3.57**
8. Using context clues help me understand what I'm reading better.	**3.77**	**3.55**	**3.90**	3.19	**4.02**	**3.86**
9. I check to see whether my guesses about the text are right or not.	**3.53**	3.41	**3.60**	**3.52**	**3.60**	3.47
10. When I come across conflicting information, I check my understanding of the text.	**3.85**	**3.84**	**3.86**	**3.68**	**3.87**	**3.94**
11. To identify key information, I use typographical aids.	3.08	2.86	3.20	**3.61**	3.07	2.76
12. I use prior knowledge to understand the reading.	**3.85**	**3.51**	**4.03**	**3.55**	**3.84**	**4.04**
13. I come up with a mind map to increase my understanding of the text.	2.54	2.49	2.57	3.39	2.56	2.00
Problem-solving strategies						
1. I pay closer attention when the text is difficult.	**3.85**	**3.63**	**3.98**	3.16	**3.89**	**4.24**
2. When I lose concentration, I try to look back on the text.	**3.92**	**3.69**	**4.05**	**3.52**	**4.07**	**4.00**

3. I stop from time to time to think about the reading content.	3.28	3.29	3.28	**3.68**	3.27	3.06
4. To ensure I understand what I'm reading, I read slowly and carefully.	**3.56**	3.33	**3.69**	3.32	**3.69**	**3.57**
5. I adjust my reading speed according to the reading text.	**3.83**	**4.00**	**3.74**	**3.68**	**3.80**	**3.96**
6. I try to visualize information to help remember the reading content.	3.16	3.16	3.16	3.39	3.18	3.00
7. I re-read to increase my understanding when the text is difficult.	**4.03**	**3.86**	**4.13**	3.35	**4.18**	**4.27**
8. When I encounter unrecognized words or phrases, I try to guess the meaning.	**3.87**	**3.80**	**3.91**	**3.58**	**3.91**	**4.00**
Support strategies						
1. I take notes to help understand the text I read.	2.45	2.31	2.53	2.81	2.56	2.12
2. I ask myself questions and answer them as I read.	2.80	2.94	2.72	3.35	2.82	2.43
3. I read aloud to help understand when the text becomes difficult.	2.36	2.31	2.39	2.55	2.35	2.25
4. Using reference materials such as a dictionary helps me understand what I read.	3.40	3.24	3.49	**3.81**	3.44	3.12
5. I find relationships among ideas by reading back and forth in the text.	**3.66**	**3.51**	**3.75**	3.42	**3.73**	**3.75**
6. I reflect on important information by summarizing what I read.	3.49	3.37	**3.56**	3.45	**3.58**	3.41
7. Selecting or highlighting information helps me remember the text.	3.47	3.41	**3.51**	**3.55**	3.42	3.49
8. I understand better by paraphrasing (restating ideas in my own word).	3.35	3.18	3.44	**3.58**	3.36	3.20
9. I check my understanding of the text by discussing it with others.	2.98	2.84	3.06	3.45	3.04	2.63

Bolded items are above 3.50 indicating high frequency of use.

Appendix B: Metacognitive Awareness of Reading Strategies Inventory (MARSI)

The instrument is revised from MARSI (Mokhtari & Reichard, 2002), and including Chinese translation.

After reading each statement listed below, choose the number (1-5) that applies to you using the scale provided. Please note that there are no right or wrong answers to the statements in this inventory. 閱讀每一句陳述，選出相對應的數字（1-5）。請注意此問卷沒有標準答案。

Five numbers (1-5) follow each statement, and each number means the following: 五點量值（1-5）分別代表：

1 – I never or almost never do this 從未如此
2 – I do this only occasionally 偶爾如此
3 – I sometimes do this 有時如此
4 – I usually do this 經常如此
5 – I always or almost always do this 總是如此

*GLOB: Firstly, I skim the text and pay attention to the length and organization of the text. 首先，我通過注意文章的長度和結構來瀏覽文章。	1	2	3	4	5
GLOB: Before reading the text, I preview what it's about. 我在仔細閱讀文章前會預覽文章的大致內容。	1	2	3	4	5
GLOB: I consider the content of the text while reading. 我會觀察和判斷文章的內容。	1	2	3	4	5
PROB: I pay closer attention when the text is difficult. 當文章比較困難時，我會更加集中注意力。	1	2	3	4	5
SUP: I take notes to help understand the text I read. 當我閱讀的時候我會做筆記來幫助我理解文本。	1	2	3	4	5
GLOB: I read with a purpose. 我有目的地閱讀。	1	2	3	4	5
GLOB: When I read the text, I try to guess what the material is about. 當我閱讀時，我嘗試去猜測內容是關於什麼的。	1	2	3	4	5
GLOB: I decide the content which should be read closely, and which should be ignored. 我決定哪些內容應該仔細閱讀，哪些內容應該被忽略。	1	2	3	4	5
GLOB: I analyse and evaluate the presented information in the text. 我分析和評估文章所呈現的信息。	1	2	3	4	5
SUP: I ask myself questions and answer them as I read. 我對自己提問並在閱讀過程中進行回答。	1	2	3	4	5
GLOB: Using context clues help me understand what I'm reading better. 我利用上下文綫索去幫助我更好地理解所閱讀的內容。	1	2	3	4	5
PROB: When I lose concentration, I try to look back on the text. 當我缺乏集中力時會嘗試返回文章查看。	1	2	3	4	5

GLOB: I check to see whether my guesses about the text are right or not. 我會檢查自己對文章的猜測是否正確。	1 2 3 4 5
PROB: I stop from time to time to think about the reading content. 我不時會停下思考我在閱讀的內容。	1 2 3 4 5
PROB: To ensure I understand what I'm reading, I read slowly and carefully. 我慢慢和仔細閱讀以確保我理解閱讀的內容。	1 2 3 4 5
GLOB: When I come across conflicting information, I check my understanding of the text. 當我遇到相互矛盾的信息時，我會檢視自己的理解。	1 2 3 4 5
PROB: I adjust my reading speed according to the reading text. 我會視乎閱讀內容調整閱讀速度。	1 2 3 4 5
SUP: I read aloud to help understand when the text becomes difficult. 當文本變得困難，我會大聲朗讀來幫助我理解文本。	1 2 3 4 5
GLOB: To identify key information, I use supporting aids. 我使用輔助工具來識別關鍵信息。	1 2 3 4 5
SUP: Using reference materials such as a dictionary helps me understand what I read. 我使用參考資料，如字典來幫助我理解我閱讀的內容。	1 2 3 4 5
SUP: I find relationships among ideas back and forth in the text. 我聯繫上下文尋找觀點之間的關係。	1 2 3 4 5
PROB: I try to visualize information to help remember the reading content. 我嘗試將閱讀內容視像化以助記憶。	1 2 3 4 5
PROB: I re-read to increase my understanding when the text is difficult. 當文章比較困難時，我會重複閱讀以助理解。	1 2 3 4 5
PROB: When I encounter unrecognized words or phrases, I try to guess the meaning. 當遇到不認識的單字和詞組，我嘗試猜想其意思。	1 2 3 4 5
SUP: I reflect on important information by summarizing what I read. 我通過總結閱讀的內容來反思文中重要信息。	1 2 3 4 5
SUP: Selecting or highlighting information helps me remember the text. 我在文中選取信息來幫助我記憶。	1 2 3 4 5
GLOB: I use prior knowledge to understand the reading. 我會運用已學的知識幫助我理解閱讀。	1 2 3 4 5
SUP: I understand better by paraphrasing (restating ideas in my own word). 我改述（用自己的話重申觀點）以更好的理解閱讀的內容。	1 2 3 4 5
GLOB: I come up with mind map to increase my understanding of the text. 我運用思維導圖來增強我對文章的理解。	1 2 3 4 5
SUP: I check my understanding of the text by discussing it with others. 我和別人討論我讀到的內容來檢驗我對文本的理解。	1 2 3 4 5

*Abbreviations of the measured items are not included in the questionnaire.