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Research Article

Reading Strategy Use and Comprehension Performance of More Successful and Less Successful Readers: A Think-aloud Study

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Abstract

This study explores the differences between more successful and less successful EFL readers in their comprehension performance and abilities to use reading strategies in interaction with English texts through thinking aloud while reading in pairs. Ten freshman high school students participated in pairs in four think-aloud reading tasks to think out loud for textual meaning and to answer reading comprehension questions about the texts they had read. The findings drawn from analysis of the reading scores and think-aloud protocols of the most successful pair and the least successful pair among the five pairs indicated that the most successful had scored higher on the comprehension questions and had performed think-aloud reading better than the least successful. Key differences characterizing the best pair from the weakest pair in this study were found to lie in readers' effective reading strategy use, sufficient linguistic knowledge and background knowledge, conscious monitoring of comprehension, and constant integration of textual meaning. Important implications of the results for pedagogical practices that encourage development of EFL reading skills are discussed.

Keywords

Reading strategy use • Comprehension performance • Think-aloud • EFL (English as a foreign language) • EFL reading

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Within the context of language study and teaching, reading is fundamentally important for language learning. Bright and McGregor (1970, p. 52) stated that "Where there is little reading, there will be little language learning." To date, there is a growing body of research that has been conducted on using reading to help second/foreign language (L2/FL) learners develop language proficiency and reading skills (e.g., Krashen, 2004; Lao & Krashen, 2000; Yamashita, 2008). Researchers, as well as language instructors, have also become increasingly interested in examining the strategies L2/FL learners use during reading and the possible effects of strategy-based reading instruction or training on reading development (Aghaie & Zhang, 2012; Anderson, 1991; Janzen, 2003; Kern, 1989; Zhang, 2008; Zhang, Gu, & Hu, 2008). To achieve strategic reading, a reader needs to possess both knowledge about strategies and the ability to apply strategies effectively (Anderson, 1991), which is also one of the notable characteristics that distinguish proficient readers from less proficient readers.

Reading Strategies

Reading strategies are self-directed actions where readers flexibly take control with a certain degree of awareness to retrieve, store, regulate, elaborate, and evaluate textual information to achieve reading goals (Erler & Finkbeiner, 2007; Paris, Lipson, & Wixson, 1994). Readers' strategy use while reading demonstrates their interaction with written texts, and effective use of strategies can improve their reading efficiency and text comprehension (Carrell, 1989). In terms of strategy categories, Williams and Burden (1997, p. 149) stated that "Strategies can be cognitive; that is, they can involve mental processing or they can be more social in nature, and their effective use is enhanced by metacognitive awareness." Cognitive strategies function for effective and efficient retrieval, storage, and acquisition of information for readers to extract and construct meaning from texts. The literature on both first and second language reading provides a binary division of cognitive strategies as bottom-up and top-down strategies, with the former being related to sound-letter, lexicon, and syntax, and the latter being concerned with text gist, background knowledge, and textual organization (Erler & Finkbeiner, 2007; Paris et al., 1994). Metacognitive strategies that address readers' knowledge of cognitive resources, awareness of cognitive processing, and the ability to adjust utilized strategies (Baker & Brown, 1984; Carrell, Gajdusek, & Wise, 1998) are performed by readers to "check the outcome of any attempt to solve a problem, plan one's next move, monitor the effectiveness of any attempted action, and test, revise, and evaluate one's strategies for learning" (Brown, 1994, p. 115). Social strategies, such as "asking for clarification or verification," "cooperating with peers and proficient users of the new language," "developing cultural understanding," and "becoming aware of others' thoughts and feelings," are categorized as one of the

six strategy groups in Oxford's (1990, pp. 323–324) system of language learning strategies useful for L2/FL reading to increase readers' social involvement in the target language.

Thinking Aloud

To best gain access to a reader's sophisticated process of reading comprehension and strategy use, thinking aloud provides a powerful means to obtain this mental data, and verbal protocol analysis can lead to new insights into reading strategies, reader responses and characteristics, as well as the influence of situational variables (Afflerbach, 2000; Smith, 2006). The technique of thinking aloud while reading requires readers to express their thoughts from their short-term memory at specific intervals; this makes covert mental processing overt and provides direct evidence of the internal reading process performed by readers while engaged in the task of reading (Gillam, Fargo, & Robertson, 2009; Kucan & Beck, 1997). In reading research, although the use of think-aloud protocols as a source of data and verbal protocol analysis as a research tool was ever criticized for potential limitations related to interference in the cognitive process and challenges to the validity of verbal report data, researchers and instructors who are interested in using the think-aloud technique for examining and supporting learners' reading comprehension process have now generally agreed that once care is taken and used appropriately, the think-aloud method can be one of the best means to elicit sufficient and reliable data for studying readers' invisible metacognitive awareness and mental strategy use (Zhang et al., 2008). To minimize the interference of thinking aloud in readers' ongoing reading process, as well as to lessen the dual burdens deriving from the task of reading and reporting on learners' cognitive load, Olshavsky (1977) suggested offering warm-up exercises or training sessions for learners to practice and familiarize themselves with the task of reading and reporting. Also, in order to deal with challenges to the validity of data gathered from the methodology of verbal reporting, inter-rater reliability in strategy coding of verbal protocols is necessary to obtain for attaining objective data analysis (Pressley & Afflerbach, 1995). In fact, thinking aloud and protocol analysis have been used widely in the research on reading with much empirical evidence that supports their validity, which has already shown widespread acceptance of the think-aloud method and acknowledgement of its legitimacy.

Relevant Studies

Numerous reading studies have exemplified the use of thinking aloud in cognitive inquiry for identifying the strategies employed by successful and less successful

L2/FL readers and have examined what differentiates these two groups of learners. Relevant to this are the important studies conducted by Anderson (1991), Block (1986), Hosenfeld (1977), Nassaji (2006), Olshavsky (1977), Yayli (2010), and Zhang et al. (2008). In Block's (1986) study, which examined the comprehension strategies of L2 readers, the more successful group of readers that Block called "integrators" (pp. 482–483) integrated information, kept aware of text structure, monitored comprehension, responded extensively, and showed improvement in both their reading skills and grade point averages. On the contrary, the other group, "non-integrators", failed to integrate information or recognize text structure, relied more on personal experience rather than the topic of the text, responded reflexively, and progressed less in their performance on reading skills and in their grade point averages. In a similar study, Anderson (1991) investigated 28 ESL (English as a second language) university students' individual differences in reading strategy use for two types of reading tasks: reading academic texts and taking a standardized reading comprehension test. The key difference that was found in strategy use between those with good and those with poor comprehension lay in the total number of the identified strategies that were used successfully while reading a text and while taking a reading test. In a study conducted in a FL context, Yayli (2010) analyzed cognitive and metacognitive reading strategies used by six proficient and six less proficient English learners in a Turkish university while they read an expository text and a narrative text. Results revealed that both groups of readers used the same strategy types. However, the proficient readers used cognitive and metacognitive reading strategies more frequently than their lower-proficiency counterparts for both text types.

The Present Study

Baumann, Jones, and Seifert-Kessell (1993) stated that exposing learners to collaborative thinking aloud which involves meaningful peer interaction can encourage a greater depth and breadth of readers' verbal reports about text understanding, elicit more use of reading strategies, and lead to more engaged reading. Most think-aloud research studies, such as the ones reviewed above, have involved the individual-based think-aloud method for studying readers' cognitive process of reading comprehension or metacognitive knowledge and awareness of strategy use. Fewer reading investigations, however, have combined the use of *thinking aloud* and *collaboration* (i.e., thinking aloud in collaborative pairs or groups) to empirically explore reader ability on reading strategy use and text comprehension performance (Scotto-Boyan, 2002; Seng, 2007). To contribute to the body of research of this nature, the present study attempts to examine the differences between skilled and less skilled EFL (English as a foreign language) Taiwanese senior high students in their reading

performance and strategy use as they collaboratively read and think aloud English texts in pairs. For this purpose, the following research question was addressed:

> What are the key differences that characterize the more successful EFL readers from the less successful ones in their comprehension performance and in their use of reading strategies to construct textual meaning and solve reading problems while reading and thinking aloud in pairs?

Findings from the study might accommodate the noted gap in reading research and provide language teachers with insights into how learners with different levels of reading skills read socially, as well as how such findings can be used in the classroom teaching and learning of EFL in order to improve students' reading development.

Method

Research Design

Mixed-methods research is defined as a methodology for conducting research which involves collecting and analyzing both quantitative and qualitative data in order to examine different elements of a single study or a program of inquiry (Bryman, 2004; Creswell & Plano Clark, 2007). In mixed-methods research, researchers may incorporate both quantitative and qualitative approaches to broaden understanding of a research problem or issue, or they may apply one approach to better explain or build upon results that have been obtained from the other approach (Creswell, 2009). This study employed the sequential explanatory design, a type of mixed-methods design, for data gathering and data analysis with quantitative evidence serving primarily as a springboard to allow questions to evolve that were examined qualitatively for greater depth and insights into how the quantitative results had emerged and to determine their significance. More specifically, the acquired quantitative data and statistical analyses in this study enabled the researcher to distinguish the most successful pair and the least successful pair through their reading scores, as well as to find out the differences between the two pairs in their frequency of strategy use. Meanwhile, the collected think-aloud data and qualitative protocol analysis allowed the researcher to gain access to participants' internal reading and thinking process, to witness their awareness and use of reading strategies in interacting with texts while comprehending textual meaning and overcoming reading difficulties, and most importantly, to generalize about the key features that comprised skilled reading processing. Both approaches were used to present the full picture of the investigation.

Participants

The participants involved in this study were 10 EFL Taiwanese high school freshmen with an intermediate level of English language proficiency, as determined by their English scores on the Comprehensive Assessment Program for Junior High School Students, a standardized assessment for high school admission in Taiwan. This level of students was chosen for it contained a larger student population with a wider range of scores and a normal distribution. Based on stratified random-sampling procedures, the 10 students agreeing to participate in this study (five male and five female native speakers of Mandarin Chinese with a mean age of 16 years and with five years of EFL learning in school), among 256 intermediate students in their freshman year, were chosen as research participants and randomly grouped into pairs to carry out the think-aloud reading tasks.

Instruments

Four English texts from the book *100 Short Stories for Reading Comprehension* (Methold & Jones, 2006) were used as the reading materials for the study participants to think aloud during their four reading tasks. These four texts were previously rated for level of engagement and level of difficulty by the pilot group, which consisted of 10 EFL intermediate-proficiency high school freshmen who did not participate in the study, in order to ensure that the selected texts were motivating and challenging enough. Also, every text, with around 200–250 words in length, was followed by five multiple-choice comprehension questions to measure participants' reading comprehension ability in main idea construction, important detail identification, and word meaning inference. A total of 20 comprehension questions were included in the four reading tasks. Cronbach's Alpha coefficient of reliability of the comprehension assessment was .90, and content validity was determined through the opinions of one TESOL (teaching English to speakers of other languages) teacher who had reviewed the questions to verify their appropriateness.

Procedures

The study lasted for four consecutive weeks during the first semester. In order to be well acquainted with the think-aloud procedure so as to minimize any interruption from it in the ongoing comprehension process, the participants were offered, prior to the first reading task, both scaffolded practice and independent practice for thinking aloud with the researcher scaffolding being gradually removed and more responsibility for thinking aloud being handed over to the participants. After having

adjusted to the think-aloud procedure and being able to talk freely about any thoughts that came into their heads while reading, the paired participants performed the four think-aloud reading tasks, one per week after school hours, with both students in a pair taking turns reading aloud and thinking aloud for textual meaning sentence by sentence. They also collaboratively answered five comprehension questions after reading each text. It should be noted that participants were allowed to use either the target language (English) or their mother tongue (Chinese) or both in their think-aloud reporting in order to obtain reasonable quality and quantity of think-aloud data. Before the onset of the study, the participants were informed that their think-aloud reports would be audio recorded for transcription, and that all collected data would be kept confidential and used only for research purposes. During the data gathering stage, the researcher circulated, listened in from a distance, and checked that the recording procedure had not suffered any technical failures. It was important for the researcher to not intervene in any way so as to maintain the independence of the participants and minimize any potential influence by the researcher.

Analysis

All of the participants' recorded think-aloud reports were transcribed and translated into English. Some characteristic nonverbal information such as laughter and silence was also encoded to ensure that the presentation of participants' spoken language was as authentic as possible. Subsequently, the reading strategies inherent in the transcribed think-aloud protocols were coded and cross-checked by the researcher and an experienced TESOL teacher who actively and regularly used strategy teaching. The two raters read through all 20 transcripts and independently coded them according to the Reading Strategy Classification Scheme (see Appendix A), which had been initially constructed by reviewing the coding schemes from previous studies (Block, 1986; Lau, 2006; Zhang, 2001) then further modified as coding went on. In the scheme, the 50 reading strategies were grouped under three major categories: cognitive, metacognitive, and social strategies. Strategy coding achieved a high inter-rater reliability of 91%, and the raters met to discuss discrepancies and reach agreement. Finally, the coded reading strategies were counted and analyzed for studying how participants' reading strategy use related to successful meaning construction and problem solving. Also, to test for statistically significant differences in frequency of each strategy use between the most successful and the least successful pairs, the test for difference in two population proportions was employed. In addition, the scores for the 20 reading comprehension questions from each pair were computed with a potential maximum total score of 100 points.

Results and Discussion

Table 1 summarizes the relative achievement of the five pairs of participants in response to the reading comprehension questions from the four reading tasks. The table indicated that Pair 1 achieved the highest reading comprehension score (85 points with only three questions answered incorrectly) to be the most successful pair in terms of reading achievement, while Pair 3 was the least successful pair with the lowest score (50 points with 10 out of 20 questions answered correctly). Pairs 1 and 3 were selected for strategy-use and comprehension-performance comparative analyses as they had individually represented the best and worst paired performers in this study.

Table 1
Each Pair's Reading Scores on the Four Think-aloud Reading Tasks

	Task	1st	2nd	3rd	4th	Total
Pair 1	NQAC/NQ	4/5	4/5	5/5	4/5	17/20
	Reading score	20	20	25	20	85
Pair 2	NQAC/NQ	5/5	3/5	4/5	4/5	16/20
	Reading score	25	15	20	20	80
Pair 3	NQAC/NQ	4/5	2/5	2/5	2/5	10/20
	Reading score	20	10	10	10	50
Pair 4	NQAC/NQ	4/5	4/5	3/5	3/5	14/20
	Reading score	20	20	15	15	70
Pair 5	NQAC/NQ	4/5	3/5	4/5	3/5	14/20
	Reading score	20	15	20	15	70

Note. 1. NQ = number of the comprehension questions in one task
NQAC = number of the comprehension questions answered correctly in one task

2. Each think-aloud task consisted of one reading text and five comprehension questions with every question being assigned with five points.

Quantitative Findings: Differences in Frequency of Strategy Use

From the protocol analysis, the most and least successful pairs were found to have used a wide range of similar types of strategies with varying frequency of use in their reading and think-aloud processes. This corresponded with the findings from Anderson's (1991) and Yayli's (2010) studies where learners had used similar reading strategies across ability levels and tasks. Eleven out of the 50 identified strategies were also found to be statistically significant between the best and weakest pairs across tasks in strategy frequency ($p < .05$), as calculated by the test for difference in two population proportions. That is, Pair 1 used Strategies T6 (drawing on prior experience/knowledge, $z = -2.06$, $p < .05$), T8 (inferring, $z = -4.26$, $p < .05$), T9 (predicting text content, $z = -2.52$, $p < .05$), T23 (summarizing, $z = -4.96$, $p < .05$), and S4 (expressing disagreement, $z = -2.81$, $p < .05$) significantly more often than Pair 3 did. However, Pair 3's application of Strategies B2 (rereading, $z = 12.01$, $p < .05$),

T4 (restating, $z = 3.34$, $p < .05$), T17 (adjusting/correcting an initial interpretation, $z = 3.52$, $p < .05$), M2 (stating failure to understand the overall meaning of the text, $z = 3.52$, $p < .05$), S1 (asking others for help, $z = 4.52$, $p < .05$), and S3 (expressing agreement, $z = 6.74$, $p < .05$) significantly exceeded Pair 1's frequency of use.

Clearly, the above strategy types that were used by these two pairs to achieve a significantly different level in use frequency were varied in terms of why they might be used so often and how they might contribute to comprehension. Mainly, most of the frequently-used strategies by the skilled pair were those that seemed to contribute more to comprehension and might bring about better reading. For instance, *summarizing* was mainly applied for readers to use their own words to interpret the text they had read, thereby internalizing textual information and enhancing comprehension. Also, *drawing on prior experience/knowledge* was another useful strategy which created a connection between learners' real-world knowledge with textual content for generating meaning construction. However, confined by lower levels of language competence and/or poorer reading skills, the less successful readers were understandably more likely to repeat the incomprehensible parts verbatim or state their comprehension failure and frequently ask for assistance from others; while receiving help, they tended to agree with the given responses and correct their initial interpretations. Overall, these quantitative data provided an initial indication of some of the differences between these two pairs, while their mental reading processes extracted from the coded transcripts specified the quality of those variations which evidently differentiated these two pairs and from which the factors resulting in success or failure in comprehension were generalized.

Qualitative Findings: Differences in Strategy Use and Comprehension Processing

The qualitative comparisons made centered on the processes in which Pairs 1 and 3 performed tasks with different degrees of success in terms of text comprehension. When looking at the coded transcripts of the two pairs, Pair 1's transcripts were found to be much shorter, but the performance of their text processing was far better than Pair 3's. Their thinking aloud apparently involved more effective use of reading strategies, more precise exploration of word meanings, more explicit attempts at problem solving, greater integration of textual elements, and ultimately, gist comprehension. In contrast, Pair 3 achieved a worse reading test result as well as poorer comprehension performance during the entire think-aloud process. They performed less strategically in their process of extracting meaning and solving problems. In particular, they seldom connected information into a coherent and integrated meaning. The parallel sections from the third coded text transcripts of both pairs were used for analyzing and comparing successful and unsuccessful strategy

use and comprehension processing where appropriate, because these sections showed with clarity the differences in qualitative performance in two major areas: meaning construction and problem solving (see Appendix B for the third text).

Contrast in terms of meaning construction.

Differences in integrating textual information and monitoring comprehension. There were some notable differences found in the ways through which Pairs 1 and 3 engaged in reading, but the degree to which they could integrate information was seen to provide an even greater contrast. The sequence below displays the ways in which Pair 3 did not succeed in integrating text while achieving and monitoring comprehension (see Appendix C for Coding Key).

Utterance No.	Participant	Verbal report	Strategy
49	P3b	Leon stood up. "I must go," he said. "I'll see you tomorrow." "OK," Tom said. "I'll be here."	Reading aloud*
50	P3b	Tom *said, "Okay, I'll….I'll be here tomorrow."*	Paraphrasing*
51	P3a	*Does this imply that* Tom *worked at the bank?*	× Providing the overall meaning of the text* Asking for confirmation***
52	P3b	*Em… Or it might mean that* Leon *gave* Tom *a ride to his workplace – bank, and* Leon *would pick him up there tomorrow.*	× Providing the overall meaning of the text*
53	P3a	*So the* security guard *mentioned earlier probably refers to* Leon.	× Inferring micro meaning from macro clues (contextual clues)*
54	P3a	Leon walked out of the restaurant and crossed the road.	Reading aloud*
55	P3a	Leon 走出了那家餐廳, 然後穿越馬路. *What was he going to do?*	Translating* Asking about the overall meaning of the text***

The inaccurate overall meaning offered by Participant P3a in line 51 clearly showed that she had not grasped the text up to that point (The two characters, Tom and Leon, were drinking tea at the restaurant, not the bank, and Tom would meet Leon at the restaurant the next day, instead of going to work at the bank). After what P3a said, P3b was misdirected to establish an alternative (incorrect) overall meaning in line 52. In line 53, P3a mixed up the roles of *Leon* and *security guard*, which again revealed that she had not comprehended the text in detail. At this point she made an attempt to link textual elements to find a connection, but she seemed to have difficulty in organizing the sentence structure, even though the text was clearly written to separate each character and their sayings, which should have produced clear meanings for understanding. As she continued reading, she correctly translated a sentence and framed a relevant question to find more overall sense (line 55). However, she was unaware that the previous interpretation she had made (the two characters were at the

bank) conflicted with her translation of the current sentence (Leon walked out of the restaurant).

Despite the fact that the textual meaning was evidently unlocked with a correct translation made by P3a, neither P3a nor P3b could detect the inconsistency here. It should have been a critical point for them to realize their previous misinterpretations, but obviously they were having problems before that point. They did not seem to hold all of the ideas that they had acquired in their working memory to assemble them into a coherent meaning, nor did they monitor their comprehension to see whether their previous interpretations and the currently encountered information were consistent. Each single textual element seemed to be isolated and unrelated in their reading. Another example of this is presented below, where they first misinterpreted a sentence involving the grammatical structure *verb + as + adverb + as one can* (lines 66–67) and later paraphrased it correctly without noticing any contradiction between their initial and latter interpretations (line 70).

66	P3b	Then he walked up to the…..security guard, said something to him and ran off as fast as he could. *Ran as fast as whom?*	Reading aloud* × Asking about syntactic structure***
67	P3a	*It might mean that he ran as fast as the* security guard.	× Tentative interpretation*
68	P3a	*He walked to the security guard, and told him something….. Who does* 'him' *refer to?*	Paraphrasing* Asking about syntactic structure***
69	P3b	*It should be that* security guard.	Providing an explanation about syntactic structure*
70	P3a	ran off as fast as he could. *That is, he did his best to….. he ran as fast as possible.*	Rereading* Paraphrasing*
71	P3b	*Ran away as fast as possible.*	Restating*

In lines 66 and 67, both P3b and P3a apparently misinterpreted the clause containing the grammatical structure *verb + as + adverb + as one can* because they paraphrased the clause "ran off as fast as he could" in the text as "*he ran as fast as the security guard.*" Moreover, when they came to this sentence, they needed to clarify whom the personal pronouns "him" and "he" referred to. In line 67, however, P3a was unable to realize that the personal pronoun "he" actually signified Leon instead of the security guard, as she had thought. Again, P3a's comprehension difficulty appeared in line 68 where she was not clear what "him" referred to until P3b clarified it for her (line 69). This indicated that she had not read with increased understanding, integrating meaning as she went along. According to the available evidence, P3a here performed poorly possibly because she often lost track of the main meaning soon after she had processed the information, and also because she hardly looked for connections between sentences while reading. In this context, on the other hand, P3a, in line 70, was quite unexpectedly able to correctly paraphrase the structure "ran off as fast as he could" about which she had previously made a wrong interpretation in line 67. Again, P3b did not recognize this discrepancy; instead, she merely restated P3a's

newly made interpretation without question (line 71). For reasons already discussed above, their comprehension problems seemed to have come from an inability to store learned information in memory for complete and coherent text construction, and also have resulted from an inability to monitor comprehension.

Below is Pair 1's treatment of the same section. Unlike Pair 3, Pair 1 did not have any difficulty with the construction of this sentence. At first, P1b spotted the repeated occurrences of the key phrase *security guard* while he was reading aloud (line 35). This showed a use of metacognitive strategies as he marked the fact that the phrase had appeared previously. He went on demonstrating his capacity for integrating details across the current paragraph by accurately paraphrasing the clause, including the grammatical structure *verb + as + adverb + as one can*, and also by correctly analyzing the syntactic structure of the sentence (line 36).

35	P1b	Then he walked up to the……s-e-c-u-r-i-t-y g-u-a-r-d. *This key phrase appears again.* said something to him and ran off as fast as he could.	Reading aloud* Finding a key word or phrase**
36	P1b	Leon *walked toward the* guard *and said something to him, and he….did his best to run.* 'he' *refers to* Leon.	Paraphrasing* Analyzing syntactic structure*
37	P1a	Um.	Expressing agreement***

Differences in linguistic knowledge. Insufficient linguistic knowledge will substantially restrict a reader's ability to interact with a L2/FL written text (Chang, 2006; Devine, 1988). To illustrate this problem, the extract below demonstrates the section where Pair 3 was establishing the textual meaning concerning the interaction between the leading characters, Leon and the security guard, but their deficiencies in English proficiency weakened their FL reading efficiency.

99	P3a	The security guard could not catch him and he was soon out of ….sight.	Reading aloud*
100	P3a	*That person was not allowed to catch him. But why?*	× Paraphrasing* Rhetorical question**
101	P3b	*not allowed to catch him*	× Restating*
102	P3a	*Is it possible that he was a spy? That is, he pretended to be somebody and……in fact he was a police officer.*	× Tentative interpretation* × Elaborating on one's own previous verbal reports*
103	P3b	*Probably.*	× Expressing agreement***
104	P3a	And he was soon out of ….sight ((reads from text indistinctly)). *What is* 'sight'?	Rereading* Asking for single word's meaning***
105	P3b	Sight (2)….. *It says he was not allowed to catch him,* and he [*went out very soon…..*	Pausing to reflect* × Restating* × Paraphrasing*
106	P3a	*very soon*]…..	Paraphrasing*
107	P3b	*left very soon….. Skip it.*	× Paraphrasing* Skipping an unknown word*

In line 100, P3a misinterpreted the clause "The security guard could not catch him" as "*That person was not allowed to catch him.*" This resulted in subsequent confusion

and misinterpretation. After paraphrasing, she immediately formulated one rhetorical question to herself regarding textual comprehension, but offered a tentative answer by overusing her imagination without any supporting evidence (line 102). Such a strained interpretation straying from the information conveyed in the text was also found on a few occasions in her other transcripts. Also, P3b was noted in the transcript to simply agree with and follow what P3a said without question. Maybe P3b's lower linguistic competence did not allow her to detect the misinterpretations made by P3a. Moreover, by restating previously made interpretations, P3b might have intended to strengthen her comprehension and memory, as seen in lines 101 and 105.

From lines 104 to 107, Pair 3 was also found to have a problem in interpreting the clause due to an unknown vocabulary word, *sight*. After restating the incorrect interpretation of the former clause, they, perhaps unsurprisingly, were unable to figure out the meaning of *sight.* Without solving this problem, they then decided to ignore it and continue reading. Such an approach throughout this whole section (lines 99–107) contrasted sharply with lines 53–54 in Pair 1's transcript presented below.

53	P1a	The ……security guard could not catch him and he was soon out of sight.	Reading aloud*
54	P1a	*That security officer was unable to catch* Leon. *Then….he instantly…. run out of……* 'sight' *might mean……energy.*	Paraphrasing* × Tentative interpretation*

In contrast with the strained interpretation made by P3a for the clause "The security guard could not catch him," P1a was seen to have paraphrased it correctly in line 54. Although the word *sight* in the sentence was not interpreted accurately (it was actually not understood by any of the participants), instead of a wild guess or ignorance, P1a resorted to context-dependent guessing to make a tentative interpretation, which helped fill in the gap in their understanding of this portion of the text. P1a's willingness to try to comprehend unknown vocabulary by making a tentative interpretation using contextual clues in this situation was an element that was absent in Pair 3's transcript dealing with the same section.

Contrast in terms of problem solving.

Differences mainly in background knowledge and effectiveness of strategy use. This section demonstrates more about the contrasts between Pairs 1 and 3 by focusing on problem solving during reading. Below are extracts which show their differences in tackling the difficult key phrase *security guard* by Pair 1 and then by Pair 3.

17	P1b	A ……. security guard was standing outside the bank.	Reading aloud*
18	P1b	*The phrase* 's-e-c-u-r-i-t-y g-u-a-r-d' *might be the name of the bank.*	× Tentative interpretation*
19	P1a	*Probably not. Because they don't begin with capital letters.*	Expressing disagreement*** Drawing on language knowledge*
20	P1b	*Underline it. Go on reading to see.*	Marking a word* Withholding judgment** Acknowledging a need for a strategy (procedure)**
21	P1a	'Stand' *is* 站. *Something was standing outside the bank. So it might be …..a person.*	Providing a word's meaning (translating)* Paraphrasing* Inferring micro meaning from macro clues (personal experience/knowledge)*
22	P1b	*Or it might be an animal.*	Inferring micro meaning from macro clues (personal experience/knowledge)*

In the beginning (lines 18–20), the participants in Pair 1 were aware that the meaning of the key phrase *security guard* was not grasped but anticipated that the problem could be clarified in upcoming text. As they continued reading, they realized its meaning by constructing rough inferences built on their prior knowledge (lines 21 and 22).

42	P1a	The security guard….was very angry and he ran after Leon shouting at him.	Reading aloud*
43	P1a	*So……perhaps the* s-something g-something *might mean a security officer.*	Tentative interpretation*
44	P1a	*First, it's saying that he ran and shouted, so the unknown phrase must be a man. Second, it says previously that the* 'security guard' *was standing outside the bank. And you know, bank security officers usually stand in front of the bank during their working hours. So I guess he was a security officer.*	Inferring micro meaning from macro clues (contextual clues and personal experience/knowledge)* Inferring micro meaning from macro clues (contextual clues and personal experience/knowledge)*

In line 43 and line 44, P1a demonstrated his grasp of the phrase's meaning using the given evidence to infer from contextual clues and prior knowledge. In other words, his success in working out this key phrase could be attributed to the availability of content schema (Carrell, 1988) and intelligent guessing by making use of context (Eskey, 1988). In addition, his ability to hold previously encountered ideas in memory and combine them with newly learned information also contributed to the construction of this key phrase's correct meaning.

57	P1b	Still angry, the ….*security officer*……hurried back to his …..position outside the bank.	Reading aloud*
58	P1b	*He was angry and hurriedly went back to his*……position…….*in the outside of the bank.* 'Position' *probably means his post for his job duty.*	Paraphrasing* Tentative interpretation*
59	P1b	*So you were right when you said he might be a security officer.*	Concluding previously stated interpretation is valid*

As the reading progressed and meaning grew, the text became easier to read with less comprehension effort required to make sense of the text. In line 58, P1b was able to make a best guess at word meaning because the accumulated knowledge acquired from the text that had so far been read helped him to construct a sensible text meaning. In line 59, the tentative interpretation made here by P1b about the unfamiliar word *position* also further confirmed the meaning of the phrase *security guard* to be *security officer*, as P1a had made earlier. This indicated that the ideas in the text were successfully linked in his construction of text meaning.

The following transcript extracts come from Pair 3's treatment of the same section.

34	P3b	A …….security g-u-a-r-d was standing outside the bank.	Reading aloud*
35	P3b	*A* security something *was standing outside the bank.*	Paraphrasing*
36	P3a	*Inferring from this sentence,* 'security guard' *must be a person.*	Inferring micro meaning from macro clues (personal experience/knowledge)*
37	P3a	*Probably…..a strange person.*	× Elaborating on one's own previous verbal reports*

The key phrase *security guard* was also seen to pose a problem for both of Pair 3's participants. In line 36, P3a drew an initial inference that the unknown phrase *security guard* was a person. In line 37, however, she seemed to mistake *security* for *strange*, and incorrectly elaborated on her previous interpretation.

81	P3a	The security guard was very angry and he ran after Leon shouting at him.	Reading aloud*
82	P3a	*That strange person was very mad, and then* ran after……*ran behind* Leon *and shouted at him*.	Paraphrasing*
83	P3b	*So it's saying that a person was outside the bank. Then someone came to tell him something. He then chased that person. Accordingly, what comes to my mind is that* security guard *is probably a person whose job is to distribute handbills at the street corner or whatever. I'm not sure.*	Summarizing* × Inferring micro meaning from macro clues (personal experience/knowledge)* Stating failure to understand a phrase**

In line 83, P3b apparently reconsidered this problematic phrase as they continued reading. In trying to make a logical connection to understand the phrase *security guard*, she first summarized the previous information in the text and then formed an inference (incorrectly) from her background knowledge. Strategically this was a strength, but due to her insufficient schema knowledge regarding jobs related to working at a bank, she did not succeed in overcoming this misunderstanding. P3b's performance was found to confirm the viewpoints of Carrell (1988) and Chang (2006), whose participants with schemata unavailability or schemata failure could neither read nor comprehend texts effectively or successfully.

The differences between the two pairs in solving difficulties while reading could be reinforced by comparing their interpretations of the key sentence written at the end of the text.

78	P1b	"I'm going to rob the bank today," Leon said. "I wanted to find out how fast he could run."	Reading aloud*
79	P1b	*I will go to* r-o-b …..	Paraphrasing*
80	P1a	'Robber' *means burglar, and* 'rob' *should mean to burgle.*	Inferring micro meaning from macro clues (language knowledge)*
81	P1a	*I got it. So…..his intention was that…..last night what* Leon *did aimed to test how fast that bank security officer could run and find out whether he could run faster than that security officer. And today he was going to rob the bank.*	Stating the realization of a new understanding** Providing the overall meaning of the text*

When coming to this topic sentence: "I'm going to rob the bank today, Leon said. I wanted to find out how fast he could run," students needed to clarify the meaning of *rob* because it was the key word essential to the main idea construction of the text. In line 80, P1a correctly inferred the word *rob* using lexical clues. In fact, there were many indications in the protocols that P1a, the participant who contributed much more to their reading success in both the task of thinking the texts aloud and of answering comprehension questions, was a good decoder and predictor with better abilities at context-free word identification and context-dependent guessing. This was consistent with Chang's (2006) claim that skillful readers usually have better abilities to decode words quickly and generate inferences built on their preexisting knowledge or the provided textual information. Of critical importance, P1a here had gained the key word's meaning in this topic sentence, which led to a successful textual gist understanding (line 81).

In contrast with Pair 1, Pair 3 was far less able to identify the key word and work out the overall point of the text.

143	P3b	"I'm going to rob the bank today," Leon said.	Reading aloud*
144	P3b	*I'll….I'll….. What does* r-o-b *mean?*	Paraphrasing* Asking for single word's meaning***
145	P3a	"I'm going to rob the bank today."….. "I'm going to rob the bank today."	Rereading* Rereading*
146	P3b	*Today I'll……*	Paraphrasing*
147	P3a	*"I go to the bank today,"* Leon *said.*	× Paraphrasing*
148	P3b	*Go there today.*	× Restating*

As seen in line 144, P3b asked for assistance with defining the word *rob*, which was followed by P3a's double reread in an attempt to draw out the general meaning of the sentence (line 145). P3b, in line 146, began to re-paraphrase, but appeared to struggle with its meaning. P3a then finished the sentence paraphrasing but mistook the future tense *be going to* as *go to*. Moreover, she either failed to identify the key word *rob* or intentionally ignored it, resulting in incorrect paraphrasing (line 147). This resulted from her limited lexical knowledge as well as an inability to use other knowledge sources or strategies to compensate for the deficiency in lexicon, as pointed out by

Stanovich (2000). In line 148, P3b again just followed P3a and was unaware of the misinterpretation made by P3a although she did spot the word *rob* and realized the future tense grammatical structure with her correct partial text paraphrase of "*Today I'll…*". P3b seemed to lack confidence in her own understanding of what she had read so that when misdirected by P3a, she could not detect a problem.

Of the five pairs, Pairs 3 and 4 did not clarify the critical word *rob*. They were also the two pairs to have lower reading scores for this task. The inability to identify the key word which the other three pairs had recognized or guessed correctly from clues resulted in failing to acquire the main idea of the whole text. The extract below exemplifies this. In Pair 3's text summary (lines 159–161), line 161 clearly showed that they did not build up a full picture of the entire text. As a result, the inability to effectively infer word meaning by using different types of resources (e.g., contextual cues, lexical clues, or prior experience/knowledge) to unlock the emerging meaning of the printed text was a critical gap in strategy (Eskey, 1988).

159	**P3b**	***So this text is about….two persons…, and one made fun of that…..*security guard.**	**Summarizing***
160	P3a	*Then* Tom *asked* Leon *why he made fun of that person.*	Summarizing*
161	P3b	*And the reason for doing that was just because he wanted to know how fast he could run. That's all.* ((laughs))	× Summarizing*
162	**P3a**	***That was very childish!* ((laughs))**	**Personal responses to text***

All of the above differences compared between Pairs 1 and 3's strategy use for constructing textual meaning and for solving reading challenges suggested that the attempted strategy use in itself did not automatically lead to meaning construction, as in Anderson's (1991) study. It was participants' successful use of strategies, sufficient EFL linguistic and background knowledge, and better ability to integrate meaning and monitor comprehension that characterized the most successful pair from the least successful pair and had a greater influence on reading success. In more specific terms, successful or good readers, such as Pair 1, were better strategy users who used reading strategies to regulate information processing more effectively than less successful or weaker readers, such as Pair 3. Pair 1 also had a higher level of language proficiency and possessed a greater amount of background knowledge, which allowed them to decode words more accurately and to create more meaning from the text. They also had better metacognitive awareness of strategy use, which enabled them to monitor their cognitive activities more constantly, detect contradictions in comprehension more consciously, and more cautiously apply appropriate strategies to deal with comprehension failure. Moreover, they were armed with a better ability to integrate textually explicit and implicit information for coherent textual understanding.

Conclusions

The present study was a small scale study involving 10 EFL senior high school students as participants. It employed thinking aloud in pairs as the lone data collection tool to explore the differences between the successful and less successful participants in their reading performance and strategy use for comprehending textual meaning and for solving reading problems. Adopting the think-aloud technique in this study allowed the differences in participants' reading strategy use to be detected and the essential elements that comprised skilled reading processing to be generalized (i.e., effective reading strategy use, sufficient EFL linguistic and background knowledge, conscious comprehension monitoring, and constant meaning integration). This lent support to Ericsson and Simon's (1993) claim that thinking aloud can be a useful and effective methodology tool of cognitive inquiry for investigating the intermediate stages of readers' ongoing reading process.

Consistent with the previous research findings of Anderson (1991), Block (1986), Hosenfeld (1977), Olshavsky (1977), Yayli (2010), and Zhang et al. (2008), the study results from participants' reading scores and think-aloud protocols also indicated that successful or good readers, such as Pair 1 in this study, seemed to be better strategy users who used strategies more effectively and strategically. They also had higher language proficiency and better content area knowledge. Throughout reading, they monitored their textual understanding, identified reading problems, and took remedial measures to repair comprehension breakdowns. More importantly, they were better able to connect pieces of information between sentences to construct well-integrated meaning. All these features brought success in making the most sense out of the text. In contrast, less able readers, such as Pair 3 in this study, applied strategies less effectively, had insufficient knowledge in both target language and content area, had little or no awareness of their ongoing text understanding, and failed to detect comprehension contradictions or employ appropriate strategies to deal with them. Throughout the whole process of reading, they made less effort to integrate textual content for coherent meaning.

One thing needs to be highlighted. As the study was conducted in pairs, the reading had a social embedment from all of the paired participants who spoke to each other, asked or answered questions, requested or provided assistance, challenged or defended positions, agreed or disagreed with the other's verbal reports, and so on. Clearly, the use of social strategies such as those listed in the Reading Strategy Classification Scheme was encouraged in the context of paired interaction. More importantly, due to the rich verbalization produced and meaningful interaction created during the paired think-aloud process, the natural social interaction and use of social strategies resulted in an extensive use of cognitive and metacognitive

strategies as well as immersed text engagement, as evidenced in the think-aloud transcript data. Moreover, as emphasized earlier, not many reading studies on collaborative thinking aloud have been conducted to investigate EFL learners' reading abilities. Therefore, this kind of research might shed new light in the future on cooperative reading in pairs.

Pedagogical Implications

In helping language learners to truly become cognitive, metacognitive, and interactive readers, there is certainly a need to impart the strategic ways with which more skilled readers read onto less able readers in order to refine their reading skills and to improve their comprehension performance. Based on the study findings, the reading strategies and skills that were available to the more successful participants and that comprised strategic reading processing are suggested for inclusion in EFL reading instruction or programs for teaching students to read more strategically and comprehensibly, particularly less skilled students or novice readers. More specifically, in addition to equipping EFL students with sufficient linguistic knowledge of the English language and textual background knowledge, targeted instruction in strategic reading is also needed to enable them to become efficient at text processing so they can flexibly operate reading strategies with greater efficiency and comprehension. To instruct learners in reading strategies, teachers can apply the think-aloud technique to model strategies that expert readers use during reading, along with explicit descriptions of when and how strategies should be used. They can also provide scaffolded practice to encourage student verbalization in thinking aloud collaboratively and individually using the modeled strategies. Through teacher modeling, students are demonstrated the strategic processing performed by competent readers for comprehending written texts and for coping with comprehension problems; through student think-aloud verbalization, students practice strategy use in their own reading and become more aware of how to use the modeled strategies so as to eventually develop efficiency and automation in the use of reading strategies. It is also imperative to train students to read in broad phrases for integrated comprehension of a larger textual portion and to monitor comprehension consistently all throughout the reading process, which will facilitate students' deployment of proper strategies and in turn support their EFL reading comprehension. This should also be the central emphasis of strategy instruction. Moreover, teachers are suggested to use the think-aloud technique to assess students' learning so as to understand students' reading processes and discern their comprehension difficulties, as well as help them overcome reading weaknesses and build up strengths.

Additionally, the paired think-aloud reading activities in this study create a context where participants were exposed to the social construction of thinking aloud and

engaged in being active meaning-makers and problem-solvers in responding to EFL texts by utilizing a variety of cognitive, metacognitive, and social strategies. The fact that extensive reading strategy use and rich peer interaction dialogues were elicited by the social nature of pair-based thinking aloud in this study is consistent with Baumann et al.'s (1993) emphasis on the beneficial effect of collaborative thinking aloud on engaged reading and supports the use of thinking aloud in pairs. Such findings in regard to EFL learners' reading strategy use through thinking aloud and working in pairs might provide teachers with insights into how to teach reading more communicatively and how to increase learners' awareness of strategy use and text engagement.

Limitations and Suggestions for Future Research

There are certain limitations to this study. First, the data sampling was limited to 10 senior high students in Taiwan, which confines some of the findings to this study especially and may not be generalizable across different groups of language learners. Further research of this nature needs to include more participants across a wider range of abilities so that research data can be subjected to more proper analysis. Second, although the think-aloud method is considered to be effective for validating evidence of readers' real-time comprehension processes, participants might occasionally verbalize only part of their textual processing (Baker & Brown, 1984). In the present study, strictly think-aloud protocols were gathered for evidence of learners' reading strategy use, which may have limited evidence of certain strategy uses. Future studies could consider using multiple data collection methods by combining the use of verbal reports with other measures, such as interviews or questionnaires, to cross-validate data and to produce more comprehensive findings.

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Appendix A

Reading Strategy Classification Scheme

Cognitive Strategies (Bottom-up Strategies)	
Code	Strategy
B1	Reading aloud
B2	Rereading
B3	Translating
B4	Analyzing lexical clues
B5	Analyzing syntactic/grammatical structure
B6	Taking notes
B7	Marking a certain part of the text
Cognitive Strategies (Top-down Strategies)	
Code	Strategy
T1	Predicting from the title
T2	Paraphrasing
T3	Tentative interpretation
T4	Restating
T5	Providing linguistic resources 1) Providing a word's pronunciation 2) Providing a word's meaning 3) Providing a phrase's meaning 4) Providing an explanation about syntactic/grammatical structure 5) Providing a meaning/interpretation of a clause or sentence
T6	Drawing on prior experience/knowledge
T7	Drawing on language knowledge
T8	Inferring Inferring micro meaning from macro clues 1) from contextual clues 2) from personal experience/knowledge 3) from language knowledge Inferring macro meaning from micro clues = Providing the overall meaning of the text
T9	Predicting text content
T10	Recognizing text structure
T11	Looking backward for key words, topic sentences, or previously related information
T12	Pausing to reflect
T13	Skipping an unknown word, phrase, sentence or pronunciation
T14	Questioning one's own pronunciation
T15	Correcting one's own pronunciation or reading aloud
T16	Questioning the reading/interpretation
T17	Adjusting/correcting an initial interpretation
T18	Elaborating on one's own previous verbal reports
T19	Approving the content or arguments made
T20	Disapproving the content or arguments made
T21	Concluding previously stated interpretation is valid
T22	Concluding previously stated interpretation is invalid
T23	Summarizing
T24	Drawing a conclusion
T25	Providing an opinion
T26	Personal responses to text

Metacognitive Strategies	
Code	Strategy
M1	Acknowledging a lack of linguistic resources 1) Stating failure to pronounce a word 2) Stating failure to understand a word 3) Stating failure to understand a phrase 4) Stating failure to understand syntactic/grammatical structure 5) Stating failure to understand a clause or sentence
M2	Stating failure to understand the overall meaning of the text
M3	Stating the realization of a new understanding
M4	Acknowledging a need for a strategy 1) Procedure 2) Rereading 3) Looking backward 4) Reflection
M5	Finding a key word or phrase
M6	Rhetorical question
M7	Withholding judgment
M8	Commenting on the text itself
Social Strategies	
Code	Strategy
S1	Asking others for help 1) Asking for a word's pronunciation 2) Asking for single word's meaning 3) Asking for a phrase's meaning 4) Asking about syntactic/grammatical structure 5) Asking for the meaning of a clause or sentence 6) Asking about the overall meaning of the text 7) Asking for confirmation
S2	Providing confirmation
S3	Expressing agreement
S4	Expressing disagreement
S5	Defending a position
S6	Questioning others' pronunciation or verbal reports
S7	Correcting others' pronunciation or verbal reports
S8	Elaborating on others' previous verbal reports
S9	Using a social strategy (general)

Appendix B

A Sample Text Used for a Paired Think-aloud Task: On Guard (the third text)

Two unemployed men, Leon and Tom, were sitting in a restaurant drinking tea. Outside, on the opposite side of the road, there was a bank. A security guard was standing outside the bank. Leon stood up. "I must go," he said. "I'll see you tomorrow." "OK," Tom said. "I'll be here." Leon walked out of the restaurant and crossed the road. Then he walked up to the security guard, said something to him and ran off as fast as he could. The security guard was very angry and he ran after Leon shouting at him. "Come back here! How dare you insult me!" he shouted, but Leon kept on running. The security guard could not catch him and he was soon out of sight. Still angry, the security guard hurried back to his position outside the bank. The next day Leon came into the restaurant. Tom was already there. He sat next to him and ordered some tea. Tom said, "Yesterday, I saw you go up to the security guard, say something to him and run off. He was very angry and ran after you." "That's right," Leon said. "I called him a fat-faced idiot. He was really angry." "Why did you do that?" Tom asked. "I'm going to rob the bank today," Leon said. "I wanted to find out how fast he could run."

Appendix C

Coding Key

In the transcripts, the verbal reports made in Chinese (coded as 'Paraphrasing') are translated into English and presented in italics to distinguish them from the verbal protocols made in English, including those used to interpret sentences in English (coded as 'Paraphrasing in English'), to read aloud, and to reread the English text. Additionally, the Chinese utterances transliterated directly and accurately from English (coded as 'Translating') are presented in Chinese characters.

P1a and P1b refer to the two participants in Pair 1; P3a and P3b refer to the participants in Pair 3.

An identified strategy is marked for each strategy type: * = cognitive strategy, ** = metacognitive strategy, *** = social strategy.

× refers to an ineffective strategy which accompanies a wrong interpretation and thus does not work in terms of meaning construction.

The length of a pause or silence is counted in seconds and marked with a single set of parentheses. For example: (5) signals a five second pause.

Actions of speakers are indicated with double parentheses. For example: ((laughs))

Overlaps among speakers' utterances are enclosed in brackets. For example: [Okay]