

Strategies-based Chinese as a Second Language Reading Instruction: Effects and Learners' Perceptions

Jia Lin
Howard University, USA

Gengsong Gao
University of Richmond, USA

Ting Huang
College of William and Mary

Abstract

Strategic reading is an important consideration in the L2 reading classroom. This study investigated the effects of a Chinese as a Second Language (CSL) strategies-based reading instruction program, in which participants were explicitly taught ten top-down reading strategies. Thirty-four students enrolled in an advanced-level Chinese class participated in this study and were randomly assigned to treatment and control conditions. This study first examined the influence of the strategies-based instruction on participants' reading comprehension. It then studied participants' perceptions of using reading strategies and of the strategy training program. A series of non-parametric Mann-Whitney U tests showed that the experimental group made significantly greater improvement in overall reading comprehension and in answering global-reference questions. The survey results revealed that although participants generally confirmed the positive effects of reading strategies, they did not have a strong interest in learning reading strategies, or in applying them in L1 or L2 reading contexts.

Keywords: Chinese as a second language, reading strategy training, reading strategy training, strategies-based reading instruction, top-down reading strategies

Since Chinese language uses a logographic, deep orthography with unique linguistic features, reading Chinese necessitates cognitive and metacognitive processes and skills that are different from those of reading alphabetic languages. Reading in Chinese as a second language (CSL) is a challenging endeavor for learners with an alphabetic first language (L1) background (Everson, 2009).

Second language (L2) readers use diverse strategies to make reading comprehension easier, faster, and more effective. Reading strategies are deliberate, goal-directed attempts to control and modify the reader's efforts to decode text, understand words, and construct meaning of a text

(Afflerbach et al, 2008, p.15)¹. Prior studies suggested that appropriate use of reading strategies was highly and positively correlated with reading comprehension achievement (e.g., Carrell, 1998; Grabe, 2009).

Bottom-up and top-down models of reading comprehension are largely applied in foreign language reading research (Young & Oxford, 1997). Accordingly, reading strategies can be classified into bottom-up and top-down strategies. While bottom-up strategies focus on word recognition, decoding, syntax, or text details and attend to lower-level linguistic units, top-down strategies focus on higher-level cues and are primarily applied to integrate information and gain a holistic understanding of larger segments or entire texts (Lee-Thompson, 2008). This group of strategies are also applied to monitor or self-evaluate the degree to which readers achieve the reading goal (Lee-Thompson, 2008). Tsao (1979) argued that a distinctive difference between Chinese and English is that Chinese is a discourse-oriented language whereas English is a sentence-oriented language. The latter has clear sentence boundaries and syntactic analysis can be done within the sentence level. In contrast, the reader's comprehension of a discourse-oriented language, like Chinese, should be based on all of the discourse information (Tsao, 1979). CSL readers often have difficulty in holistic meaning construction even though they know each word in the text. Therefore, top-down reading strategies, which facilitates the holistic understanding, are crucial to CSL reading, especially for advanced learners who often engage with longer texts.

Reading strategies are teachable (Carrell, 1985). Previous empirical research (e.g., Karimi, 2015; Macaro & Erler, 2008; Singh, 2019) has shown that direct strategy training can improve L2 learners' reading comprehension and increase strategy use frequency. Struggling readers may benefit if strategies used by good readers can be taught, through explicit instruction. Teaching reading strategies should be an important consideration in the reading classroom (Han & Anderson, 2009), especially for college-level language teaching (Holligan, 2018). Since the 1990s, the obvious pedagogical effects of strategy training have led to strategies-based instruction, a learner-centered approach with two major components: (1) students are explicitly taught how, when, why, and which strategies can be used to facilitate language learning and complete language use tasks; (2) strategies are integrated into everyday class materials and may be explicitly or implicitly embedded into the language tasks (Cohen et al, 1996).

However, although some prior studies have investigated how CSL learners use reading strategies (e.g., Chang, 2010; Huang, 2018; Lee-Thompson, 2008), little research has explored how to teach reading strategies in CSL class. While there have been some studies of the effects of explicit strategy training on French/English L2 readers or Chinese L1 readers (e.g., Gu & Lau, 2021; Lau & Chan, 2007; Macaro & Erler, 2008; Yapp et al, 2021), the effects of strategy

¹ The distinctions between strategies and skills can be confusing. Some researchers use the two terms interchangeably. Reading strategies are referred to as the actions that readers either consciously decide to use or use automatically when attempting to access a written text (Macaro, 2003, p.136). Some researchers strictly distinguish reading strategies from reading skills. They regard the techniques that have achieved automation as reading skills, and only view the actions and techniques used consciously as reading strategies. The present research distinguishes between reading strategies and skills: Reading strategies in this article refer only to the conscious techniques and actions.

training are still understudied in the field of CSL research. In addition, previous studies on strategies-based reading instruction did not examine its pros and cons from L2 learners' perspectives. The investigation of participants' perceptions of strategy training can generate important instructional implications and shed light on how to improve existing strategies-based instruction models. More studies on top-down reading strategies are needed.

To fill in the gaps, the researchers designed and conducted a seven-week strategies-based reading instruction program, in which CSL readers learned and practiced 10 top-down reading strategies. This study could update the understanding of the components, procedures, effectiveness, and limitations of strategies-based reading instruction.

Literature Review

Top-down Chinese Reading Strategies

Compared with ESL research, studies on CSL learners' use of reading strategies are scant. Two case studies (Huang, 2018; Lee-Thompson, 2008) investigated top-down reading strategies used by CSL learners through think-aloud and recall protocols. Lee-Thompson (2008) examined strategies that eight intermediate CSL learners applied to read a narrative text and an argumentative text. She identified 15 top-down reading strategies and among them, often-used strategies included *paraphrasing*, *hypothesizing*, *monitoring comprehension*, *using background knowledge* and *personal experience*. A more recent study, Huang (2018) also focused on intermediate learners. She investigated how three intermediate readers used top-down strategies in reading one argumentative essay. In addition to the nine top-down reading strategies already reported by Lee-Thompson (2008), Huang (2018) observed three new strategies, including *identifying important information*, *analyzing text structure*, and *evaluating text*.

Models of Strategies-based Reading Instruction

L2 language strategy training should be conducted systematically instead of casually (Oxford, 1994). Strategies-based instruction is an approach that integrates strategy training into everyday class materials. Prior studies have discussed the components and procedures of strategies-based instruction.

According to Cohen and Weaver (2005), a typical strategies-based instruction (referred to as styles and strategies-based instruction in their studies) lesson consists of the following five steps: (1) strategy preparation, (2) strategy awareness-raising, (3) strategy training, (4) strategy practice, and (5) personalization of strategies. Janzen (2002) put forward a similar model of strategies-based instruction that consists of five stages: (1) general strategy discussion, (2) teacher modeling, (3) students practicing using strategies and demonstrating their strategy use by the think-aloud method, (4) analysis of strategies used by both teachers and students, and (5) explanation/discussion of individual strategies. The effectiveness of this model has received empirical verification from Moghadam's research on ESL reading (Moghadam, 2004). These models guided the design of the strategies-based reading instruction used in the present study. Please see the Methodology section for details.

Effects of Explicit Strategy Training

This section includes a review of recent empirical studies on the effects of explicit reading strategy training on English L2 learners, French L2 learners, and Chinese L1 learners. So far, the researchers have not found any publications on CSL strategies-based reading instruction. In addition to the program effectiveness, the review also focuses on the components and procedures of the strategy training as well as reading comprehension measurement.

English L2 Research

Most studies published after 2000 focused on English L2 readers. The lengths of strategy training programs in English L2 studies ranged between 7 to 16 weeks. While these programs varied in the specific steps of strategy training, they generally incorporated the important components highlighted in the models of Cohen and Weaver (2005) and Janzen (2002) reviewed in the previous section, including direct instruction, teacher modeling, collaborative practice, scaffolding and individual practice, reflection, and lastly evaluation and expansion. Reading comprehension gains after the treatment were assessed by standardized multiple-choice tests (e.g., Moghadam, 2004; Yapp et al, 2021) or self-developed reading tasks (e.g., Karimi, 2015).

Top-down reading strategies commonly taught in English L2 studies included: *connecting or using background knowledge* (Moghadam, 2004; Yapp et al, 2021), *asking oneself questions while reading* (Moghadam, 2004; Singh, 2019; Yapp et al, 2021), *making predictions while reading* (Karimi, 2015; Singh, 2019; Yapp et al, 2021), *summarizing* (Karimi, 2015; Singh, 2019), *inferring* (Karimi, 2015; Moghadam, 2004), and *identifying structures* (Moghadam, 2004; Yapp et al, 2021). Among them, the first four strategies were also included in the strategies-based instruction of the present study. Additionally, English L2 studies examined the following strategies which were also covered in the current research: *previewing* (Moghadam, 2004), *directing attention* (Moghadam, 2004), *comprehension monitoring* (Karimi, 2015), and *highlighting key information* (Singh, 2019).

While they had some variation in strategy training procedures and measurement instruments, previous studies on English L2 reading all found that students receiving strategies-based instruction significantly outperformed their counterparts who received traditional reading instruction (Bozorgian & Aalaam, 2018; Moghadam, 2004; Shih & Reynolds, 2018). Their reading comprehension gains were significantly greater than natural growth (Singh, 2019; Yapp et al, 2021). Students receiving strategies-based instruction also used reading strategies significantly more frequently (Karimi, 2015; Singh, 2019). These findings provided empirical evidence for the effectiveness of hypothesized strategies-based reading instruction models (e.g., Cohen & Weaver, 2005; Janzen, 2002).

French L2 Research

Two studies (Macaro & Erler, 2008; Raymond, 1993) focused on French L2 readers. Raymond (1993) studied college French L2 readers. The experimental group received five hours of strategy training, one hour for each of the following content structure strategies which were all top-down strategies: *description*, *sequence*, *causation*, *problem solution*, and *comparison*. The strategy

instruction consisted of five steps: what a strategy was, why it should be learned, how to use it, when to use it, and a short quiz. Reading comprehension was operationalized as the number of correct idea units that participants could recall immediately. Raymond (1993) found that the experimental group were able to recall significantly more idea units from a well-structured expository than the control group.

Macaro and Erler (2008) investigated young-beginner L2 learners of French. The experimental group underwent a 14-month reading strategy instruction. Six strategies were taught and practiced, including three top-down strategies: *using common sense (prior knowledge)*, *remembering to read the whole sentence to see if it makes sense*, and *using a process of deduction*. Staged strategy instruction began with awareness-raising and modeling of strategies, followed by scaffolded practice, removal of scaffolding, evaluation of attitudes toward reading. Participants' reading comprehension was measured by self-developed French-English translation tasks. Findings indicated that reading strategy instruction improved comprehension of both simple and more elaborate texts. The experimental group greatly improved in understanding the idea units in a text that would normally be considered much too difficult for their level. The strategy instruction also brought about improved attitudes towards reading.

Chinese L1 Research

While there is little research on Chinese L2 readers, two studies examined young Chinese L1 readers. Lau and Chan (2007) investigated 7th graders in Hong Kong. The experimental group received six weeks' direct reading strategy instruction, consisting of direct explanation, teacher modeling, and guided and independent practice. Eleven of the thirteen strategies taught in this study were top-down strategies, including *summarizing a paragraph*, *summarizing a whole article*, *selecting the topic sentence* etc. Two sets of Reading Strategy and Comprehension tests were used to assess participants' strategy use and reading comprehension. The results showed that the experimental group's reading comprehension made substantial progress. They used more strategies, had more knowledge about strategy use, and showed a more positive attitude toward reading instruction. A later study on young Chinese L1 readers in Beijing conducted by Gu and Lau (2021) also found that explicit strategy training had a positive effect on students' reading comprehension growth, as measured by open-ended reading comprehension questions from a standardized elementary school graduate exam. In that study, four top-down strategies were taught and the first three were also examined in the current study: *summarizing*, *questioning*, *connecting*, and *visualizing*.

In summary, previous studies on English/French L2 and Chinese L1 readers have investigated the effects of explicit teaching of most top-down strategies covered in the present study. Although they differed in strategy instruction design, participants' language background, age, proficiency levels, and reading comprehension measurement tools, prior studies all have provided empirical evidence of the positive effects of explicit reading strategy training. Participants who received reading strategy training could recall significantly more idea units from the text they read, showed significant reading comprehension gains, used strategies more frequently, had more knowledge about reading strategies, and had a more positive attitude toward reading instruction than those who did not receive reading strategy training.

Gaps and Limitations

Based on the literature review, the researchers identified the following gaps and limitations. First, with regards to the effects of explicit strategy training, while there have been many studies on English L2 readers and a few studies on French L2 and Chinese L1 readers, there is little research in the effects of explicit strategy training on Chinese L2 readers. Second, although previous studies have evaluated the effectiveness of strategy training through gauging students' reading comprehension growth, very few researchers have examined the quality of strategy training from the perspective of learners' perceptions. Therefore, they did not offer suggestions on how to improve the design of reading strategy training. Lastly, top-down strategies are of particular importance to the reading comprehension of Chinese, a discourse-oriented language. However, very little CSL research has focused primarily on top-down reading strategies. To fill in the gaps, the researchers designed, conducted, and evaluated a strategies-based CSL reading instruction program, in which students were explicitly taught 10 top-down reading strategies.

Research Questions

Three research questions have guided this study.

1. In the experimental group, to what extent do CSL learners make greater progress in reading comprehension after the seven-week strategies-based reading instruction, as compared with the control group?
2. What are CSL learners' perceptions of using reading strategies?
3. What are CSL learners' perceptions of this strategies-based reading instruction program?

Method

Participants

Thirty-four students enrolled in a non-heritage fourth-year Chinese class at an East Coast public university in the United States participated in this study. They varied in age from 18 to 24 with a mean of 20.7 years and were all English L1 speakers. According to American Council on the Teaching of Foreign Language Proficiency Guidelines (ACTFL, 2012), participants' proficiency levels ranged from Intermediate-high to Advanced-mid. This class met twice per week: Tuesday for integrated language skills training and Thursday for reading practice. Each session lasted 75 minutes. Before taking the course, they had completed seven semesters of Chinese language learning. This class had two parallel sections. One section with 17 students (female = 7, male = 10) was the experimental group and the other section (female = 9, male = 8) formed the control group.

Strategies-based Reading Instruction

For the experimental group, the strategies-based reading instruction happened on Thursdays during the first seven weeks of the spring semester. They were explicitly taught 10 top-down reading strategies (Appendix A), which were repeatedly identified by previous studies on strategies used by CSL readers (e.g., Lee-Thompson, 2008; Huang, 2018). The strategies-based reading instruction consisted of two parts: strategy-use training in the first week and strategy application practice in the following six weeks. The control group received traditional reading instruction without strategy training.

Strategy-Use Training (Week 1)

In the first week, the experimental group received a 75-minute session of strategy-use training, in which they were explicitly taught 10 top-down reading strategies. Based on Janzen (2002), Carrell (1998), Cohen and Weaver (2005)'s models, the researchers designed a training sequence of the following five steps:

Step 1: Strategy Awareness Raising: The instructor gave a short presentation on the influence of strategy use on reading comprehension to raise students' awareness of the following strategy-use training. This step also helped students activate their prior knowledge and personal experience of using reading strategies.

Step 2: Strategy-use Modeling: The strategy-use modeling involved the instruction of declarative, procedural, and conditional knowledge of reading strategies. Specifically, the instructor introduced what a certain strategy was, how to use this strategy, why using this strategy was necessary, and when (pre-reading, while-reading, or post-reading) and where (in which part of the text) to use this strategy. The detailed components of modeling are given in Appendix A. After going over knowledge of reading strategies, the instructor read aloud an article sentence-by-sentence and verbalized her strategy use for each sentence. The instructor demonstrated not only how to use each individual strategy, but also how to orchestrate several strategies to understand the same segment.

Step 3: Independent Strategy-use Practice: Students practiced using each of the 10 reading strategies to read a new article. Each strategy was assigned a code (see details in the second column of the table in Appendix A). Participants were asked to write down corresponding codes on the reading material to indicate which strategies they used and where (in which part of the article) they used these strategies. For instance, "B" stands for the strategy of *using background knowledge*. Participants wrote down a "B" beside the sentences for which their comprehension was supported by background knowledge. When reading a paragraph, a participant underlined the first sentence and then wrote down the symbol for *anticipating* (||Anti → :). It meant this participant first identified the first sentence as the topic sentence and then she/he anticipated the following content based on the topic sentence. In this way, participants' strategy use could be captured.

Step 4: Students' Reporting and Discussion: Students reported their strategy use in Step 3 and discussed its effectiveness. The instructor first read the article aloud. Right after reading a sentence or segment of text, she asked students to report which reading strategies they used and why. In processing the same segment, different participants might use different strategies. The instructor then guided participants to think about whether their strategy uses were appropriate. The instructor also reminded the participants that the comprehension of a single segment of text may involve using multiple strategies. Through discussion and practice, participants could have a better understanding of both the employment of individual strategies and the integration of multiple strategies.

Step 5: Internalization of Strategies: Learners summarized what they had learned about these strategies. They reflected on their strategy use, evaluated strategy use effectiveness, and then thought about how to transfer reading strategy knowledge to other reading contexts.

Strategy Application Practice (Week 2 to 7)

The strategy use training was followed by six 50-minute sessions of strategy application practice. In each session, participants from both groups completed a *Strategy Application Worksheet*. Experimental group participants were asked to apply reading strategies learned in the first week while reading articles on the *Strategy Application Worksheets*. They were also asked to write down corresponding codes, as shown in the second column of the table in Appendix A, on reading materials to indicate which strategies they used and in which segments of the text they used each strategy. In this way, the researchers could track and make sure that the experimental group were using strategies while reading. Control group participants read articles without being required to use reading strategies or mark on the text. After reading each article, participants from both groups answered some reading comprehension questions.

Materials

A *Reading Comprehension Test* was adapted from a set of intermediate-level HSK Chinese Proficiency Test Reading Comprehension Subtest (The Office of Chinese Language Council International, 2007), and was used for both the pretest and posttest. The *Reading Comprehension Test* consisted of five short articles, each followed by three or four multiple-choice reading comprehension questions. In total, it included 22 multiple-choice questions. To reduce the practice effect, the order of articles in the posttest was altered. In addition, since the posttest was conducted seven weeks after the pretest, the practice effect was further reduced. The researchers checked with participants after the posttest and found that 32 out of 34 participants did not recognize that the pretest and posttest were the same in content.

Six sets of *Strategy Application Worksheets* were used for the strategy application practice. Each set of worksheets consisted of three articles followed by 13 to 18 multiple-choice or fill-in-the-blank questions in Chinese. These articles and comprehension questions were adapted from the *Intermediate Chinese Reading Course* textbook (Xu & Zhou, 2009). The selected articles were of diverse genres, including six narrations, six expositions, and five argumentations. The researchers examined the readability of *Strategy Application Worksheets* by using *Chinese Readability Index Explorer, CRIE 3.0*

(<http://www.chinesereadability.net/Process.htm?L1L2=L2&LANG=CHT>). The readability index of these articles, operationalized as the number of characters, the number of words, the number of sentences, the number of connectives, the number of words at beginning through distinguish levels, the ratio of different words, the ratio of simple and complex sentences, ranged between CEFR (Common European Framework of Reference for Languages) B1 to B2 level.

According to ACTFL (n.d.), a study of the alignment between the CEFR and the ACTFL scales, the CEFR B1 level is comparable to the ACTFL Intermediate-high to Advanced-low levels. B2 is equivalent to ACTFL Advanced-mid level. So, the overall difficulty of the *Strategy Application Worksheets* was appropriate to the participants' proficiency levels. At the end of this instruction program, the experimental group filled in a *Reading Strategy Survey* (Appendix B). The *Reading Strategy Survey* mainly investigated participants' perceptions of: (1) learning reading strategies, (2) the effect of using reading strategies, (3) the necessity of strategies-based reading instruction, and (4) the effectiveness of the strategies-based reading instruction program in the current study. Students' opinions were reflected in their responses to 14 statements marked on a six-point Likert scale, where 0 indicated "disagree" and 6 meant "agree", and two open-ended questions (Question 15, and 17). In addition, this survey also elicited CSL learners' suggestions regarding how to further improve strategies-based reading instruction by several open-ended questions (Question 16, 20, and 21).

Procedure

Step 1: Pretest. Before the experimental group received the strategy training, both the experimental and control group took the *Reading Comprehension Test*. Participants were required to finish the test within 75 minutes.

Step 2: Treatment. The experimental group received the seven-week strategies-based reading instruction. Please refer to the Strategies-based Reading Instruction subsection for details.

Step 3: Posttest. After the experimental group finished seven weeks of strategies-based instruction, all participants took the *Reading Comprehension Test* again as a posttest. They were required to complete the test within 75 minutes.

Step 4: Filling in the Reading Strategy Survey. Participants from the experimental group filled in the *Reading Strategy Survey* three weeks after the posttest.

Data Scoring and Analysis

For the *Reading Comprehension Test*, each correct choice counted one point. According to the length of text based on which reading comprehension questions could be answered, the 22 reading comprehension questions were classified into two groups: eight sentence-reference and 14 global-reference questions. The answer to a sentence-reference question could be found within a single sentence-level segment. However, to answer a global-reference question, readers needed to construct a holistic understanding of several segments or the whole article. For instance, "What is the author's purpose of writing this article?" was a global-reference question while "according to the underlined sentence, which one is incorrect?" was a sentence-reference question. Table 1 shows item numbers, examples, and commonly used top-down strategies for each category.

Table 1
Types of Reading Comprehension Questions

Question category	Question item No.	Example of reading comprehension question	Top-down strategies immediately needed to answer the example question	Other top-down strategies that may be helpful
Global-reference	1,2,4,5,8,9, 12,13,14,15, 16,19,21, 22	Item 19: 第一段主要为说明: (The major purpose of the 1 st paragraph is:)	Identifying the key sentence of a paragraph, Making a summary, Monitoring comprehension	Previewing, Using background knowledge, Attending selectively
Sentence-reference	3,6,7,10,11, 17,18,20	Item 3: 女青年 “迟疑了一下”，是因为她感到: (The girl “hesitated a bit” because:)	Identifying the main idea, Anticipating, Formulating questions	Using background knowledge

A series of non-parametric Mann-Whitney U tests was conducted to examine whether there was a significant difference between the experimental and control group in reading comprehension gains as measured by posttest scores minus the pretest scores. The researchers investigated participants' gains in overall reading comprehension (as measured by their answering to all questions), answering sentence-reference questions, and answering global-reference questions separately. Because the sample sizes were small, Mann-Whitney U tests instead of *t*-tests were used since the former was more conservative and did not rely on normal distribution assumptions. The effect size was estimated by dividing the absolute (positive) standardized test statistic *Z* by the square root of the number of participants ($r = Z/\sqrt{N}$). According to Cohen (1988,1992), a commonly used interpretation is to refer to effect sizes as small ($r = 0.1$), moderate ($r = 0.3$), and large ($r = 0.5$).

To answer the second and third research questions, the *Reading Strategy Survey* was analyzed both quantitatively and qualitatively. Responses to Likert-Scale items were analyzed quantitatively by calculating the averages. Responses to open-ended questions were analyzed qualitatively through thematic coding. Dedoose, a qualitative data analysis software, was used for coding (SocioCultural Research Consultants, 2021). The researchers repeated thematic coding three times and revised code structure when necessary to accurately represent the results.

Results

Reading Comprehension Gains

The means and standard deviations of the pretest and posttest for each group are displayed in Table 2. Table 3 reports the results of Mann-Whitney U tests. The control group and the experimental group did not have significant differences in the pretest ($Z = -1.330$, $p = 0.193$, two-tailed). It meant that the two groups were similar in reading ability before this study. The

experimental group made significantly more progress than the control group from the pretest to the posttest ($Z = -2.339, p = 0.02^*$, two-tailed). This finding suggested that participants receiving strategies-based instruction improved significantly more than the control group in overall reading comprehension. According to Cohen's classification, the Effect Size $r = 0.43$ indicated a moderate degree effect.

Table 2
Descriptive Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Pretest	0	17	12.47	3.923	.951
	1	17	10.06	5.250	1.273
Posttest	0	17	13.76	4.024	.976
	1	17	13.94	4.815	1.168

Note. Group 0 = Control Group, Group 1 = Experimental Group

Table 3
Mann-Whitney Test-Ranks

	Group	N	Mean Rank	Sum of Ranks
Post-pre	0	17	13.53	230.00
	1	17	21.47	365.00
Post-pre (global)	0	17	13.24	225.00
	1	17	21.76	370.00
Post-pre (sentence)	0	17	16.09	273.50
	1	17	18.91	321.50

Mann-Whitney Test Statistics

	Post-pre	Post-pre (global)	Post-pre (sentence)	Pretest	Pretest (sentence)	Pretest (global)
Mann-Whitney U	77.00	72.00	120.50	106.00	119.50	100.00
Wilcoxon W	230.00	225.00	273.50	259.00	272.50	253.00
Z	-2.339	-2.531	-.839	-1.330	-.874	-1.542
Asymp. Sig. (2-tailed)	.019*	.011*	.402	.183	.382	.123
Exact Sig. [2 (1-tailed Sig.)]	.020*	.012*	.413	.193	.394	.131
Effect Size	0.43	0.43	0.14	0.23	0.15	0.26

* $p < 0.05$

Notes. Post-pre: the group difference in progress between posttest and pretest with all reading comprehension questions included; Post-pre (global): the group difference in progress between posttest and pretest with only global-reference questions included; Post-pre (sentence): the group difference in progress between posttest and pretest with only sentence-reference questions included; Pretest: the group difference in the pretest with all reading comprehension questions included; Pretest(sentence): the group difference in the pretest with only sentence-reference questions included; Pretest(global): the group different in the pretest with only global-reference questions included.

To further analyze the effect of the strategies-based reading instruction, the researchers classified the 22 reading comprehension questions in the *Reading Comprehension Test* into two categories: global-reference and sentence-reference questions (see Table 1). As shown in Table 3, the experimental group made significantly greater improvement than the control group in answering global-reference questions ($Z = -2.531, p = 0.012^*$, two-tailed) from the pretest to the posttest, with a moderate effect size ($r = 0.43$). However, there was no significant difference in answering sentence-reference questions ($Z = -.839, p = 0.413$, two-tailed).

Participants' Perceptions of Using Reading Strategy

The *Reading Strategy Survey* data used both quantitative and qualitative analyses. The results (Table 4) indicated that participants slightly agreed on the positive effect of top-down reading strategies on their reading comprehension ($M = 3.9/6$). However, they were not strongly interested in learning reading strategies ($M = 3.4/6$). They did not show obvious motivation to apply top-down reading strategies in Chinese reading tasks ($M = 2.9$), in English or other L2 reading contexts ($M = 2.5$) (Table 5).

Table 4

Summary of Reading Strategy Survey (1)

Students' Evaluation of the Impact of Using Reading Strategies	
7): The application of reading strategies has improved my reading comprehension.	3.9
8): By using the ten reading strategies, I can read faster and achieve a higher degree of comprehension	3.4

Table 5

Summary of Reading Strategy Survey (2)

Students' Attitudes Toward Using Reading Strategies	
9): I like learning reading strategies.	2.8
10): I like using the ten reading strategies for Reading Chinese articles.	2.9
11): I often transfer what I learn in Thursday classes about the ten reading strategies into other reading contexts, such as reading in other Chinese classes or reading in English or in other foreign languages	2.5
12): Sometimes although I do not write down the corresponding strategy codes, I actually use strategies	4.1

According to the responses to the open-ended question item 17 “*Did you apply the 10 reading strategies in the six strategy application practice sessions?*”, three (17.6 %) of the participants reported that they seldom applied top-down reading strategies. They provided some reasons for their non-use: reading strategies did not give a deep understanding, only a superficial one; as long as the answer is right, whether or not strategies were used did not matter; just a few of the ten reading strategies taught in class were useful. Eight (47.1%) of the participants sometimes used reading strategies and the remaining six participants (35.2%) always used reading strategies. One participant provided reasons for frequent use of reading strategies. He believed that “reading strategies help me in understanding the reading better. I pick up things more frequently when using the strategies.” However, it should be noted that among the six participants who always used reading strategies, three said that they used reading strategies just because this was part of the credits. Some participants also mentioned that it was easier to apply the reading strategies only when they knew the topic and context and had enough vocabulary. Otherwise, it was difficult to use these strategies.

Participants’ Perceptions of Strategies-based Reading Instruction

As shown in Table 6, despite their low motivation to learn and use the ten top-down reading strategies, participants still tended to agree that it was necessary to integrate reading strategy instruction into reading class ($M = 3.9/6$). They slightly agreed that the reading practice sessions in which they practiced using strategies and marking the text were necessary ($M = 3.5/6$).

Table 6
Summary of Reading Strategy Survey (3)

<u>Students’ Attitudes Toward the Necessity of Strategies-based Reading Instruction</u>	
1): It is necessary to integrate reading strategy instruction into our reading class.	3.9
2): It is necessary to have the six reading practice sessions in which you practice using reading strategies and marking the text.	3.5

According to Table 7, the participants showed a moderate satisfaction with the strategies-based instruction: They could understand the instruction and demonstration ($M = 4.6/6$). Participants’ responses to the open-ended question 15, “*Do you think this semester’s reading strategy instruction is useful and helpful to you? Why or why not?*” further revealed participants’ attitudes toward this strategies-based reading instruction program. Four (23.5%) participants had a negative attitude toward the strategies-based reading instruction in this research. They felt more pressured to use the strategies and had no time to understand the articles or answer the questions.

In addition, they believed that some of the strategies were unnecessary to learn and useless. Two (11.8%) participants thought that using reading strategies might only help for exams, but would not help with reading Chinese in general. One participant (5.9%) thought that when over 50% words in an article were unfamiliar to them, reading strategies were not helpful. The rest of the participants (58.8%) showed a positive attitude toward the effectiveness of the reading strategy

instruction in this study. They believed that the instruction helped them understand the strategies and how to use them. However, it should be noted that half of those with a positive attitude towards reading strategy instruction regarded writing down strategy codes as boring and unnecessary although they confirmed the overall effectiveness of the reading strategy instruction. Participants tended to agree that the strategies-based reading instruction enhanced their ability to figure out the structure of a text. However, it did not help understand the details.

Table 7

Summary of Reading Strategy Survey (4)

Students' Perceptions of the Quality of the Strategies-based Reading Instruction in this Research

4): I can understand the teacher's instruction and demo of reading strategies.	4.6
5): I cannot understand the teacher's instruction and demo of reading strategy, so I do not know how to use these strategies in practice sessions.	1.7
13): Generally speaking, I like the strategy instruction in Thursday's reading class.	3.4

Three open-ended questions (item 16, 18, 19) aimed to examine participants' suggestions on how to improve strategies-based reading instruction. The qualitative analysis of participants' responses revealed the following limitations of the current strategy training program as well as potential ways to improve. First, participants would like to receive more individualized reading strategy instruction and would like to have more autonomy over their learning. As one participant argued, "I think it will be helpful to see which strategies are actually used and are useful to the student. Everyone is different and it applies to what reading strategies they already use." Second, the instructor introduced the ten top-down reading strategies very intensively in the first week of instruction. However, the intensive reading strategy instruction seemed to have overwhelmed the students. Two out of the 17 participants thought that the modeling of some reading strategies was not detailed or clear enough. Third, in this study, the experiment group participants were required to write down corresponding codes for strategies on the text while reading, as a shorthand method of capturing participants' strategy use. Around 25% participants reported that coding the text while reading distracted their comprehension. Fourth, through just a short-term strategies-based instruction program, they did not understand the value of the strategies and did not show much interest in them.

Lastly, this study only investigated the instruction of top-down reading strategies. The participants showed a strong interest and need to learn more about some bottom-up reading strategies, including how to guess the meaning of unfamiliar radicals, characters, or words and their usage in a sentence, and how to understand the patterns and meanings of sentences. Regarding what other reading strategies they would like to learn, three out of the 17 participants believed that it was helpful to read the questions before actually reading the text. Skipping hard words, writing summaries of the text in the margins, using context clues, and guessing the

meanings of unfamiliar words were also regarded as useful reading strategies. In addition, participants showed interest in finding a quicker way to summarize the text while reading, knowledge of radicals and their meanings, and ways to read faster. Participants also wanted to know more about two reading strategies that were introduced in this study: *identifying key sentences*, and *formulating questions*.

Discussion

Results suggested that the strategies-based reading instruction significantly improved participants' overall reading comprehension and their ability in answering global-reference questions. However, no significant effect has been observed on answering sentence-reference questions. While participants generally acknowledged the effectiveness of using reading strategies, they did not show interest in learning or applying the ten types of top-down reading strategies. This study addressed the lack of research on L2 learners' perceptions on explicit strategy training and its findings could shed light on the modification of existing strategies-based reading instruction models.

Effects of Strategies-based Reading Instruction

After receiving the treatment, the experimental group improved significantly more than the control group in answering all reading comprehension questions as one composite group. The effect size ($r = 0.43$) was close to 0.5, the cut-off of large effect size, indicating that the magnitude of group difference in reading comprehension gains was medium to large size. The effects of this strategies-based instruction program on improving reading comprehension were significant and obvious. This result echoes findings of previous studies on ESL or other foreign languages that explicit teaching of reading strategies can significantly enhance reading comprehension (e.g., Macaro & Erler, 2008; Singh, 2019; Shih & Reynolds, 2018). In this study, the seven-week strategies-based reading instruction was designed drawing on instruction models proposed by Janzen (2002), Carrell (1998), and Cohen and Weaver (2005), the effects of which had been demonstrated by empirical studies on reading alphabetic languages (e.g., Moghadam, 2004). By putting theory into practice, the current study provided additional empirical evidence on the soundness of these strategy training models from analyzing CSL data.

Analyzing global-reference and sentence-reference questions as two separate groups further showed the effects of the strategies-based instruction. Compared with the control group, participants receiving the treatment improved significantly more in answering global-reference questions but not in answering sentence-reference questions. The treatment in this study only focused on top-down strategies. Top-down reading strategies can help readers integrate information and gain a holistic understanding of a text. Global-reference questions require participants to refer to several segments, to synthesize beyond the sentence level, and to generate holistic comprehension of the whole article. Global-reference questions assess top-down reading comprehension and are mainly supported by top-down strategies. By contrast, answering sentence-reference questions is closely associated with the use of bottom-up strategies. Specifically, readers can answer a sentence-reference question correctly as long as they are able to locate and decode a single sentence that includes the answer. Bottom-up strategies focus on word recognition, decoding, syntax, or text details and could directly contribute to the

comprehension of smaller linguistic units and help readers to answer sentence-reference questions. Bottom-up strategies were not included in the strategies-based instruction in this study. As reflected by the survey data, participants thought that the strategies-based reading instruction, which only focused on top-down reading strategies, improved their ability to understand the textual structure. However, it did not help understand the details.

These findings all suggest that the experimental group's significantly larger reading comprehension gains can be attributed primarily to their higher competence in top-down reading comprehension and the mastery of top-down reading strategies, which was the focus of the treatment. Their lack of improvement in bottom-up reading comprehension, which was not the focus of this study, helps to confirm that their reading comprehension gains should be largely attributed to the strategies-based reading instruction instead of natural proficiency development or general reading practice.

Students' Low Interest in Using Reading Strategies

This study investigated the experimental group participants' perceptions of using reading strategies after they received the treatment. While generally confirming that using reading strategies could facilitate their reading comprehension, participants were not enthusiastic about learning or using top-down reading strategies. It should be noticed that since the control group was not surveyed, findings did not reflect the difference between the experimental and control group.

A few previous studies have examined L2 learners' perceptions of using reading strategies and they reflected a positive L2 learner attitude toward reading strategies. For instance, Karimi (2015) and Singh (2019) found that English L2 learners who received explicit strategy training tended to use reading strategies more frequently. After receiving direct strategy training, young Chinese L1 readers were also found to use more strategies, be more knowledgeable about strategic reading than their peers (Lau & Chan, 2007). Macaro and Erler (2008) also reported that strategy instruction led to improved attitudes towards reading. Regarding the current study, the experimental group participants' low interest in using reading strategies seems to challenge previous findings.

Indicated by participants' responses to open-ended survey questions, several factors could explain their low level of interest in reading strategies in the current study: (1) Using reading strategies was a great change to their existing reading habits. It took time to get used to the new approach. (2) Unskilled strategy application might slow down reading and reduce concentration. Therefore, they doubted the usefulness of reading strategies. (3) Writing down strategy codes while reading interfered with their train of thought. This might be one of the major causes of students' negative attitudes toward reading strategies.

How to make students aware of the of benefits of strategic reading is an essential consideration in strategies-based reading instruction. Considering CSL learners' low interest and low enthusiasm in learning and using reading strategies, how to encourage and motivate them to engage in strategies-based reading instruction is a big challenge to educators.

How to Improve Strategy Instruction: What We Can Learn from Students' Perceptions

While prior studies have widely examined the effect of strategy training on reading comprehension, they seldom investigated the quality of their strategy instruction from students' perspective. One study on L1 Chinese learners (i.e., Lau & Chan, 2007) reported that students who received strategy instruction had a more positive attitude toward the instruction of reading strategies. Similarly, in the present study, the majority of participants showed a positive attitude toward the reading strategy instruction. However, in the present study, around 23.5% of participants still held a negative attitude toward it. This study's strategies-based reading instruction had some limitations. Arduous efforts should be made to further improve it. Themes arising from participants' responses to open-ended questions 16, 18, and 19 suggested that the quality and effectiveness of the current strategies-based reading instruction model could be improved in the following ways.

Individualizing Instruction and Encouraging Autonomy

Learning style, gender, age, beliefs, previous educational and cultural experiences, and learning goals are important factors affecting strategy choice (Oxford, 1994). Strategies that work for one individual do not necessarily work for others. Teachers could consider giving students more freedom in deciding which strategies to learn and practice according to their learning styles, tasks, and goals. Instead of providing homogeneous reading strategy instruction, teachers could tailor the instruction to each individual learner if it is possible.

Making Instruction and Modeling More Understandable

Strategy training should provide a large amount of practice of varied types (Oxford, 1994). Detailed and understandable strategy-use modeling is indispensable to the success of strategy training. In future strategy instruction, instructors may consider slowing the instruction pace, explaining the definitions better, and providing multiple examples to show how to apply these reading strategies in diverse reading contexts. When modeling strategy use, instructors should use articles with appropriate difficulty.

Writing Down Strategy Codes After Instead of During Reading

In this study, participants were required to write down corresponding codes to indicate their strategy use, which was distracting to some readers. Future strategies-based instruction may consider asking students to write strategy codes after instead of during reading. Marking text may become unnecessary when readers begin to apply reading strategies more automatically.

Cultivating Students' Motivation and Positive Attitudes

Strategy training should directly address learners' affective issues, including motivations, beliefs, and interests (Oxford, 1994). Future instruction should provide students with a mechanism to assess the value of reading strategies, as well as their improvement in reading comprehension immediately after learning reading strategies. By doing so, students can realize that strategic competence is an indispensable supplement to language knowledge.

Including Bottom-Up Reading Strategies and Other Useful Strategies

This study explicitly taught 10 types of top-down reading strategies. Students showed interest in knowing more about some of them. They also named some bottom-up strategies that they wanted to learn, such as guessing or skipping unfamiliar words, using knowledge on radicals to facilitate reading, etc. Previous studies showed that morphological awareness (Zhou, 2022), radical awareness (Shen & Ke, 2007), and syntactic awareness (Zhou, 2021) correlated with reading comprehension. Future strategies-based reading instruction programs should consider incorporating the training of bottom-up strategies that facilitate lower-level decoding and syntactic parsing.

Conclusion

This study investigated a strategies-based reading instruction program that focused on the learning and practice of ten top-down reading strategies. Despite its limitations, the current study constitutes some contributions to the CSL reading instruction. First, it provided theoretical foundations, empirical evidence, and practice advice for CSL strategies-based reading instruction. Findings supported the positive effects of strategies-based reading instruction on enhancing reading comprehension, which have been widely observed in research on other foreign languages. Given its significant instructional effect, the strategies-based reading instruction seems to be a promising approach in improving reading comprehension for CSL learners with alphabetic L1 background, especially for struggling readers. This study also modeled the components and procedures of this strategies-based instruction program in detail. This will benefit researchers and teachers who want to design training on reading strategies or general language learning strategies.

Moreover, this study investigated CSL learners' perceptions of reading strategies and strategies-based reading instruction. Participants generally confirmed that it was necessary to integrate reading strategy instruction into regular reading class, but their satisfaction, interest, and enthusiasm with this strategies-based reading instruction program was in a low to moderate degree. This suggests that when designing strategies-based reading instruction, teachers should not only consider its effectiveness but also think about how to make the instruction more engaging and interactive. Participants provided inputs regarding problems in the current program and how to make improvement. These findings throw light on the modification of existing models of L2 strategies-based reading instruction.

This study only examined ten top-down strategies. Future studies may want to include other types of top-down strategies and bottom-up strategies. The strategies-based reading instruction only lasted for seven weeks, and the posttest was conducted right after the treatment. Future studies may consider examining long-term programs and conduct a delayed posttest to see if the effects of the treatment can be retained. In terms of the effects of strategies-based reading instruction, this study mainly examined their effects on enhancing reading comprehension. Future studies need to investigate other effects revealed by prior studies, such as the effects on knowledge about reading strategies, and on strategy use frequency.

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Appendix A***Components of Strategy-use Modeling***

Strategies	Code	Declarative knowledge/Definition	Procedural knowledge	Conditional knowledge		
		What	How to use	Why to use	When to use	Where to use
Previewing	P	The reader browses the article before actually reading it.	Before reading, the reader skims titles, the glossary, the beginning paragraph, the closing paragraph, and the first sentence of each paragraph, as well as the comprehension questions.	The reader can have a general idea about the characteristics of the text, including topic, organization, and difficulty levels.	Pre-reading	Title, heading, glossary, comprehension questions, opening and closing paragraphs, the first sentence of each paragraph
Anticipating	Anti → :	The reader predicts what will occur in the succeeding segments of the text.	Based on topic sentences, transitional sentences, conjunctions, and other cues, the reader consciously predicts what the author will talk about next.	The reader can form a mental model of the succeeding text, read more actively, and check understanding.	Pre-reading/ During-reading	Topic sentences, transitional sentences, conjunctions, and other cues

Using background knowledge and personal experience	B	The reader uses his/her general knowledge and personal experience to facilitate reading comprehension.	The reader connects the reading text with his/her background knowledge or life experience to explain, extend, and clarify content and to evaluate the veracity of his/her interpretation of the content.	The use of background knowledge may facilitate comprehension. The reader can gain a deeper understanding and develop a personal relationship with the reading materials.	Pre-reading/ During-reading	Content that activates the reader's background knowledge
Formulating questions	(?) (How, why, what, who, when)	The reader raises questions while reading.	The reader reflects on what she/he read actively and formulates questions (i.e., what, why, how, who, where, or when) about the text.	Reading is interactive processing instead of passive receiving. The reader should be actively involved in the process of meaning co-construction.	During-reading	Content that stimulates the reader's questions

Attending selectively	S	The reader selectively attends to specific aspects of the comprehension task at hand.	The reader pays more attention to segments of greater importance, such as the topic sentences, main ideas, and contents related to comprehension questions, and skips less important segments, such as examples and supporting sentences.	The reader can save time, reduce cognitive load, gain a better mastery of main points and the text structure, and answer reading comprehension questions more effectively.	During-reading	Topic sentences, main ideas, contents related to comprehension questions; examples, supporting sentences
Identifying the main idea	_____	The reader identifies the main idea of a whole text.	The reader reflects, summarizes the reading text, and identifies the sentences that contain the main idea.	The reader can have a better understanding of the theme and substance of the text.	During-reading/ post-reading	The first and last paragraph and the first few sentences of each paragraph
Identifying key sentences of a paragraph or segment of text	~~~~~	The reader identifies the key sentence of a paragraph or a segment of text.	The reader identifies the key sentences to better understand the main idea of a given paragraph.	The reader can gain a better understanding of the main point of a certain paragraph or segment of text.	During-reading	The first few sentences of each paragraph
Making a summary	← Sum	The reader summarizes and reflects on what she/he has read.	After reading a whole paragraph or an entire article, the reader summarizes and reflects on what she/he has read.	The reader can gain a general idea of what she/he reads, achieve greater recall, and keep active while reading.	During-reading/ post-reading	At the end of a segment of text or the whole text

Monitoring comprehension	M (0-100%)	The reader assesses his/her degree of understanding of the reading text.	The reader evaluates her/his comprehension by assigning a value between 0% and 100%, indicating what percentage of the content she/he can understand.	The reader can maintain awareness of his\her reading comprehension.	During-reading/post-reading	Anywhere
Evaluating strategy use	E (0%-100%)	The reader evaluates his/her application of strategies.	The reader evaluates her/his strategy-use effectiveness by assigning a value between 0% and 100%.	The reader can stay aware of his\her strategy employment and think about whether she/he uses strategies appropriately.	Post-reading/during-reading	After using a strategy or several strategies

Appendix B Reading Strategy Survey

Gender----- Heritage Non-heritage

Instructions:

This survey aims to investigate your attitudes towards the strategies-based reading instruction program. Your participation in this study is completely voluntary. There are no foreseeable risks associated with this project. However, if you feel uncomfortable answering any questions, you can withdraw from the survey at any time. Your information will remain confidential. Your answer to the questions will not influence your course grade, so please feel free to express your true feelings. For the following questions, please answer by giving marks from 1 to 6.

1): It is necessary to integrate reading strategy instruction into our reading class.

Disagree 1 2 3 4 5 6 Agree

2): It is necessary to have the six reading practice sessions in which you practice using reading strategies and marking the text.

Disagree 1 2 3 4 5 6 Agree

3): The reading strategy instruction has improved my knowledge of reading strategies.

Disagree 1 2 3 4 5 6 Agree

4): I can understand the teacher's instruction and demo of reading strategies.

Disagree 1 2 3 4 5 6 Agree

5): I **cannot** understand the teacher's instruction and demo of reading strategies, so I do not know how to use these strategies in practice sessions.

Disagree 1 2 3 4 5 6 Agree

6): The reading practice sessions have improved my ability to apply reading strategies.

Disagree 1 2 3 4 5 6 Agree

7): The application of reading strategies has improved my reading comprehension.

Disagree 1 2 3 4 5 6 Agree

8): By using the ten reading strategies, I can read faster and achieve a higher degree of comprehension

Disagree 1 2 3 4 5 6 Agree

9): I like learning reading strategies.

Disagree 1 2 3 4 5 6 Agree

10): I like using the ten reading strategies for reading Chinese articles.

Disagree 1 2 3 4 5 6 Agree

11): I often transfer what I learn in Thursday classes about the ten reading strategies into other reading contexts, such as reading in other Chinese classes or reading in English or in other foreign languages.

Disagree 1 2 3 4 5 6 Agree

12): Sometimes although I do not write down the corresponding strategy codes, I actually use strategies.

Disagree 1 2 3 4 5 6 Agree

13): Generally speaking, I like the strategy instruction in Thursday's reading class.

Disagree 1 2 3 4 5 6 Agree

14): Generally speaking, the reading strategy instruction and practice sessions are successful.

Disagree 1 2 3 4 5 6 Agree

15): Do you think this semester's reading strategy instruction (before spring break) is useful and helpful to you? (Y/N) Why or why not?

16): If the instructor wants to improve the reading strategy instruction, do you have any suggestions? (E.g. how to introduce strategies, how to practice using strategies, etc.)

17): Did you apply the 10 reading strategies in the six reading practice sessions? (always, sometimes, seldom or never) Why or why not?

18): Do you like marking the text, specifically writing down strategy codes **P**, **||Anti->**, etc, while applying reading strategies? (Y/N) Why or why not?

19): Have you learned any reading strategy in any other situations, such as English class, or other foreign language class. (Y/N) If yes, could you please write down which strategies you have learned and where you learned?

20): What other reading strategies are helpful to your reading comprehension in addition to the ten strategies introduced in the class?

21): What other reading strategies would you like to know more about?

About the Authors

Jia Lin is an Assistant Professor at Howard University. Her research focuses on second language reading, foreign language testing and assessment, foreign language pedagogy, and language learning strategies. Her publications appeared in *Language Teaching Research*, *Chinese as a Second Language*, and *Chinese Journal of Applied Linguistics*.

Gengsong Gao is an associate professor of Chinese studies and Chinese program's coordinator at University of Richmond. He specializes in contemporary Chinese literature and language teaching. His publications appeared in the journal of *Modern Chinese Literature and Culture*, *Reading in a Foreign Language*, and *The Computer Assisted Language Instruction Consortium Journal*.

Ting Huang is an Assistant Professor from College of William and Mary. Her research interests include reading, educational technology, video learning, diversity, and teacher education. Her published work can be found in *Chinese as a Second Language*, *Reading in a Foreign Language*, *Transformative Works and Cultures*, and other journals.