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Chinese senior high school EFL students' metacognitive awareness and reading-strategy use

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Abstract

This paper reports findings from a study that assesses metacognitive awareness and reading-strategy use of Chinese senior high school students who are learning English as a foreign language (EFL). A total of 270 students responded to a 28-item survey of reading strategies (SORS). The strategies were classified into 3 categories: global, problem-solving, and support. The results showed that the students reported using the 3 categories of strategies at a high-frequency level. Both the main effect for strategies and the main effect for learners' proficiency were significant. The high-proficiency group outperformed the intermediate group and the low-proficiency group in 2 categories of reading strategies: global and problem-solving; but no statistically significant difference was found among the 3 proficiency groups in using support strategies. Pedagogical implications of these findings are discussed in relation to the changing Chinese society.

Keywords: metacognitive awareness, EFL reading, reading strategies, Chinese EFL learners of English

The importance of reading for second language (L2) acquisition has been widely acknowledged (Day & Bamford, 1998, 2002; Grabe, 2004), and the use of reading strategies is regarded as being conducive to successful reading comprehension despite the complex nature of the reading process, which invokes both the L2 reader's language ability and reading ability (Alderson, 1984; see also Bernhardt, 2005; Hudson, 2007). In reviewing over 3 decades of L2 reading research, Bernhardt (2005) maintained that necessary components of a contemporary L2 reading model should consider readers' first language (L1) literacy levels, L2 knowledge levels and the interactions of vocabulary levels, processing strategies, background knowledge, relationships between and among various cognate and non-cognate L1s and L2s, and the need to examine emerging L1 and L2 readers in addition to adult L2 readers. She argued for a compensatory processing model for L2 reading, which recognizes knowledge sources acting in an interactive and synergistic fashion in contributing to reading comprehension success. Koda's (2007)

synthesis of recent advances in L2 reading research emphasized similar importance, recognizing crosslinguistic constraints on L2 reading development. Taken together, L2 reading research indicates that reading is an interactive meaning-making process (Alderson, 1984, 2005; Anderson, 1999; Carrell, 1988; Hudson, 1998; Zhang, Gu, & Hu, 2008) in which readers capitalize on various available sources and utilize a multitude of strategies to achieve the goal of comprehension. Therefore, L2 researchers have made attempts at identifying a variety of reading strategies (e.g., Anderson, 1991; Block, 1986; Hudson, 2007).

It needs to be pointed out, however, that most of the comprehension activities of efficient readers take place at the metacognitive level, as shown by recent research on the reading strategies used by successful and less successful readers (e.g., Carrell, Gajdusek, & Wise, 1998; Hudson, 2007). Researchers have begun to recognize the significant role of metacognitive awareness in reading comprehension. Metacognitive awareness, or metacognition, was first defined by Flavell (1979) as one's ability to understand, control, and manipulate his own cognitive process to maximize learning. Applied to reading, such awareness entails readers' "knowledge of strategies for processing texts, the ability to monitor comprehension, and the ability to adjust strategies as needed" (Auerbach & Paxton, 1997, pp. 240–41). This concept has offered great insights as to how learners manage their cognitive activities to achieve comprehension before, during, and after reading (Wenden, 1998).

Studies on learners' metacognitive aspects of reading-strategy use have discovered that successful readers generally display a higher degree of metacognitive awareness, which enables them to use reading strategies more effectively and efficiently than their unsuccessful peers (Carrell, 1989; Carrell et al., 1998; Hudson, 1998; Sheorey & Mokhtari, 2001; Zhang, 2001; Zhang et al., 2008). Grounded in this understanding, extensive research has been conducted to examine the effects of reading-strategy instruction on reading improvement (Carrell, 1998; Macaro & Erler, 2008; Zhang, 2008). The results confirmed that reading strategies can be taught and that once students' metacognitive knowledge about reading strategies and strategy use is developed, they will become better readers (Carrell, Pharis, & Liberto, 1989; Farrell, 2001; Zhang, 2008). Although readers' metacognitive awareness in reading has been recognized in the available literature to be critical to successful L2 reading, very few studies in this area have been conducted in the People's Republic of China, particularly with high school students. At present, English reading instruction in high schools in China is undergoing reforms. Teachers of English as a foreign language (EFL) are encouraged to implement strategy instruction in order to "help students cultivate reading strategies and form good reading habits" (Ministry of Education of China, 2003, p. 5). However, due to various reasons, instruction of reading strategies at high school level is still characterized by the traditional *comprehension-testing model* (Anderson, 1999). As this study has witnessed, a typical English reading lesson in high schools usually goes through pre-, while-, and post-reading procedures, in which students are required to do various kinds of comprehension-testing exercises that implicitly require a limited number of EFL reading strategies. It is assumed that students will naturally acquire the target strategies through implicit learning. However, problems arise. Students complain that they do not see improvement in their reading ability. Neither do they know what strategies to use. Teachers complain that students just cannot use their learned strategies to cope with new reading tasks.

Just as Cohen (1998) and Macaro (2001) put it, only when teachers know what strategies

students are using and how they are using them in different contexts can they better understand the sources of students' problems with reading strategies and be able to decide on students' learning needs and adjust teaching procedures accordingly. Therefore, knowledge about what goes on in students' minds during reading is a prerequisite for teachers' decision-making in strategy-based instruction. For this reason the present study examines the metacognitive awareness of a group of Chinese senior high school EFL students and their perceived use of EFL reading strategies. The findings from this study are expected to generate some practical implications for EFL reading-strategy instruction in high schools in China or in other similar contexts where EFL reading instruction is conducted with students from China.

Reading Strategies

Over the last 2 decades, most research on L1, L2, and foreign language (FL) reading has focused on the strategies that readers deploy in processing written input. According to Cohen (1990), reading strategies are "those mental processes that readers consciously choose to use in accomplishing reading tasks" (p. 83). Garner (1987) saw it as an action, or a series of actions that a reader employs in order to construct meaning in the reading process (see also Hudson, 2007). Hence, using reading strategies indicates how readers conceive a task, what they do to make meaning from texts, and what they do when comprehension breaks down (Block, 1986, 1992; Macaro, 2001; Macaro & Erler, 2008; Zhang, 2001).

So far, L1 and L2 reading researchers have profiled a wide array of reading strategies used by readers. These range from the more traditionally well-known ones like skimming, scanning, and inferring to the more recently recognized ones such as activating schemata, recognizing text structure, using mental imagery, visualizing, generating questions, monitoring comprehension, evaluating strategy use, etc. (Anderson, 1991; Carrell, 1989; Block, 1986; Cohen, 1990; Pressley, 2002; Zhang et al., 2008).

However, researchers such as Cohen (2003, 2007), Grabe (2004), Hadwin, Winne, Stockley, Nesbit, and Woszczyna (2001), Paris (2002), and Zhang (2003) pointed out that strategies themselves are not inherently good or bad, but they have the potential to be used effectively or ineffectively in different contexts. Readers' use of reading strategies is informed by their metacognitive awareness of the strategies and how these strategies can be maximized for optimal effects in solving comprehension problems (Carrell, 1998; Carrell et al., 1998; Cohen, 2007; Hudson, 2007; Wenden, 1998; White, 1999; Zhang, 2008).

Metacognitive Awareness

The term "metacognitive awareness" or "metacognition" is often defined simply as "cognition about cognition" (Flavell, 1979, 1987) in cognitive psychology and in learning theories in the instructional sciences. It is used to refer to one's understanding of and control over his or her own cognitive processes (Carrell, 1998; Carrell et al., 1998; Flavell, Miller, & Miller, 1993; Hartman, 2001; for recent reviews see Hudson, 2007; Veenman, Van Hout-Wolters, & Afflerbach, 2006).

According to Flavell (1979), metacognitive awareness consists of both metacognitive knowledge and metacognitive regulation. Metacognitive knowledge is one's knowledge of the cognitive process in relation to three variables that affect the outcomes of the cognitive enterprises, namely, person variable (beliefs about oneself or others as a cognitive processor), task variable (understanding of the nature and demand of tasks), and strategy variable (perceptions about strategies and strategy use that facilitate learning). To put it simply, people's metacognitive knowledge is reflected in their belief that they, unlike other people, should use Strategy A rather than Strategy B in Task X rather than Task Y to achieve a learning goal (Hadwin et al., 2001; Paris & Winograd, 1990).

While metacognitive knowledge is very consciousness-focused, metacognitive regulation is executive in nature, working on the basis of the metacognitive knowledge and referring to people's management of their cognitive processes to ensure realization of learning goals. This management involves planning, monitoring, evaluating, and manipulating the cognitive processes to obtain optimal learning outcomes (Flavell, 1979, 1987; Paris, 2002; Veeman et al., 2006).

Applied to reading, metacognitive awareness includes readers' conscious awareness of strategic reading processes, of the reading-strategy repertoires, and of their actual utilization of the strategies to maximize text comprehension (Carrell et al., 1998; Forrest-Pressley & Waller, 1984; Sheorey & Mokhtari, 2001; Zhang, 2001). Therefore, readers with stronger metacognitive awareness display hints to interpret a reading task based on context requirements. They select reading strategies in relation to reading purposes, task demands, and their own cognitive style. They monitor the process of comprehension, evaluate the effects of the selected strategies, and adjust strategies when needed (Cohen, 1998; Hudson, 2007; Paris, Lipson, & Wixson, 1994; Pressley & Afflerbach, 1995; Zhang, 2008).

Metacognitive Awareness and Reading Comprehension

Over the last decade, numerous studies have been conducted to investigate the use of reading strategies in L1 contexts, either using think-aloud protocols or questionnaires and comprehension tests. After examining 38 published studies that used think-aloud protocols to explore native speakers' strategy use, Pressley and Afflerbach (1995) discovered that efficient readers are constructively responsive readers, who are able to use strategies more effectively and flexibly than inefficient readers. The finding establishes a direct relationship between metacognitive awareness and reading proficiency. Research has also shown that while generalized knowledge about reading processes and strategies may be necessary, it is not sufficient for proficient reading comprehension. Forrest-Pressley and Waller (1984) found that skilled readers not only know that there are different ways of reading but also know how to monitor the efficiency and to regulate the use of different techniques (see also Paris, 2002; Paris et al., 1994; Paris & Winograd, 1990). Hadwin et al. (2001) explained that students use different strategies in different contexts and that context-free measures do not accurately reflect strategy use for any of those contexts. Given that the present study was conducted independently of any specific task, it is necessary to provide this background information so that the limitation of the study is made explicit at the very beginning.

Besides, this information is also important for interpreting the results.

Research in L2 and FL contexts has focused much on the differences in reading-strategy use among learners of different language proficiency levels. Anderson (1991), for example, concluded from his study that both advanced and low L2 readers may use the same kind of strategies, but the more proficient readers tend to use a higher number of different strategies and are able to orchestrate their use more effectively. Studies conducted in other Chinese EFL contexts have brought about similar findings (e.g., Yang, 2002; Zhang, 2001, 2002; Zhang et al., 2008), further confirming the role of metacognitive awareness in successful L2 reading.

Differences in metacognitive awareness of reading strategies among native and nonnative readers have also been investigated in a number of studies. The major findings are (a) nonnative readers bring with them their L1 knowledge of the reading process and strategies and apply them to L2 or FL reading contexts (Block, 1986), (b) L1 and L2 readers use similar kinds of reading strategies, (c) proficient L1 and L2 readers display comparably higher degrees of metacognitive awareness than non-proficient readers (Anderson, 1999; Block, 1986, 1992; Grabe & Stoller, 2002; Hudson, 1998; Macaro & Erler, 2008; Sheorey & Mokhtari, 2001).

Researchers who conducted these studies maintained that metacognitive awareness is crucial to proficient reading. In addition, insights from such studies have been useful for reading teachers in helping struggling readers to become strategic readers. Auerbach and Paxton (1997), for example, conducted an intervention study that was specifically designed to apply findings of such studies to classroom practices; and they reported great success in helping problematic readers to become high-ability readers. Similar findings were reported by Zhang (2008), who conducted strategy-based reading instruction at a tertiary institution in Singapore with young adults from China who were required to take the English-for-academic-purposes (EAP) courses. Working within Flavell's (1979) framework of metacognition and Vygotskyan (1986) thinking of constructivism, Zhang integrated clusters of reading strategies in the reading curriculum and conducted the reading instruction systematically for 2 months.

Generally, the studies on the metacognitive aspects of reading have indicated a need to increase understanding of readers' metacognitive awareness of reading strategies to gain insights into effective strategy instruction. However, most of the studies so far either have been conducted in contexts other than China or have dealt with students at primary or tertiary levels; thus, the contexts in which these studies were conducted are quite different from the high school context in which the data of the present study were collected. Chamot (2005), Cohen (1998), and Zhang (2008) pointed out that the contexts of the learning situation may have a strong influence on learners' choice of language learning strategies. Therefore, the present study attempts to fill the gap by assessing the metacognitive awareness of Chinese senior high school students and their perceived use of reading strategies, through a questionnaire survey, while they are engaged in reading school-related English materials (e.g., textbooks, passages for exams, and supplementary readings in newspapers and magazines).

The aim is to find out what reading strategies Chinese senior high school students deploy to approach EFL reading and whether there are differences in strategy choice among high-, intermediate-, and low-proficiency students. Three specific questions are addressed in this study:

1. How often do the students use the designated strategies?

2. What kind of strategies are they using most?

3. Is there any difference among high-, intermediate-, and low-proficiency students in their proneness of strategy choice and frequency of strategy use?

Method

Participants

Participants in this study were randomly selected from a population of about 2,000 second-year students at a senior high school in Hainan province of China. A total of 270 students were invited to respond to the questionnaire, but only 249 responses were valid. The 249 participants were divided into three proficiency groups (high, intermediate, and low) according to their average scores of three English exams administered among the whole population pool. These exams were standardized mid-term and final English tests designed by English teachers of the school to assess students' overall English proficiency. These exams reliably measured students' reading proficiency by virtue of their strong emphasis on reading comprehension and vocabulary, as has been the practice in FL instruction in senior high schools in China. The scores of the high-proficiency group ranged from 73 to 91, those of the intermediate from 63 to 71, and those of the low-proficiency group from 31 to 62.

Materials

The data for this study were collected through a questionnaire (see Appendix A) adapted from the survey of reading strategies (SORS) by Mokhtari and Sheorey (2002) that was developed to measure the metacognitive awareness and perceived use of reading strategies of adolescent and adult learners of English as a second language (ESL) "while reading school related materials in English" (p. 2). It comprises 30 items measuring three broad categories of reading strategies: global reading strategies (henceforth "GLOB"), problem-solving strategies (henceforth "PROB"), and support strategies (henceforth "SUP"). A 5-point Likert scale following each item indicates the frequency of strategy use ranging from 1 (*never do*) to 5 (*always do*).

Taking into consideration of the participants' EFL proficiency level as well as feedback from the pilot study, this study made several adaptations to SORS to increase feasibility of the present study. Firstly, it was decided that the questionnaire be administered in Chinese, the native language, which the participants were most proficient in and comfortable with. This was to guarantee successful data collection and avoid comprehension difficulties that participants might encounter when given the English version, as some students reported having difficulty in understanding the contents of some of the terms in English. A university faculty member of the Nanyang Technological University, who had a PhD in applied linguistics and was highly proficient in both English and Chinese, was invited to review the translated Chinese version for clarity, readability, and appropriacy. Secondly, for more complete data analysis, a background

information section was added to elicit information about participants' name, gender, age, and the class and school they were attending. After the first Chinese version was pilot-tested, revisions on individual questionnaire items were made as delineated below.

Firstly, Item 14 was deleted because it was considered ambiguous and repetitive of item 25. Secondly, Items 4 and 8 were incorporated into one in response to respondents' comment that these two strategies were always used at the same time. Thirdly, Items 2, 3, and 21 were rephrased and further elaborated on so that the statements became more comprehensible for the students.

Finally, in light of the observation as well as students' suggestions, the sequence of items in the original SORS were rearranged, with strategies under the same category put together, so that it would be easier for students to understand and differentiate some of the relevant and similar strategies. The finalized questionnaire consisted of 28 items, with 12 items falling into the GLOB category, 7 into PROB category, and 9 into SUP category (see Table 1).

The internal consistency of the revised SORS for the study was proven to be acceptable. The internal reliability coefficients (Cronbach's alpha) for the three strategy categories were as follows: GLOB (α = .780), PROB (α = .790), and SUP (α = .720). The overall reliability coefficient (α = .85) ensured the general reliability of the study (see Glass & Hopkins, 1996).

Table 1. *Categorization and description of EFL reading strategies*

Category	Description	Example	Item
Global reading strategies (GLOB)	The intentional, carefully planned techniques by which learners monitor or manage their reading	Having the purpose in mind; previewing the text	1–12
Problem-solving strategies (PROB)	The localized, focused techniques used when problems develop in understanding textual information	Adjusting reading speed; rereading the text	13–19
Support strategies (SUP)	The basic support mechanisms intended to aid the reader in comprehending the text	Using dictionaries; taking notes	20–28

Note. Adapted from Mokhtari and Sheorey (2002, p. 4).

Procedure

Seliger and Shohamy (1989) suggested that a pilot study "will significantly improve the quality of the data obtained" (p. 173). Therefore, it was decided that the first Chinese version of the questionnaire be pilot-tested with a group of 10 students from the same population pool but in a different class. The purpose was to check clarity and comprehensibility of the items. In addition, the amount of time needed to answer the questions was calculated. Some modifications to the questionnaire were made in response to problems arising from the pilot test. Later, the revised questionnaire was re-piloted on the same students to further minimize the possibility of misinterpreting the questions.

Eventually, the finalized questionnaire was administered to 270 students in five classes, assisted by the class English teachers. The administration was conducted in the evening self-study period,

and the researcher was present to deal with questions that students may pose. Students were informed of the purposes and requirements of the survey, and they were asked to provide honest responses. Most students were able to finish the questionnaire within 10 minutes. Later, all the completed questionnaires were examined; and after discarding 21 unnamed or incomplete ones, only 249 valid questionnaires were used for statistical analysis.

Data Analysis

Methodologically, the present study is quantitative in nature. It helps measure the extent of students' awareness of reading strategies through an examination of the frequencies and variances of strategy use. Therefore, the collected data were analyzed quantitatively to obtain descriptive and inferential statistics. The data were subjected to a two-factor ANOVA with repeated measures to compare the differences among the three proficiency groups.

The patterns of strategy choice in relation to individual strategies, types of strategy, and overall strategy use were analyzed by examining the means and the standard deviations within the whole participant group. Similar procedures were adopted to ascertain the variance of strategy use among the three proficiency groups. Then ANOVA was used to check whether these differences were statistically significant. In examining students' strategy use in terms of the Likert scale that ranges from 1 to 5, this study employed three levels of usages, as suggested by Oxford and Burry-Stock (1995) for strategy use in language learning, that is, *high* (mean of 3.5 or higher), *moderate* (mean of 2.5 to 3.4), and *low* (mean of 2.4 or lower).

Results and Discussion

Overall Pattern of Reading-Strategy Use by Chinese High School Students

With regard to the first two research questions (i.e., "How often do the students use the designated strategies?" and "What kind of strategies are they using most?"), Table 2 presents descriptive statistics for students' perceived use of individual strategies and the overall mean frequency of each of the three categories of strategies in EFL reading. The results showed that students on the whole reported using the available reading strategies at a high-frequency level (M = 3.5, SD = 0.61). Among the 28 strategies, 15 strategies (54%) fell into the high-usage level ($M \geq 3.5$), and 13 strategies (46%) went to the medium level ($M \geq 2.5$). No strategy was reported at the low-usage level ($M \leq 2.4$). As far as the three categories of strategies are concerned, students showed a moderate to high usage, with problem-solving strategies (M = 3.78, SD = 0.59) as their prime choice, followed by global strategies (M = 3.63, SD = 0.59) and support strategies (M = 3.06, SD = 0.64). The top five strategies that were most favored by the students were under the PROB and GLOB categories, while the bottom five mainly went to the SUP category.

Within the category of problem-solving strategies, 6 of the total 7 strategies (82%) were reported of frequent usage, indicating that students were generally conscious of their comprehension process and were able to take actions when comprehension breaks down. For example, when losing concentration, they "tried to get back on track" (Item 19, M = 4.10, SD = 0.87). When a text became difficult, they "re-read to increase understanding" (Item 17, M = 4.07, SD = 1.03) or

"adjusted reading speed" (Item 14, *M* = 3.90, *SD* = 0.95).

Table 2. *Chinese high school EFL student' perceived use of reading strategies* (*N* = 249)

	Item	*M* (*SE*)	*SD*
Global strategies			
	1	3.59 (.071)	1.12
	2	2.78 (.077)	1.21
	3	3.51 (.076)	1.19
	4	3.26 (.075)	1.18
	5	4.08 (.061)	.96
	6	3.83 (.077)	1.21
	7	4.12 (.058)	.92
	8	3.86 (.072)	1.14
	9	3.43 (.072)	1.13
	10	4.23 (.054)	.85
	11	3.83 (.065)	1.03
	12	3.07 (.067)	1.06
	Overall	3.63 (.037)	.59
Problem-solving strategies			
	13	3.28 (.069)	1.08
	14	3.90 (.060)	.95
	15	3.55 (.062)	.98
	16	3.53 (.069)	1.09
	17	4.07 (.065)	1.03
	18	4.00 (.062)	.98
	19	4.10 (.056)	.89
	Overall	3.78 (.037)	.59
Support strategies			
	20	3.08 (.072)	1.14
	21	3.48 (.077)	1.22
	22	2.99 (.082)	1.29
	23	3.35 (.075)	1.18
	24	2.70 (.075)	1.19
	25	3.53 (.064)	1.01
	26	2.49 (.065)	1.03
	27	2.57 (.080)	1.27
	28	3.35 (.067)	1.06
	Overall	3.06 (.408)	.64

While displaying ability to detect comprehension difficulty and adjust strategies accordingly, students also demonstrated capacity of planning for reading. This is seen from their frequent use of some global strategies like "setting goals for reading" (Item 1, *M* = 3.59, *SD* = 1.12), "previewing" (Item 3, *M* = 3.51, *SD* = 1.19), "using prior knowledge" (Item 5 *M* = 4.08, *SD* = 0.96), and "predicting text content" (Item 10, *M* = 4.23, *SD* = 0.85). They also showed involvement in comprehension monitoring through use of "confirming prediction" (Item 11, *M* = 3.83, *SD* = 1.03) and "checking understanding" (Item 9, *M* = 3.43, *SD* = 1.13). In addition, their frequent use of "deciding what to read or ignore" (Item 4, *M* = 3.26, *SD* = 1.18) and "using context clues" (Item 7, *M* = 4.12, *SD* = 0.92) showcased their ability of on-line decision-making

to facilitate understanding and to improve their reading speed.

Support strategies like "underlining" (Item 21, *M* = 3.48, *SD* = 1.22) and "going back and forth in text" (Item 25, *M* = 3.53, *SD* = 1.01) were also quite espoused by the students, indicating their ability to utilize possible aids to enhance understanding and memorizing. Other support strategies (e.g., reading aloud, paraphrasing, asking oneself questions, and translating from English to Chinese) were among the least favored on the list. Since the effectiveness of these strategies depends largely on the context of use (e.g., translation is considered slowing reading speed but helping with clarifying meaning when comprehension breaks down, Pressley & Afflerbach, 1995), it is not surprising to find them bearing a less frequent usage. In fact, such results seem to suggest that students were flexible in their strategy selection.

If a frequency of 3.5 and above is taken as indicating high strategy use, 2.5 to 3.4 as medium, and 2.4 and below as low, then another look at Table 2 can give us sufficient information about the overall tendency of the participants' reported frequency of individual strategy use. As can be seen, out of the 15 strategies reported to be used with high frequency, 8 strategies (53%) were under the dimension of GLOB, 6 under PROB, and 1 under SUP, suggesting that the use of global and problem-solving strategies may be closely associated with students' overall EFL proficiency level. Nevertheless, due to the design of the study, it is difficult to indicate the directionality of the relationship. The high-proficiency group's reported high frequency of these particular strategies may be due to their high proficiency as readers, and the same applies to the low-proficiency group.

The above analysis showed that the students on the whole displayed characteristics of active strategic readers. They were conscious of their cognitive process during reading and were able to utilize a wide array of EFL reading strategies to achieve comprehension. These findings support many other studies (e.g., Block, 1986, 1992; Hadwin et al., 2001; Sheorey & Mokhtari, 2001; Zhang, 2001; Zhang et al., 2008), which asserted that effective or successful L2 and FL readers, like their native counterparts, were aware of a multitude of reading strategies available for use.

Given that a comprehension-testing model is often adopted in EFL reading lessons (Anderson, 1999), Chinese senior high school teachers might be engaged in similar practices without knowing it. The Chinese students might have acquired these strategies through frequent practice of the target strategies embedded in the comprehension exercises conducted by their teachers, even if they were not taught the strategies explicitly (Paris et al., 1994; Pressley, 2002). Although the effects of comprehension testing needs to be further investigated, it is reasonable to believe that comprehension testing is beneficial to some extent and should not be totally rejected as a teaching strategy.

The learning of English in the Chinese context itself can be another explanation for the students' clearer metacognitive awareness of strategies than usually assumed. The students in this study generally approached EFL reading after they had learned their L1, Chinese, for some years and developed an awareness of Chinese reading strategies. As a result, it is natural that they would transfer some of their Chinese reading strategies to EFL reading (Grabe & Stoller, 2002; Zhang, 2008). Furthermore, teachers' explicit explanations that are focused on teaching vocabulary, grammar, and discourse structure of the English language in classroom instruction could help

students develop awareness about English and English learning. This factor might have also contributed to facilitating students' improvement in metacognitive awareness of L2 reading strategies (Hudson, 2007).

Chinese Senior High School EFL Students' Reading-Strategy Use and Their EFL Achievements

To answer the third research question ("Is there any difference among high-, intermediate-, and low-proficiency students in their proneness of strategy choice and frequency of strategy use?"), a two-factor ANOVA with repeated measures was conducted. The dependent variable was the rating of reading strategies from 1 to 5. The within-subject factor was strategy category (global, problem-solving, and support); the between-subject factor was the learners' proficiency level (low, intermediate, high). The main effect for strategies, $F(2, 492) = 182.15$, $p < .001$, the main effect for learners' proficiency, $F(4, 492) = 3.27$, $p < .05$, and the interaction between strategies and learners' proficiency are all statistically significant, $F(4, 492) = 12.98$, $p < .001$.

Tests of simple effects were conducted to follow up the significant interactions. To control for family-wise error rate across these tests, the Holm's sequential Bonferroni approach was adopted. The mean ratings of strategies by the low-proficiency group showed significant differences between the global and problem-solving strategies, $t = -3.53$, $p = .001$, between the global and support strategies, $t = 3.23$, $p = .002$, and between the problem-solving and support strategies, $t = 5.09$, $p < 001$. The mean ratings of strategies by the intermediate-proficiency group also showed significant differences between the global and problem-solving strategies, $t = -3.41$, $p < .001$, between the global and support strategies, $t = 9.15$, $p < .001$, and between the problem-solving and support strategies, $t = 10.48$, $p < .001$. Similarly, the mean ratings of strategies by the high-proficiency group differed significantly between the problem-solving and support strategies, $t = 12.68$, $p < .001$, and between the global and support strategies, $t = 11.59$, $p < .001$. No significant differences were found between the global and problem-solving strategies, $t = - .97$, $p > .05$.

Table 3 shows the means and standard deviations of the participants' perceived use of reading strategies across three proficiency groups. As can be seen, there does exist some significant difference among the three groups. Generally, the high-proficiency group outperformed the intermediate- and low-proficiency groups in overall strategy use, and this difference was statistically significant. The three proficiency groups ranked PROB as the most important, followed by GLOB and SUP. However, although all the three groups reported frequent use of the first two categories of strategies, the high-proficiency group demonstrated the most frequent use of them.

Table 3. *Means (standard deviations) for the high-, intermediate-, and low-proficiency EFL readers' perceived use of reading strategies* ($N = 249$)

Strategy	Proficiency		
	Low	Intermediate	High
Global	3.407 (.572)	3.631 (.582)	3.855 (.529)
Problem-solving	3.597 (.685)	3.821 (.580)	3.912 (.450)
Support	3.179 (.652)	3.023 (.577)	2.979 (.687)

While the ANOVA results revealed the differences in reading-strategy choice among students of

different EFL proficiency levels, a correlation analysis further confirmed the relationship between students' reading-strategy use and their general EFL proficiency despite the non-causal nature (see Appendix B for detailed correlation statistics). The results show that altogether 8 strategies (5 from the GLOB category) bear a close positive correlation to students' English achievement, with the correlation coefficient (r) ranging from .225 to .507, $p < .001$. Item 26 ($r = -.160$, $p = .011$) and 27 ($r = -1.20$, $p < .001$) actually revealed a negative correlation between strategy use and students' EFL proficiency level, corresponding to the difference in strategy use between the three proficiency groups discussed earlier.

In sum, the above analysis has shown that the high-, intermediate-, and low-proficiency students were different in strategy choice, and the effective use of global strategies was found to be correlated with the students' higher English achievements. These findings are consistent with those of previous studies, which revealed a relationship between global strategy use and language proficiency level (Anderson, 1991; Block, 1992; Zhang, 2002). It has to be highlighted, however, that the issue of whether reading in an L2 is a reading problem or a language problem has always been a contentious one. Some argue that it is a language problem, whereas others argue that it is a reading problem, meaning that students perform poorly in reading in an L2 because they do not have good reading skills or strategies in their L1. Alderson (1984), for example, posited that reading in an L2 is both a language problem and a reading problem. Carrell's (1991) findings further lent support to Alderson's position. This implies that, in the long run, informed training in the use of global strategies for problem-solving in reading comprehension for unsuccessful readers can be useful in helping them improve their reading ability, with a potential of leading to improvement in their overall English proficiency. Alternatively, reading instruction focusing on developing FL students' decoding skills can be conducted concurrently with strategy-based instruction so that provision of reading strategies is possible in the process of their learning to read.

Conclusion

The study set out to investigate the degree of Chinese high school students' metacognitive awareness of EFL reading strategies, which was measured through their reported use of EFL reading strategies. By examining the students' responses to the questionnaire, the study revealed that Chinese senior high school students are also active EFL reading-strategy users and that their pattern of strategy use is closely related to their overall EFL achievement. Such findings generally lend support to the published research of this field conducted in other contexts (e.g., Anderson, 1991; Block, 1986; Carrell, 1989; Sheorey & Mokhtari, 2001; Zhang, 2002; Zhang et al., 2008).

The study has some practical implications for EFL reading-strategy instruction in Chinese high schools or other educational settings that share similar characteristics. First, the results of this study suggest that although students on the whole frequently use a wide range of strategies, good learners seem to be distinguished from their low-proficiency counterparts in strategic knowledge. Good learners are better at planning for reading, monitoring their comprehension, and selecting appropriate strategies. Therefore, it can be hypothesized that low-proficiency learners will benefit from an informed metacognitive strategy training course that guides them to think about

their reading processes, identify their weaknesses, and take remedial measures, as suggested by some researchers who have concluded positive effects of strategy training on EFL and ESL learning (e.g., Carrell et al., 1989; Hudson, 1998; Rasekh & Ranjbary, 2003). Secondly, the finding of this study that high-, intermediate-, and low-proficiency learners have knowledge of a range of strategies at a moderate to high level is contradictory to some teachers' assumption that senior high school students know little about reading strategies. This implies that students might know various EFL strategies that are useful for achieving comprehension by virtue of their high motivation and frequent exposure to English in various modalities nowadays, including hypertext, print, non-print, visual, and multimedia English materials. This change in the learning environment from one of poor language input to that of richer exposure might have given these learners many opportunities to read in English. Necessarily, this would affect their way of learning and the cultures of learning with which they were strongly associated. Therefore, what teachers need to do is to find out how effectively students are using different strategies and give them guidance accordingly. As suggested by the findings from this study, poor high school EFL readers need more help in increasing their knowledge about global strategies, as reading in a FL is not only a language problem but also a reading problem (Alderson, 1984, 2005; Hudson, 1998; for recent reviews, see Bernhardt, 2005; Hudson, 2007; Koda, 2007).

Since many high school English teachers employ a comprehension-testing type of teaching strategy, it is possible that students develop EFL reading strategies through their experience of doing comprehension-testing exercises (Grabe & Stoller, 2002); and the strategies they use are mainly test-taking strategies, which are different from reading comprehension strategies for effective meaning-making. These test-taking strategies could have helped them become test-wise, but their ability for in-depth understanding of the reading material at hand might not have improved (Cohen, 1998). Although such a tentative conclusion needs further investigation, the comprehension-testing strategy should not be totally rejected or discarded. After all, comprehension exercises offer opportunities for students to practice using various reading strategies. These practices have much to do with the way teachers perceive language teaching and the various facets of language teacher preparation (Zhang, 2000, 2003, 2004). Therefore, teacher training programs might need to take into consideration language teaching methodologies that involve the use of strategy-based approaches to reading comprehension (Anderson, 1999; Chamot, 2005; Macaro, 2001; Hudson, 2007).

Necessarily, this does not mean that comprehension-testing type of teaching is good enough. What should be advocated is an incorporation of explicit strategy training into the usual reading instruction procedures (Chamot, 2005; O'Malley & Chamot, 1990; Zhang, 2008; see also Zhang, 2003, for a review of research on Chinese ELF learners, especially in relation to strategy-based instruction). For example, teachers can adopt a "comprehension exercise plus strategy evaluation" teaching method, where more focus is ascribed to the evaluation of strategy use. In this way, students will increase their knowledge or awareness of strategies and strategy use through reflecting on and verbalizing their use of the strategies at the beginning. Gradually, they can develop a higher degree of autonomy in using these reading strategies in different contexts. This recommendation is supported by findings from the studies by Cohen (1990, 2007), Zhang (2001), and Zhang et al. (2008), which suggest that being able to verbalize and evaluate strategy use is a sign of high metacognitive awareness of reading strategies. In the long run, however, developing students' interest in reading in the way extensive reading activities are organized will

be an effective means to achieving reading efficacy in these EFL learners, given that strong relationships between extensive reading and reading achievement have been firmly established (see Day & Bamford, 1998, 2002, for a delineation on these issues and rich extensive reading activities; for recent findings of the benefits of extensive reading in developing various aspects of L2 language proficiency, see Renandya, 2007; Yamashita, 2004, 2008).

Although the study has revealed some interesting findings that might inform EFL reading instruction, it has a number of limitations, especially in connection with the research method adopted (see Brantmeier, 2002, for a review of such issues). The first limitation is about the reliability of the questionnaire responses. Although students reported use of some strategies, it is difficult to know whether they are actually using these strategies. Future research should incorporate on-line think-aloud protocols or interviews to further examine students' actual strategy use. The other limitation is related to the way that metacognitive awareness is assessed in the scoring in this study. It is obvious that awareness of vocabulary in EFL reading is not assessed in this study despite research findings that scores on vocabulary size and depth of vocabulary knowledge are highly and positively correlated to reading comprehension and that scores on depth of vocabulary knowledge can make a unique contribution to the prediction of reading comprehension levels (Qian, 1999, 2002; Zhang & Annul, 2008). Qian (2002) called for recognizing the importance of improving learners' depth of vocabulary knowledge in language learning. Finally, given that the participants in the study were from a key senior high school in China, their overall EFL proficiency may be relatively higher than those in other senior high schools, which might have indirectly contributed to their overall high usage of strategies. Therefore, findings from the study should be interpreted with caution. Further studies are needed to examine how students' awareness of reading comprehension strategies interacts not only with their perceived use of the strategies but also with their actual use of reading strategies, as well as with their use of vocabulary-handling strategies and their vocabulary size and vocabulary depth, in relation to gains in reading scores.

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Appendix A

The Revised Survey of Reading Strategies
(Chinese version)

英语阅读策略调查问卷

亲爱的同学们:

为了帮助我们及时发现英语阅读教学中存在的问题，我们需要了解同学们在阅读与英语学习相关的文章（如课文、阅读理解短文、同步阅读资料等）时常用的阅读技巧和策略。这将帮助我们深入理解同学们的英语阅读行为，为改进英语教学提供依据。本调查仅供学术研究参考使用，我们将会对同学们所提供的一切个人资料绝对保密。因此，请同学们放心提供尽可能准确的资料。非常感谢你们的参与和帮助！

个人简况

姓名_____ 性别_____ 年龄_____ 学校_____ 班级_____

问卷说明

以下是人们阅读与英语学习相关的文章（如教材中的课文、试题中的阅读理解短文、报刊杂志中的同步阅读或补充阅读资料等）时使用的技巧和策略。每个句子后面有五个数字表示不同的含义：

1 表示"我**从不**这样做"
2 表示"我**偶尔**这样做"
3 表示"我**有时**这样做"（**频率约为 50%**）
4 表示"我**通常/大多数时候**这样做"
5 表示"我**总是/一直**都这样做"

请仔细阅读每个句子，选择一个数字并圈起来，如"3"。注意，这些问题并没有标准答案，请同学们根据自己的实际阅读情况作出恰当的选择。

全局策略	从不	偶尔	有时	通常	总是
1 用英语阅读时，我有明确的阅读目的，如为了学习，或为了获取与教材内容相关的信息等。	1	2	3	4	5
2 用英语阅读时，我会考虑文章的内容与我的阅读目的是否相符。	1	2	3	4	5

3	用英语阅读时，我通常先预览全文，了解文章结构特征，长度和大意。	1	2	3	4	5
4	用英语阅读时，我会决定哪些内容该仔细读，哪些内容该跳过或忽略。	1	2	3	4	5
5	用英语阅读时，我利用我已有的知识（如与文章主题相关的知识或语法知识）来帮助理解文章内容。	1	2	3	4	5
6	用英语阅读时，我会利用文章中的表格、图表和插图来增强理解。	1	2	3	4	5
7	用英语阅读时，我利用上下文线索来帮助我更好的理解所读内容。	1	2	3	4	5
8	用英语阅读时，我通过印刷特征如粗体、斜体来识别重要信息。	1	2	3	4	5
9	用英语阅读时，我通过文章中出现的新信息来检查自己对文章的理解。	1	2	3	4	5
10	用英语阅读时，我设法猜测所读内容的大意。	1	2	3	4	5
11	用英语阅读时，我会检查自己对文章内容的猜测或预测是否正确。	1	2	3	4	5
12	用英语阅读时，我以批判性的眼光分析和评判文章所提供的信息，而不是被动接受文章的信息。	1	2	3	4	5
解决问题策略						
13	用英语阅读时，我读得很慢很仔细以确保我理解所读内容。	1	2	3	4	5
14	用英语阅读时，我会根据所读的内容调整阅读速度。	1	2	3	4	5
15	用英语阅读时，我有时会停下来琢磨所读内容。	1	2	3	4	5
16	用英语阅读时，我在脑海中描绘所读信息，使文字信息图片化或情景化以便能记住所读内容。	1	2	3	4	5
17	用英语阅读时，当文章变难的时候，我会重读较难的部分来增强理解。	1	2	3	4	5
18	用英语阅读时，如果遇到生词和短语，我会设法猜测它们的意思。	1	2	3	4	5
19	用英语阅读时，当我注意力分散的时候，我会设法再次集中精神。	1	2	3	4	5
辅助策略						
20	用英语阅读时，我将文章的关键词语或句子作笔记来帮助我理解所读内容。	1	2	3	4	5
21	用英语阅读时，我会划出或圈出文章中的主要信息以便能记住它们。	1	2	3	4	5
22	用英语阅读时，当文章内容变得难以理解的时候，我读出声来帮助我理解所读内容。	1	2	3	4	5

23	用英语阅读时，我借助相关参考书（如字典）来帮助理解所读内容。	1	2	3	4	5
24	用英语阅读时，我用自己的话复述文章以便更好的理解所读内容。	1	2	3	4	5
25	用英语阅读时，我会来回往复的阅读上下文以便掌握文中前后出现的观点、大意之间的关系。	1	2	3	4	5
26	用英语阅读时，我会向自己提问，并且希望能从所读文章获得这些问题的答案。	1	2	3	4	5
27	用英语阅读时，我把所读内容逐词逐句翻译成汉语.	1	2	3	4	5
28	用英语阅读时，我有时用英语，有时用汉语来思考文章提供的信息。	1	2	3	4	5

再次感谢你们的合作！

The Revised Survey of Reading Strategies
(English translation; adapted from Mokhtari & Sheorey, 2002).

Survey of EFL Reading Strategies

Name_____ Gender_____ Age_____ School_____ Class_____

The purpose of this survey is to collect information about the various techniques you use when you read **academic materials** in English (e.g., reading textbooks for homework or examinations, reading journal articles, etc.).

All the items below refer to your reading of **school-related academic materials** (such as textbooks, reading comprehension exercises, or other supplementary readings related to course contents). Each statement is followed by five numbers, 1, 2, 3, 4, and 5, and each number means the following:

"1" means that "I **never or almost never** do this."
"2" means that "I do this **only occasionally**."
"3" means that "I **sometimes** do this" (About **50%** of the time).
"4" means that "I **usually** do this."
"5" means that "I **always or almost** do this."

After reading each statement, **circle the number** (1, 2, 3, 4, or 5) which applies to you. Note that there are **no right or wrong responses** to any of the items on this survey.

Global strategies	Never				Always
1 I have a purpose in mind when I read	1	2	3	4	5
2 I think about whether the content of the text fits my reading purpose	1	2	3	4	5
3 I review the text to know about its length, organization and main idea	1	2	3	4	5
4 When reading, I decide what to read closely and	1	2	3	4	5

	what to ignore					
5	I use my prior knowledge (e.g., knowledge about the theme of the text, or grammar knowledge) to help me understand what I read	1	2	3	4	5
6	I use tables, figures, and pictures in text to increase my understanding	1	2	3	4	5
7	I use context clues to help me better understand what I am reading	1	2	3	4	5
8	I use typographical features like bold face and italics to identify key information	1	2	3	4	5
9	I check my understanding when I come across new information	1	2	3	4	5
10	I try to guess what the content of the text is about when I read	1	2	3	4	5
11	I check to see if my guesses about the text are right or wrong	1	2	3	4	5
12	I critically analyze and evaluate the information presented in the text rather than passively accept everything	1	2	3	4	5
Problem-solving strategies						
13	I read slowly and carefully to make sure I understand what I read	1	2	3	4	5
14	I adjust my reading speed according to what I am reading	1	2	3	4	5
15	I stop from time to time and think about what I am reading	1	2	3	4	5
16	I try to picture or visualize information to help remember what I read	1	2	3	4	5
17	When text becomes difficult, I re-read it to increase my understanding	1	2	3	4	5
18	When I read, I guess the meaning of unknown words or phrases	1	2	3	4	5
19	I try to get back on track when I lose concentration	1	2	3	4	5
Support strategies						
20	I take note of the key expressions and ideas while reading to help me understand what I read	1	2	3	4	5
21	I underline or circle information in the text to help me remember it	1	2	3	4	5
22	When text becomes difficult, I read aloud to help me understand what I read	1	2	3	4	5
23	I use reference materials (e.g., a dictionary) to help me understand what I read	1	2	3	4	5
24	I paraphrase (restate ideas in my own words) to better understand what I read	1	2	3	4	5
25	I go back and forth in the text to find relationships among ideas in it	1	2	3	4	5
26	I ask myself questions I like to have answered in the text	1	2	3	4	5

27	When reading, I translate from English into my native language	1	2	3	4	5
28	When reading, I think about information in both English and my mother tongue	1	2	3	4	5

Appendix B

Pearson Correlations of Strategy Use to Students' EFL Achievement

Reading strategies	Average exam scores
1 Set purpose for reading	.129*
2 Check how text content fits purpose	-.007
3 Preview text before reading	.042
4 Determine what to read	.249***
5 Use prior knowledge	.270***
6 Use text features (e.g., tables)	.183**
7 Use context clues	.220***
8 Use typographical aids (e.g., italics)	.221***
9 Check understanding	.123
10 Predict or guess text content	.205**
11 Confirm prediction	.226***
12 Critically evaluate what is read	.181**
13 Read slowly and carefully	-.116
14 Adjust reading speed	.213**
15 Pause and think about reading	.041
16 Visualize information	.051
17 Re-read to increase understanding	.275***
18 Guess meaning of unknown words	.263***
19 Try to stay focused on reading	.171**
20 Take note while reading	.042
21 Underline information in text	.023
22 Read aloud when text becomes hard	-.004
23 Use reference materials like dictionary	-.051
24 Paraphrase for better understanding	-.091
25 Go back and forth in text	.080
26 Ask oneself questions	-.160*
27 Translate from English to mother tongue	-.331***
28 Think about information in both English and mother tongue	-.120
GLOB (items 1–12)	.304***
PROB (items 13–19)	.209**
SUP (items 20–28)	-.126
OVERALL (overall reading strategies)	.170*

Note. *$p < .05$; **$p < .01$; ***$p < .001$.

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