

ABSTRACT

Title of Dissertation: CROSS-LANGUAGE TRANSFER: THE STRATEGIC
READING PROCESSES OF EIGHTH-GRADE
TAIWANESE READERS IN CHINESE AND ENGLISH
WITHIN A SELF-REGULATED LEARNING
FRAMEWORK

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Although the relationship between first language (L1) and second language (L2) reading strategies has been discussed in existing literature, few studies have examined this relationship among L2 readers whose L1 is sharply different from their L2, who are at the middle-school age range, and who are learning English as a foreign language (EFL), i.e., in a setting where English is not used in daily communication.

This mixed-methods study used a task-based reading strategy inventory, a background questionnaire, think-alouds and semi-structured interviews. This study began as an attempt to address the gaps in research by investigating 345 Taiwanese 8th grade students who were learning English in an EFL setting, and whose L1 (Chinese) differs greatly from their L2 (English) especially in their writing systems: one is non-alphabetic, and the other is alphabetic. The two languages also differ morphologically and syntactically. The purposes of this study were: (a) to examine how 8th grade Taiwanese readers monitored, regulated, and controlled their reading-related thoughts and actions (i.e., reading strategies) to comprehend expository texts in the L1 (Chinese) and the L2 (English); (b) to investigate the relationship between reading achievement and reading

strategies; (c) to examine the transfer of strategies across languages; (d) to uncover students' views and attitudes toward L1 and L2 reading tasks and reading strategies; and (e) to study the relationships among six personal variables with overall reading strategies.

The results indicated that high-achieving readers, compared to low-achieving readers, used strategies more frequently, diversely, and consistently for both Chinese and English reading. In addition, the high-achieving readers seemed to require more language-based and text-centered strategies to process the linguistic elements of the L2 text, but the average- and low-achieving readers did not. Further, the findings supported the possibility of cross-language transfer of reading strategies even when the writing systems of the L1 and L2 were very dissimilar. However, for the weaker readers, limited language proficiency—or more specifically, limited L2 vocabulary—seemed to be a primary factor that short-circuited the transfer process. The last important finding is that those L2 readers who rated their reading achievement higher also valued reading strategies, enjoyed L2 reading, and spent more time on reading were likely to report using more strategies. Detailed profiles of strategies reported using by Taiwanese middle-school readers contribute to the knowledge related to L1 and L2 reading, and the mixed-method design provides insights for future research concerning the complex reading process of L2 readers.

CROSS-LANGUAGE TRANSFER:
THE STRATEGIC READING PROCESSES OF EIGHTH-GRADE TAIWANESE
READERS IN CHINESE AND ENGLISH WITHIN A SELF-REGULATED
LEARNING FRAMEWORK

By

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Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2007

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DEDICATIONS

The success of this work is dedicated to:

My father, Chian-Long Chuang (莊江龍) and my mother, Bao-Zhu Wu (吳寶珠),

Who always believe in me

My sisters, Ching-Tin (靜婷) and Ching-Wu (靜雨), and my brother, Sheng-Bo (勝博),

Who always support me

and

My fiancé, Jui-Hao Wang (王瑞豪),

Who is always there for me

Heartfelt thanks to all of them for their unconditional love and support.

ACKNOWLEDGEMENTS

First and foremost, I must acknowledge my advisor, Dr. Rebecca Oxford. She has encouraged me to explore my own research interest, and at the same time she has also provided me valuable guidance and support throughout my learning. She also challenged me to think beyond what I believed I could do. I have been grateful to have her as my advisor. Thank you, Dr. O.

I also must thank my committee members, Dr. Mariam Dreher, Dr. Roberta Lavine, Dr. George Macready and Dr. Min Wang. Their feedback for the proposal helped me shape my research, and their suggestions for the dissertation helped me polish my research. Thank you all.

I am also indebted to my colleges: Donna Butler, Alec Chen, Kyoung Rang Lee, Seunghyun Baek, Chen-Su Chen, and Amy Dai. They dedicated their time in discussing and reading my research. Thank you all for the intellectual support.

I also want to thank Daria Buese, Juliana Stover, and Heather Schugar for devoting their time and effort on reading the proposal and this manuscript.

Last but not least, I must thank my friends who have listened to my struggles, and who have provided me with emotional support. Thank you, my dear friends, Mandy, Fu-Chin, Joanna, Wen-Chyi, Olivia, Jason, Hung and Rei.

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Chapter 1: Introduction

The existing literature on first language (L1) reading research documents the importance of reading strategies in text comprehension, which has led to an increase in research on the use of reading strategies in the second language (L2) reading process. The term *reading strategies* refers to the mental thoughts and behaviors that readers consciously select to store, retrieve, or apply information learned in a text (Koda, 2005). Much of the L2 reading research had been influenced by the theoretical models of the reading process proposed by the L1 reading researchers. Among the models conceptualizing the reading process, the interactive view of the reading process has appealed to many researchers in both L1 and L2 reading fields (e.g., Bernhardt, 2005; Carrell, 1988; Grabe 1991; Pressley, 2002; Spiro & Myers, 1984). According to the interactive perspective, *the reading process* is an interactive procedure in which readers integrate textual information with their background knowledge (top-down processing), and in which readers need to use language-based skills, such as decoding (bottom-up processing) in order to gain information from a text (Goldman & Rakestraw, 2000; Grabe, 1991; Stanovich, 1980). The notion of the interactive reading process suggests that readers need to flexibly and actively use a variety of strategies for successful comprehension.

The various research themes on L1 and L2 reading have focused on reading strategies as associated with proficiency (e.g., Chamot & El-Dinary, 1999; Chern, 1994; Hardin, 2001; Jiménez, García, & Pearson, 1996; Sheorey & Mokhtari, 2001), reading tasks (e.g., Feng & Mokhtari, 1998; Kuo, 1993; Oxford, Cho, Leung, & Kim, 2004; Young & Oxford, 1997), and motivation (e.g., Dole, Brown, & Trathen, 1996;

McCrudden, Perkins, & Putney, 2005). The majority of the studies reached a common finding that readers who are more self-directed, effective, and engaged in their reading processes tend to have a higher awareness and better control of strategies during reading, compared to those who are not. The findings suggest that self-regulated learning capacity distinguishes effective readers from less effective readers. The term *self-regulated learning (SRL)* is used to describe one kind of learning process in which learners are engaged and attain their goals by generating thoughts, feelings, and actions (strategies) that facilitate learning (Zimmerman, 2001).

Another line of research, which is unique in the L2 context, focuses on the relationship between L1 and L2 reading strategies. Many researchers have investigated the reading process, reading strategies of L2 readers, and relationships between L1 reading and L2 reading when the L1 and the L2 are similar, e.g., Spanish and English (see Hardin, 2001; Jiménez, 1997; Jiménez et al., 1996; Padrón, 1992). They have also explored how the L1 influences the L2 comprehension process, and how L2 readers view the general reading process and their reading strategies in both L1 and L2 reading. However, few studies have examined those themes among L2 readers whose L1 is sharply different from their L2, who are at the middle-school age range, and who are learning English as a foreign language (EFL), i.e., in a setting where English is not used in daily communication.

This study began as an attempt to address the gaps by investigating these topics with Taiwanese eighth-grade students who are learning English in an EFL setting, and whose L1 (i.e., Chinese) differs greatly from their L2 (i.e., English), particularly in the writing system: one is non-alphabetic, and the other is alphabetic. These two languages

also differ in morphology and syntax. This study specifically examined how eighth-grade Taiwanese students with different reading achievement levels monitor, regulate, and control their strategies to comprehend L1 (Chinese) and L2 (English) expository texts. In addition, this investigation attempts to offer insights into the possible relationships among reading strategies (in both the L1 and the L2) and other motivational factors.

This study focuses its inquiry on Chinese readers from Taiwan because, as a Taiwanese L2 reader and researcher myself, I want to contribute my research to the knowledge base of L1 and L2 strategic reading processes among Taiwanese students, leading to improvement of the curriculum and English instruction in Taiwan. This investigation specifically involved Taiwanese middle-school students because Taiwanese students at this age not only are officially required to learn to read in the L2 (i.e., English), but also must learn to adjust their use of strategies in order to become self-regulated readers in both L1 and L2 reading processes.

Purposes of the Study

This dissertation has five purposes. The first purpose of the study is to examine how eighth-grade Taiwanese readers use reading strategies to comprehend expository texts in Chinese and in English. To control for the possible effects of reading genres, both L1 and L2 texts in this study were expository. An expository text reflects a variety of information-bearing text patterns, such as comparison and contrast, cause and effect, problem and solution, and time order. Of the four texts used in this study, the two expository texts associated with a written reading strategy inventory focus on comparison among ideas; the two expository texts used in think-aloud tasks involve descriptive information, which contains main ideas and details.

The second purpose is to inspect the relationship between reading achievement and reported reading strategy use for three groups: high-reading-achieving Taiwanese students, average-reading-achieving Taiwanese students and low-reading-achieving Taiwanese students. In this study, reading achievement was determined by standardized, school-made assessments for Chinese and English. The school-made assessments are standardized in the sense that all students in a particular grade take the same assessment at exactly the same time, regardless of who their teacher is or what marks they make on daily classroom tasks. The standardized, school-made assessments are aimed at testing students' reading *achievement* (i.e., reading performance vis-à-vis the specific reading curriculum), rather than general reading *proficiency* (i.e., reading proficiency not linked to the specific reading curriculum), for which no data are available at the eighth grade.

The third purpose of the study is to explore the transfer of reading strategies across languages, as shown via both quantitative data (from a questionnaire) and qualitative data (from think-aloud protocols and semi-structured interviews). The think-alouds and semi-structured interviews involved representatives of high- and low-reading-achieving students, not average-reading-achieving students. The study thus compared the “extreme” (high- and low-achieving) cases to understand what distinguishes those who perform very successfully on standardized, school-made reading assessment from those who perform very poorly.

The fourth purpose is to investigate, via semi-structured interviews, the views of the high-reading-achieving and the low-reading-achieving Taiwanese students regarding reading tasks and reading strategies in the reading process of each of the languages, Chinese and English. It is important to understand how students view these phenomena,

and investigating high- and low-achieving readers makes their patterns stand out more clearly.

The fifth purpose is to explore how reported strategy use (in both L1 and L2) is related to personal variables such as (a) gender; (b) enjoyment of reading in general; (c) enjoyment of reading in Chinese/English; (d) amount of daily reading time; (e) students' self-rated reading achievement; and (f) students' rating of effectiveness of reading strategies. These crucial background variables might shed light on other findings, as they have done in prior studies regarding the reported strategy use of children's general learning in Taiwan (see, e.g., Lan, 2005).

Background: Learning to Read English in Taiwan

This section addresses (a) problems in the Taiwanese context for learning to read English and (b) difficulties based on the differences between Chinese and English writing systems. These issues make English reading difficult for Taiwanese students.

Educational Context

In educational environments such as those in Taiwan, English is taught as a foreign language (EFL). This means that English is viewed as a classroom subject rather than as a form of everyday communication for most people. In contrast, English as a second language (ESL) is learned in a setting where the English language is used for daily communication and serves as a primary medium for academic instruction. In the Taiwanese EFL situation, English learning has focused mostly on reading. In an EFL context, from the student's perspective, the purpose of reading an English text is often not to learn information or be entertained, but instead to get good grades on academic assessments. As a result, EFL readers often focus more on basic components of an

English text (e.g., word meaning and sentence structures) rather than the broader meaning of a text. It is therefore very meaningful to investigate how EFL readers' perspectives on L1 reading and L2 reading influence the reading process and reported use of reading strategies.

To teach students how to read an English text in Taiwan, many teachers introduce vocabulary and sentence structures first, and they then read the text aloud. Students repeat after the teachers' demonstration. Finally, teachers guide students to go through each word or each sentence to explain the meaning in order to help students understand the content (Tsao, 1992). This traditional teacher-centered, Grammar Translation Method is still widely used in English classes in Taiwan, especially in middle schools, even though the Communicative Language Teaching Approach is officially recommended by the Ministry of Education in Taiwan. Influenced by the teacher-centered instruction, students often heavily rely on teachers' interpretations to understand the content of a text instead of utilizing their own skills and knowledge to comprehend the text.

Because of this, as Tsao (1992) reported, many Taiwanese students who encountered unknown vocabulary often reported using one strategy—checking dictionaries¹—to solve reading problems. Tsao pointed out that many of the Taiwanese students did not utilize a variety of reading strategies to solve comprehension breakdowns in English reading due to the teacher-centered instruction. Therefore, most Taiwanese middle-school students, who are usually placed in the traditional teacher-centered classrooms, are likely to be largely deficient in the ability to use a range of strategies to

¹ Checking the dictionary, as a means of using the information for overcoming reading comprehension breakdowns, actually involves more strategies than just looking a word up in the dictionary. For example, readers need to go through each definition of a word and select the one relevant to the text. This was not stated by Tsao (1992).

solve reading problems in order to learn information from the L2 text. The problematic phenomenon was also observed among many of the Taiwanese middle-school students in my pilot study conducted in 2006 (see Chapter 2).

One of the main goals in the English curriculum of middle school education in Taiwan is to develop students' ability to solve comprehension problems independently when they read an EFL text (Taiwan Ministry of Education, 2000). As a result, middle-school students need opportunities to learn and practice applying reading strategies, which can facilitate comprehending a text. Before providing appropriate strategy instruction, the profiles of reading strategies by Taiwanese middle students are needed. This dissertation research attempts to explore reading strategies reported using by eighth-grade Taiwanese students when reading Chinese and English texts.

Writing Systems: Chinese and English

As noted earlier, the L1 of the Taiwanese readers is Chinese, and they learn English as a foreign language. The writing systems of Chinese and English greatly differ in many aspects in their orthographic representation, morphology and syntax. Orthographic representation refers to the linguistic unit that each graphic symbol denotes (Koda, 2005). In an alphabetic writing system, such as English, each letter corresponds to a phoneme, which can be a single consonant or a vowel. On the other hand, Chinese, the L1 in this study, is a logographic language. The basic unit of its writing system is a "character," which represents a morpheme, i.e., the smallest meaningful unit in a language. A character is composed of one or more fundamental semantic roots, called radicals. Unlike English words, sounds of Chinese characters are not self-evident.

In addition to orthography, Chinese is different from English in morphology (word

formation) and syntax (sentence formation). For example, in Chinese there are no bound morphemes. Bound morphemes refer to linguistic forms that must be attached to other morpheme such as *-ed*. However, in English, bound morphemes, such as *-ed* signifying the past tense and *-s* indicating plural nouns, serve an informational function and indicate grammatical attributes (Aaronson & Ferres, 1986). In Chinese, such facets of language are not present and must be understood from the context. Because the writing systems are sharply dissimilar, transfer of reading strategies from Chinese to English may not be straightforward (Feng & Mokhtari, 1998). Orthographic, morphological, and syntactic differences might make Taiwanese readers rely on some distinct strategies when reading English as compared to reading Chinese. However, some reading strategies might be relevant to reading in both languages. This study attempts to uncover both differences and similarities in reading strategies that are reported using by Taiwanese middle-school students during Chinese reading and English reading.

Statement of Research Problems

Five research problems underlie this research: (a) the general lack of discussion of reading strategies in Taiwanese schools; (b) a paucity of studies of reading strategies in Chinese EFL contexts; (c) a lack of information about Taiwanese middle-school students' reading strategies; (d) the scarcity of mixed-methods studies, which integrate quantitative and qualitative methodologies, to investigate L2 students' reading strategies; and (e) an inadequate number of studies in which L2 readers' voices are heard. These problems are explained below.

First, based on my teaching experiences in Taiwan and the findings of my pilot study with Taiwanese middle-school students, I noticed that many Taiwanese

middle-school students lack the knowledge that reading strategies used for reading in Chinese can be transferred to English reading. Moreover, they seem to lack strategies specific to English reading. These problems might be caused by many factors.

Instructional styles and teachers' beliefs often influence students' learning the most (Paris, Wasik, & Turner, 1991). As noted earlier, many teachers in Taiwan still follow the traditional Grammar Translation Method to teach English. This method does not encourage Taiwanese EFL students to learn or to use reading strategies. In Taiwanese K-12 schools, reading strategies are explicitly taught neither for Chinese reading nor for English reading. Based on my own learning experiences, I did not encounter any reading strategy instruction until my university studies, when there was the need to take and to pass the Test of English as a Foreign Language (TOEFL).

Second, relatively few reading strategy studies exist involving the Chinese EFL setting. While there are numerous studies focusing on L2 readers' reported strategy use (Chamot & El-Dinary, 1999; Garcia, 1991; Hardin, 2001; Jiménez et al., 1996; Young & Oxford, 1997), most of those studies included L2 readers whose L1 was an alphabetic language (e.g., Spanish), similar to English. In addition, those L2 readers typically learned English in an ESL setting rather than an EFL setting. Compared to the dozens of ESL reading strategy studies where the L1 is alphabetic, relatively few studies focused on strategies of EFL students whose L1 is (logographic) Chinese and who are learning to read (alphabetic) English texts (Chern, 1994; Feng & Mokhtari, 1998; Kuo, 1993). An EFL learning context might influence students' perspectives on reading itself in each language and further influence their attitudes toward reading tasks and reading strategies for Chinese and English.

Third, there is little knowledge about early adolescent Chinese readers' use of strategies in the reading process. Of the studies on the strategies of Chinese L2 readers, most focused on students at senior high school level, college level and beyond (Chern, 1994; Feng & Mokhtari, 1998; Kuo, 1993; Yang, 1997). There are few studies investigating the reading strategies reported using by middle-school students, as they read English (Hsieh, 2003), and there are even fewer studies examining reported strategy use for both Chinese reading and English reading with Taiwanese middle-school students. As noted above, I am particularly interested in early adolescent EFL students because my experiences of teaching EFL in Taiwanese middle schools made me notice the lack of awareness of reading strategies among my students, especially those who were low-achieving readers, a situation also found by other Taiwanese researchers with their own students (Chen, 2002; Hsieh, 2003).

Fourth, most studies fail to integrate quantitative and qualitative research methods to investigate the complexities in how L2 readers read in their L1 and their L2. Most of the existing studies on L2 readers either employed questionnaires (e.g., Oxford et al., 2004; Sheorey & Mokhtari, 2001) or used think-aloud protocols (e.g., Chamot & El-Dinary, 1999; Hardin, 2001; Jiménez et al., 1996), but few studies combined both questionnaires and think-aloud protocols to collect both quantitative and qualitative data for analyzing the distinct, complicated reading process of L2 readers.

Finally, the voices of L2 readers themselves about their views on L1 and L2 reading and reading strategies are rarely presented in the existing L2 reading research. Exceptions are studies by Oxford, Lavine, Felkins, Hollaway, and Saleh (1996) and Young and Oxford (1997).

Overview of the Theoretical Framework

The theoretical framework of this study draws on four sources: (a) interactive reading approaches, (b) reading strategies, (c) self-regulated learning (SRL) theories, and (d) Cummins' Linguistic Interdependence Hypothesis. Review of the theoretical framework is presented in greater detail in Chapter 2.

Interactive Reading

Simply speaking, interactive reading approaches incorporate the notions of both top-down and bottom-up processing. That is, reading is an interactive process in which readers integrate their world knowledge, such as background knowledge, expectations, and context, into textual information (top-down processing) and simultaneously also use their language-based skills, such as decoding and grammatical skills, to process elements in the physical text (bottom-up processing) (Eskey & Grabe, 1988; Goldman & Rakestraw, 2000; Pressley, 2002; Stanovich, 1980). In other words, top-down strategies and bottom-up processing strategies are used interactively at any level during the comprehension process. Interactive processing approaches, as many L2 reading researchers believe (e.g., Bernhardt, 1991, 2005; Carrell, 1988; Grabe, 1991), present a more inclusive, integrated view accounting for the complex reading process, especially when reading involves an additional (second or foreign) language.

Reading Strategies

As noted earlier, reading strategies generally refer to thoughts, actions and procedures that readers use consciously in order to store, retrieve or apply information learned in a text (Koda, 2005). Effective readers usually use a variety of strategies effectively and flexibly in the reading process (Jiménez et al., 1996). Several researchers

(e.g., Anderson, 1991; Chamot & O'Malley, 1994a; Paris et al., 1991) presented different ways of categorizing reading strategies, for example, based on time of use or on the function of strategies. In the time-based categorization, reading strategies are grouped as pre-reading strategies, during-reading strategies, and post-reading strategies. The function-based categorization concerns major functional categories, such as cognitive (strategies for mental processing as used to work directly on a task), metacognitive (strategies used for planning, monitoring and evaluating), and socioaffective (strategies involving collaboration and self-affective control).

Self-Regulated Learning

The notion of *self-regulated learning* (SRL) has recently appealed to reading strategy researchers. This term has been introduced to describe a form of learning in which learners proactively select, employ and adjust their thoughts and behaviors (i.e., strategies) to attain their learning goals in an efficient manner (Zimmerman, 2001). Among SRL theories, Winne and Hadwin's (1998) SRL model, which centers on cognitive information processing, is closely relevant to this study, because it provides important insights on how a reader strategically processes the information from a written text. Vygotsky's SRL-related notion of egocentric speech provides a theoretical underpinning for the use of think-aloud protocols to infer the self-regulation process of readers. In line with SRL theories, part of the current study is aimed at the focal difference that distinguishes self-regulated (highly strategic) readers from their peers who do not engage in strategic reading. Another part of the study explores possible factors (e.g., self-efficacy and enjoyment of reading Chinese and English) associated with the development of strategic reading.

Linguistic Interdependence Hypothesis

Cummin's (1979a) Linguistic Interdependence Hypothesis has been used to explain the tendency that most good readers in an L1 or an L2 often read well in their other language. The Linguistic Interdependence Hypothesis suggests that reading strategies can be transferred across languages. Some L2 reading studies (Chern, 1994; Jiménez, 1997; Jiménez et al., 1996; Padrón, 1992; Swicegood, 1994) demonstrated that reading strategies learned in one language were able to be transferred to help read in another language. For example, Swicegood (1994) revealed that strategies taught in the L1 reading class not only helped L1 reading comprehension but also facilitated L2 reading comprehension. In addition, Chern (1994) and Jiménez et al. (1996) indicated that the majority of the strategies were reported using for both L1 and L2 reading by many L2 readers. Therefore, the results from those empirical studies support the theory that L1 and L2 reading are related and interdependent.

The present study helps us understand how closely Cummins' hypothesis fits the situation in which Taiwanese middle-school readers of Chinese (L1) are learning to read English (L2), given that the two languages are very different orthographically, morphologically, and syntactically. I hypothesize that once L2 readers reach a certain level of L1 and L2 reading achievement, they are able to transfer reading strategies across languages, regardless of the linguistic distance between the L1 and the L2.

Overview of the Research Design

This dissertation is a mixed-methods study which analyzed quantitative data from the *Task-based Reading Strategy Inventory (Task-Based RSI)* and the *Background Questionnaire*, and qualitative data from think-aloud protocols and semi-structured

interviews. The *Task-Based RSI* was created by adapting strategy items from two reading strategy questionnaires—the *Metacognitive Awareness of Reading Strategies Inventory* (Mokhtari & Reichard, 2002) and the *Reading Strategy Questionnaire* (Oxford et al., 2004) with the authors' permission. The 345 participants in this study were asked to report their use of reading strategies on the *Task-Based RSI* after reading a Chinese expository text, and report their reading strategy use on the *Task-Based RSI* again after reading an English expository text. The *Background Questionnaire* was designed to obtain participants' general information and specific information about language learning and reading. The think-aloud protocol was employed to offer access to participants' unobservable reading processes; the semi-structured interview was used to provide opportunities to understand students' perspectives toward L1 and L2 reading processes and reading strategies. Detailed methodological issues, including rationale and data collection procedures, are explained in Chapter 3. A pilot study which involved 146 eighth-grade Taiwanese students preceded this dissertation and helped shape the research design. See Chapter 2 for details on the pilot study.²

Research Questions

There are a total of nine research questions (RQ): six quantitative questions and three qualitative questions. The quantitative research questions are conceptually divided into three parts. Part A, focusing on RQ 1, explores the underlying structure of the English version of the *Task-Based RSI*. Part B, containing RQ 2 through RQ 4,

² Briefly, the pilot study had the following results: (a) more strategies were used by the students with high self-rated L1 and L2 reading achievement than by the students with low self-rated L1 and L2 reading achievement; (b) high self-rated L1 and L2 reading achievement used most of the reading strategies rather consistently across L1 reading and L2 readings; and (c) reading strategy transfer seemingly occurred only among the Taiwanese L2 readers who had high self-rated L1 and L2 reading achievement.

investigates the relationship between reading achievement status and overall reported strategy use or reported strategy use in each identified strategy category. Part C, including RQ 5 and RQ 6, examines the six predictors to overall reported strategy use. In contrast to the quantitative parts, Part D, comprised of RQ 7 through RQ 9, focuses qualitatively on strategy-use differences between high- and low-achieving readers as reflected in think-aloud reading protocols and the semi-structured interviews. Below are nine research questions.

Exploring Underlying Factors in the Task-Based RSI (Part A Quantitative)

RQ 1: What are the underlying factors in the English version³ of the *Task-Based RSI*?

Relationships between Reading Achievement Status and Reported Strategy Use across Languages (Part B Quantitative)

RQ 2: How does overall reported strategy use differ by reading achievement status (high reading achievement in both Chinese and English, average reading achievement in both Chinese and English, or low reading achievement in both Chinese and English) between reading a Chinese expository text and reading an English expository text?

RQ 3: How does reported strategy use in specific categories⁴ differ by reading achievement status (high reading achievement in both Chinese and English, average reading achievement in both Chinese and English, or low reading achievement in both Chinese and English) between reading a Chinese

³ The *Task-Based RSI* associated with the Chinese reading excluded the four translation strategies and has 43 items. The English version of the *Task-Based RSI*, which contains 47 items, is slightly more comprehensive and was therefore used to explore the underlying factors.

⁴ The strategy categories were identified based on the principal component analysis in RQ 1.

expository text and reading an English expository text?

RQ 3.1: Does reported strategy use in the metacognitive strategy category differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 3.2: Does reported strategy use in the problem-solving strategy category differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 3.3: Does reported strategy use in the grammatical/morphological strategy category⁵ differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 3.4: Does reported strategy use in the support strategy category differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 3.5: Does reported strategy use in the skipping strategy category differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 3.6: Does reported strategy use in the purpose-emphasizing strategy category differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 4: Does reported strategy use in the translation strategy category⁶ differ by

⁵ Grammatical = Syntactic

⁶ This is asked as a separate research question because four translation strategies are not included in the version of the *Task-Based RSI* associated with Chinese reading. The reason not to include translation strategies is that Chinese is the participants' native language, so there is no translation needed for reading in Chinese.

reading achievement status in reading an English expository text?

Prediction of Overall Reported Strategy Use (Part C Quantitative)

RQ 5: Which of the following personal variables significantly predict overall reported strategy use for Chinese reading?

- a. gender
- b. students' self-rated Chinese reading achievement
- c. enjoyment of reading in general
- d. enjoyment of reading in Chinese
- e. amount of daily reading time in any language
- f. students' rating of effectiveness of strategies for Chinese reading

RQ 6: Which of the following personal variables significantly predict overall reported strategy use for English reading?

- a. gender
- b. students' self-rated English reading achievement
- c. enjoyment of reading in general
- d. enjoyment of reading in English
- e. amount of daily reading time in any language
- f. students' rating of effectiveness of strategies for English reading

Strategy-Use Differences between Three High-Reading-Achieving Students and Three Low-Reading-Achieving Students (Part D Qualitative)

RQ 7: Which reading strategies are reported using by three high-reading-achieving Taiwanese students and three low-reading-achieving Taiwanese students in Chinese reading, according to think-aloud reading protocols and

semi-structured interviews?

RQ 8: Which reading strategies are reported using by three high-reading-achieving Taiwanese students and three low-reading-achieving Taiwanese students in English reading, according to think-aloud reading protocols and semi-structured interviews?

RQ 9: How do three high-reading-achieving Taiwanese students and three low-reading-achieving Taiwanese students describe their views on Chinese and English reading tasks, reading processes, and reading strategies, according to semi-structured interviews?

Definitions of Key Terms

1. ESL: English as a second language. A second language is learned in a community where the language serves daily social and communicative functions for the majority of the people in that community. Although a second language might be learned in an educational institution, it is mainly a means of communication, not merely a school subject.
2. EFL: English as a foreign language. A foreign language is learned in a community where this language is not the primary medium for daily communication for the majority of the people in that community. A foreign language is typically studied as a school subject rather than used as a communication tool.
3. L1: The person's first language or native language.
4. L2: The additional language (a target language) that one tries to learn. L2 encompasses both second and foreign languages.
5. L2 readers: Individuals who are literate, at least to some extent, in their first

languages and who learn to read an additional language (L2).

6. Middle school: A period of education that serves as a bridge between elementary school education and high school education. Middle schools in Taiwan include three grades: seventh, eighth, and ninth.
7. Bottom-up processing: Bottom up-processing is viewed as text-driven process in which reading starts from the analysis of small units to larger ones in the text (Spiro & Myer, 1984).
8. Top-down processing: Top-down processing is called background-driven process in which readers use background knowledge to make an intelligent guess about what would happen in a text (Goldman & Rakestraw, 2000).
9. Interactive Processing: Interactive processing is the reading process in which readers combine their world knowledge (e.g., background knowledge) with fine grained linguistic and textual knowledge, and simultaneously use both types of knowledge to understand a text (Eskey & Grabe, 1988; Stanovich, 1980).
10. Learning strategies: Mental thoughts and behaviors consciously employed by the learner to aid learning, i.e., the acquisition, storage, retrieval, and use of information (Oxford, 1990, 1996, forthcoming).
11. Strategic learners: Learners who select, take, or adjust thoughts or actions (strategies) in order to (a) attain learning goals, (b) overcome learning barriers, or (c) transfer prior world knowledge and learning strategies to new learning tasks in a conscious, efficient manner.
12. Reading strategies: Mental thoughts and behaviors that readers consciously use to store, retrieve and apply information learned in a text (Koda, 2005).

13. Reading skills: “Information-processing techniques that are automatic, whether at the level of recognizing grapheme-phoneme correspondence or summarizing a story” (Paris et al., 1991, p. 611). Reading skills suggest a reader’s habitual, automatic competency and ability, whereas reading strategies emphasize a reader’s actual and conscious way of comprehending information in a text.
14. Strategic readers: Readers who select, take, or adjust thoughts or actions (strategies) in order to (a) attain reading goals (e.g., retrieving information), (b) overcome reading barriers (e.g., inadequate linguistic knowledge), or (c) transfer prior world knowledge, literacy knowledge, and strategies to new reading tasks in a conscious, efficient manner. The concepts of strategies presented by multiple researchers (e.g., Cohen & Weaver, 1998; Koda, 2005; Oxford, 1990) coalesced to form the definition of strategic reader used in this study.
15. Skilled readers: Readers who no longer need to use strategies because these strategies are now automatic. These behaviors should not be called strategies but instead skills⁷.
16. Self-regulated learning (SRL): “Learning that results from students’ self-generated thoughts and behaviors [strategies] that are systematically oriented toward the attainment of their learning goals” (Schunk, 2001, p. 125). Self-regulated learners are strategic learners.

⁷ In my study, high-achieving L2 readers are still in the process of learning to be strategic readers in both Chinese and English.

Significance of the Study

This study uses a mixed-methods approach to examine how eighth-grade Taiwanese readers monitored, regulated, and controlled their reading strategies in the L1 and L2 reading processes. Another significant feature of the study is to present an “emic” perspective (Maxwell, 2002) on Taiwanese readers. In this study, an emic perspective⁸ allows readers to self-report their strategy use in their reading processes, and their attitudes towards reading tasks, reading processes, and reading strategies (Maxwell, 2002). These features allow this study to fill in, as noted earlier, the following knowledge gaps left by the previous studies:

- the general lack of discussion of reading strategies in Taiwanese schools
- a paucity of studies of reading strategies in Chinese EFL contexts
- a lack of information about Taiwanese middle-school students’ reading strategies
- the scarcity of mixed-methods studies, which integrate quantitative and qualitative methodologies, to investigate L2 students’ reading strategies
- an inadequate number of studies in which L2 readers’ voices are heard

All told, through rigorous investigation using quantitative data and qualitative data, this study appears to make a unique and significant contribution to the world’s understanding of reading strategies and the knowledge base of L1 and L2 reading by:

- involving Taiwanese middle-school readers whose L1 (Chinese) and L2 (English) were sharply different
- employing mixed-method research which provided both quantitative data and

⁸ This is contrasted with an “etic” perspective, which reflects the point of view of the researcher rather than the participant (Maxwell, 2002).

qualitative data regarding reported strategy use associated with a reading task

- investigating the interaction between reading achievement and reported reading strategy use within each language (L1 and L2)
- examining the interaction between reading achievement and reported reading strategy use across language
- discussing the cross-language transfer of reading strategies and language translation in very new ways
- exploring the relationships among personal variables with reported strategy use.

Limitations

The reading materials used for the *Task-Based RSI* and the think-aloud protocols were chosen according to certain desirable features, such as specific genre (expository) and topics that were interesting but unfamiliar to the readers in this particular population. Naturally, the strategic reading patterns presented in this study would have been different if other reading materials and tasks had been used. Because the participants were native Chinese readers, the Chinese reading texts were necessarily more advanced than the L2 (English) reading tasks. This is the first limitation of the study.

The second and third limitations were the age group and ethnicity of the sample. The results of this study might not be generalizable to ages above or below middle school or to native speakers of languages other than Chinese.

Fourth, for the purpose of comparing strategic patterns of students with different levels of reading achievement, the same reading materials and tasks were intentionally used for all participants. However, the texts could be relatively difficult for low-achieving readers and relatively easy for high-achieving readers, so text difficulty could have

influenced reported strategy use. While this could be considered a limitation, it could indeed be viewed as a naturally occurring phenomenon.

Fifth, self-report, while a respected research strategy, relies on the degree of awareness of the study participants and, in think-alouds and interview, their ability to talk spontaneously about their reading. Results are therefore influenced by students who are less aware or less articulate.

Sixth, self-reporting in some studies can be affected by social desirability response bias, i.e., the tendency of the participant to report what he or she thinks the researcher wants to hear. I tried to minimize social desirability response bias by keeping reminding the participants that honestly reporting which strategies that they themselves used to facilitate their comprehension was important to this study. In addition, I told them that their responses would not be graded and teachers' judgments would not be influenced. Teachers also informed the students about this.

Overview of the Dissertation

In this chapter, the purposes and problems were presented, along with background information about English education in Taiwan. This chapter also included a brief overview of the dissertation's theoretical framework and research design. A list of research questions guiding the study were presented, followed by definitions of key terms, significance of the study, and possible limitations.

Chapter 2 is the literature review and concerns both theory and empirical research. The review starts with a theoretical view of the reading process from three perspectives: bottom-up, top-down, and interactive processing. Special attention is given to interactive processing, which holds much promise for understanding effective L2 reading. In

addition, theoretical classifications of reading strategies are offered, followed by the discussion of the role of metacognition on reading strategies. Moreover, three sets of SRL theories are presented: Winne and Hadwin's (1998) SRL model, Vygotsky's views on SRL, and the social cognitive view on SRL. Chapter 2 explains Cummins' (1979a) theoretical Linguistic Interdependence Hypothesis, which demonstrates how reading strategies in the L1 are related to those in L2 reading. Finally, a major part of Chapter 2 reviews empirical research on strategic L2 reading, including among others my own pilot study.

In Chapter 3 concerns the study's methodology. The following methodological aspects are included in detail: (a) research design and its justification, (b) participants and educational setting, (c) materials and instruments, and (d) procedures of data collection and data analysis. Chapter 3 guides the implementation of the whole dissertation plan.

Chapter 4 and Chapter 5 respectively report the results of the quantitative and qualitative data. Chapter 4 presents the results derived from the statistical analyses of the *Task-Based RSI* and the *Background Questionnaire*, while Chapter 5 offers the results of the qualitative analyses involving the think-aloud protocols and the semi-structured interviews.

Chapter 6, the final chapter, first briefly reviews the quantitative and qualitative results, and then leads to the discussion of the major synthesized findings. Chapter 6 also presents the implications for future research and instruction. At the end, a final conclusion of the study is provided in Chapter 6.

Chapter 2: Review of Research and Theory

Introduction

This chapter consists of five sections that present an orderly review of key theories and empirical studies relevant to this specific study. To investigate how reading strategies are reported using in the reading process of students, the review starts with three perspectives on the reading process. The three perspectives are bottom-up, top-down, and interactive processing. The first section also includes the interactive perspective in L2 reading context. In the second section, theoretical research literature related to reading strategies is presented, along with a theoretical presentation on metacognition. In the third section, the theory of self-regulated learning (SRL), which has appealed to researchers of reading strategies, is discussed. In the fourth section, the Linguistic Interdependence Hypothesis (Cummins, 1979a) is described. The Linguistic Interdependence Hypothesis explains the relationship between L1 reading and L2 reading, that is, cross-language transfer of reading strategies. The fifth section reviews empirical studies on reading strategies among L2 readers and includes my own empirical pilot study, which preceded this dissertation. Only empirical studies that were relevant to the purpose and that had met standards of high quality (e.g., reliability and validity) were accepted for inclusion.

Reading Process

Reading researchers in L1 and L2 areas have presented models of the reading process following three perspectives: bottom-up (text-driven), top-down (background-knowledge-driven), and interactive processing (e.g., Bernhardt, 1991; Goldman & Rakestraw, 2000; Spiro & Myers, 1984). Based on different conceptualizations of the reading process, specific strategies are emphasized and categorized. For instance, such

strategies as decoding and analyzing sentence structures are often associated with bottom-up processing, while strategies such as predicting and activating prior knowledge are usually mentioned as top-down processing strategies. The interactive perspective encompasses both bottom-up and top-down processing. To understand the theories underlying reading strategies and also to understand the complex reading process, this review starts by explaining the perspectives on the reading process.

In this section, the basic notions of each of the three perspectives in the L1 reading research are presented, followed the interactive view of reading in L2 research. Interactive processing approaches, as many L2 reading researchers (e.g., Bernhardt, 1991; Carrell, 1988; Grabe, 1988) believe, present a more inclusive, integrated view accounting for the complexities of the L1 and L2 reading process. However, not all students balance the use of bottom-up and top-down processing; some favor one type of processing over the other.

Perspective 1: Bottom-Up Processing

Bottom-up processing is viewed as a text-driven process because in the bottom-up process, readers mainly work on the elements from the text (Spiro & Myers, 1984). This includes specific linguistic elements of the text such as words, phrases and sentences.

According to this perspective, readers go through a series of stages, starting from the analysis of small units then moving to larger ones in the text (Spiro & Myers, 1984). In other words, text comprehension is constructed by combining sounds and letters to form meaning of words, then combining words to generate meaning of phrases and sentences in a linear sequence (Bernhardt, 1991). In this perspective, Gough's (1972) model, which describes how a text is processed by a reader from the moment of looking

at the printed letters and words to the time of deriving meanings from them, is a prime example of bottom-up processing. In Gough's model, readers begin with letters, transforming the string of letters into systematic phonemes. By mapping the phonemes with the mental lexicon (i.e., a dictionary of words and meanings stored in the brain), phonemes are recognized in the printed syllables and words. After readers process each word in a sentence, syntactic and semantic rules then operate in a mechanism to generate the meaning of the sentence.

In Gough's model, as in other bottom-up models, the primary focus is on the letter and word level in the text. Even though proficiency in decoding is necessary for successful reading comprehension, is it sufficient? The answer is absolutely not. Other researchers (e.g., Goodman, 1968) further proposed the view of top-down processing, indicating that contextual factors, such as readers' prior knowledge, greatly influence text comprehension.

Perspective 2: Top-Down Processing

In contrast to bottom-up processing, also called text-driven processing, top-down processing is considered background-knowledge-driven processing. In top-down processing, the reader uses general knowledge of the world or background knowledge of a particular text to make intelligent guesses about what might happen in the text (Goldman & Rakestraw, 2000).

Goodman's (1968) model is the one often associated with top-down reading processing. Goodman (1968) described the reading process as a "psycholinguistic guessing game" (p. 126). Goodman claimed that the human brain employs five processes in reading: recognition-initiation, prediction, confirmation, correction, and termination

(Goodman, 1968). In his model, readers begin by recognizing a graphic display in a written language, forming a mental representation which is partly what is seen and partly what is expected to be seen. As reading proceeds, readers confirm the predictions or correct the predictions when inconsistencies are found. The reading process is terminated when the reading task is completed. Termination also may occur at any point for other reasons: little meaning is constructed, the task is uninteresting, or the text does not match the reading purpose. Even though there are different contextualizations of top-down processing, readers' interpretation and background knowledge are the important elements common to top-down models (Grabe, 1991).

Along with the development of top-down processing approaches, the importance of the reader's active role is recognized and emphasized in the top-down reading process. However, reading is an extremely complex process in nature, and thus effective readers do not employ just one type of processing, either bottom-up or top-down, to achieve comprehension. Therefore, a view of interactive processing has arisen to explain the multifaceted reading process of successful readers.

Perspective 3: Interactive Processing

The interactive perspective that explains the reading process synthesizes both types of processing, bottom-up and top-down. Interactive processing includes two important conceptions. The first concept is that readers comprehend the text partly as a result of drawing componential information from the text and partly from their prior knowledge. The second concept is that reading involves not only "lower-level rapid, automatic identification skills" (strategies for analyzing linguistic components such as letters and words) valued in bottom-up models, but also "higher-level comprehension/interpretation

skills” (cognitive strategies for integrating various forms of knowledge) stressed in top-down models (Grabe, 1991, p. 383).

Among interactive models, Stanovich (1980)’s Interactive-Compensatory model not only explains the dynamic interaction between bottom-up and top-down processing required to achieve successful reading comprehension but also addresses individual differences in reading. In addition to the interactive models’ common assumption that the reading process is a process of synthesizing information provided simultaneously from several knowledge sources, Stanovich’s interactive model adds an important perspective—the compensatory assumption. The essence of the compensatory assumption is that “a process at any level can compensate for deficiencies at any other level” (1980, p. 36). In other words, the poor reader, who may be less proficient in word recognition but might have background knowledge, could use top-down processing to compensate for the weakness. The theory helps explain the inconsistent empirical data summarized by Stanovich (1980) that some poor readers might rely more on background knowledge to compensate for a lack of vocabulary knowledge.

In addition, the Stanovich’s model provides much promise that efficient L2 readers might use reading strategies learned from the L1 to compensate for less linguistic knowledge in the L2 (Barnett, 1989). The view of interactive reading influences the L2 reading research profoundly. As many L2 researchers argued, L2 readers need both top-down and bottom-up processing and should learn both types of strategies in order to be successful readers (Bernhardt, 1991; Carrell, 1988; Eskey, 1988).

Applying the Interactive Perspective to L2 Reading

Before discussing the interactive view on L2 reading, it is important to point out

the diverse variables of L2 readers that make the L2 reading process even more complex. Urquhart and Weir (1998) summarized numerous variables to be kept in mind when discussing L2 readers. The first is the degree of L1 literacy. It should be noted that some L2 readers may or may not be literate in their L1,⁹ and literacy in this sense is a matter of degree. The second variable is the script of L1 and L2. Some L2 readers begin to learn their L2 based on a similar orthographic system, such as English to Spanish. On the contrary, other L2 readers, such as Chinese L2 readers, need to switch orthographies and must develop a new sense of an orthographic system different from that of their L1 (Bernhardt, 1991). The third variable is the previous language learning experience. Some L2 readers might have already acquired several languages in addition to their L1. The final variable summarized by Urquhart and Weir (1998) is cultural relationships. For instance, L2 readers from Western Europe may bring more shared knowledge to English texts than readers from other cultures, such as Asian, that are more distanced from English texts. Therefore, each L2 reader is likely to bring diverse background knowledge when coming to comprehend a text.

The role of background knowledge in reading comprehension has been formalized as *schema theory* (Carrell & Eisterhold, 1988; Reznitskaya & Anderson, 2002; Rumelhart, 1980). Background knowledge refers to previously acquired knowledge, and schemata are generally described as previously acquired knowledge structures (Rumelhart, 1980). According to Rumelhart's (1980) definition, "a schema is a data structure for representing generic concepts in memory" (p. 34). Schemata are hierarchical in nature. In other words,

⁹ The Taiwanese participants in this current study had developed their L1 literacy before learning to read English (L2). However, some of these participants had higher L1 reading achievement scores than did others.

schemata organize general, broad concepts at the top and specific concepts at the bottom. Incoming information evokes bottom-up processing by mapping against the existing bottom-level schemata, and as these bottom-level schemata are combined into higher-level schemata, both levels of schemata become activated and interact with each other. Top-down processing, on the other hand, is turned on as the system makes general predictions and inferences based on the higher-level schemata (Carrell & Eisterhold, 1988). As suggested by Paas, Renkl, and Sweller (2004, cited in Oxford, forthcoming), development of greater numbers of increasingly complex, higher-level schemata allows the learner to classify interacting information components as though they are a single element. Consequently, the burden on working memory can be reduced.

An important aspect of bottom-up and top-down processing is that both should interact in the process of comprehending and interpreting information (Rumelhart, 1980). New information is processed through bottom-up processing, and top-down processing helps comprehension if the new information is compatible with the reader's conceptual predictions (Carrell & Eisterhold, 1988).

The theoretical concepts about the interactivity of bottom-up and top-down processing and schema theory attracted many L2 reading researchers to the interactive processing perspective, because this perspective allows us to inspect a more complicated reading process that L2 readers experience in depth. In addition, the interactive processing perspective emphasizes mixing of both top-down and bottom-up processing strategies, unlike the unidirectional thrusts of top-down processing or bottom up-processing. Top-down processing, if used by itself, deemphasizes the decoding dimensions of reading, which are compulsory for being a skillful, fluent reader (Eskey,

1988); bottom-up processing, if used by itself, overlooks prior knowledge that readers bring to the text.

Reading Strategies

As defined in Chapter 1, reading strategies refer to the mental thoughts and behaviors that readers choose to use in order to learn, retrieve, and apply information learned from a text in a conscious, deliberate manner (Koda, 2005). Within the three reading perspectives outlined above, L1 and L2 reading strategies have been discussed as a binary set of bottom-up and top-down strategies. Specially, strategies that are used to understand the meaning and structure of each word, each phrase, and each sentence structure are often categorized as *bottom-up strategies*. The term, *top-down strategies*, often refers to the strategies focusing on main ideas and meaning in a broad context.

In addition to the binary distinction of reading strategies, some cognitive researchers (e.g., Anderson, 1991; Chamot & O'Malley, 1994a, 1994b; Paris et al., 1991) have categorized strategies in other ways. These ways are explained below.

Reading Strategy Classifications

The cognitive literature on reading strategies presents different ways to categorize strategies. Anderson (1991) introduced five function-based reading strategy categories, including L1 and L2 readers' reading processing strategies (1 through 4 below) and test-taking strategies (5 below). These five categories were established based on the think-aloud protocols that sixty five Spanish-speaking college students reported while taking a standardized English reading comprehension test and academic English reading tasks.

1. Supervising strategies: These strategies are used for monitoring and evaluating

reading comprehension process, such as confirming/disconfirming an inference and recognizing a loss of concentration.

2. Supporting strategies: These strategies are used for regulating processing behaviors, such as skipping unknown words and visualizing.
3. Paraphrase strategies: These strategies are used for analyzing linguistic elements, such as using cognates and breaking lexical items into parts.
4. Strategies for establishing coherence in text: These strategies are used for aiding global understanding of a text, such as reacting to an author's style and using background knowledge.
5. Test-taking strategies for reading: These strategies are used for solving problems posed on a reading test, such as looking for the answers in chronological order in the passage.

However, in Anderson's (1991) five categories, the strategies listed in the "paraphrase" category are debatable in my view. Those strategies, such as using cognates and breaking lexical items into parts, are analytic strategies used to identify parts of a word (e.g., prefix, suffix, and root) for better recognizing the word meaning. Therefore, these strategies should not be labeled as "paraphrase" strategies, which usually involve using other words or phrases to express the meaning of a sentence.

Koda (2005) adopted the function-based categories presented by Chamot and O'Malley in their book (1994a) and applied them to L2 reading: cognitive, metacognitive, and social/affective.

1. Metacognitive strategies: Such strategies are used to plan for learning, monitor one's own comprehension, and evaluate how well one has performed.

2. Cognitive strategies: These strategies are mental-processing actions or procedures used to work on language and content tasks. Examples of such strategies are elaborating prior knowledge, making inferences and analyzing linguistic elements.
3. Social and affective strategies: Such strategies involve collaboration with others during reading and the use of positive self-talk to reduce anxiety.

Chamot and O'Malley's (1994a) classification based on empirical research, not just theory, presents the strategies that L2 learners can apply to academic tasks. Their classification has been widely used in the L2 research.¹⁰

Paris et al. (1991) grouped reading strategies based on time of use: pre-reading strategies, during-reading strategies and post-reading strategies. Before reading, readers might use such strategies as skimming text, looking at pictures, or examining the title to activate prior knowledge. During reading, readers need strategies to confirm main ideas, make inferences and identify the relationships between parts of a text. After reading, the strategies used for reviewing text content, evaluating comprehension and appraising the success of strategies might be applied.

The ways of categorizing reading strategies suggested by all these researchers provide different insights on reading strategies used by readers. For example, the function-based categorization of reading strategies by Chamot and O'Malley (1994a) divided reading behaviors in terms of cognitive operations. The distinction between cognitive and metacognitive strategies has been found to be useful in identifying effective and less effective readers by some empirical studies (see Chamot & El-Dinary, 1999;

¹⁰ Another widely used classification of strategies in the L2 research is Oxford's (1990) six-category model. These six categories are metacognitive, cognitive, memory, compensation, affective, and social strategies. Oxford's (1990) classification of these categories, and the examples of them, cover language learning overall, not just reading.

Chern, 1994; Jiménez et al., 1996; Young & Oxford, 1997).

Metacognition and Strategy Use

Metacognition is a crucial concept closely related to efficient use of reading strategies. The term “metacognition” refers to the ability to (a) reflect on and (b) self-regulate cognitive processes. The first ability is metacognitive reflection, while the second ability is metacognitive regulation.

Metacognitive *reflection*, one element of metacognition, entails three types of metacognitive knowledge: knowledge about self, knowledge about tasks, and knowledge about strategies (Flavell, 1987; Wenden, 2001). Oxford (forthcoming) presents clear definitions of each type of metacognitive knowledge based on Wenden (2001) and Flavell (1987). First, knowledge about self includes general knowledge about how human learn, and also a specific knowledge of how one, himself or herself, learns. Second, knowledge about tasks entails knowledge about the nature of a task and the potential processing demands placed on the individual by the task. Third, knowledge about strategies includes knowledge about what types of strategies (declarative knowledge) exist, and when certain strategies should be used for what purposes (conditional knowledge). Oxford (forthcoming) adds two more types of metacognitive knowledge not mentioned in other theories of metacognitive reflection: whole-process knowledge and sociocultural knowledge. Whole-process knowledge is a future-oriented knowledge about what long-range L2 learning involves or brings about. This knowledge influences learners’ motivation to learn, as well as strategies that they use. Sociocultural knowledge entails an understanding of three elements: (a) values and beliefs toward learning a L2 in a culture, (b) L2 cultural practices different from the learner’s own, and (c) other sociocultural

concerns (e.g., sociocultural identity) affecting L2 learning. All five types of metacognitive knowledge can be applicable to reading.

Metacognitive *regulation*, the other element of metacognition, is closely related to but different from metacognitive reflection. Metacognitive regulation involves using or revising strategies to achieve a goal for learning or performance, based on the learner's own monitoring and evaluating of the utility of the strategies (Baker, 2002). Empirical research in L1 and L2 reading has strongly suggested that metacognitive strategies are related to the reading comprehension of both L1 readers and L2 readers. Paris and Myers (1981) compared good and poor L1 readers, controlling for the variables of age, gender, and arithmetic achievement. They reported that good readers set up a plan before beginning to read, organized the information learned from various sources, monitored their comprehension constantly, and evaluated how well they achieved reading. These all reflect metacognitive regulation.

Similarly, good L2 readers also display a close relationship between metacognition and reading comprehension (Carrell, Gajduse & Wise, 1998). Metacognition might promote the transfer of reading strategies across languages. Hardin (2001) found that successful L2 readers who were more metacognitively aware of (able to reflect on) the strategies that they employed in reading demonstrated better self-regulated capacities to select, apply and adjust reading strategies for different reading tasks, and those L2 readers also transferred the strategies across languages.

Strategic Reading within Self-Regulated Learning

The term self-regulated learning (SRL) is used to describe how students actively participate in the learning process and attain their goals by generating thoughts and

actions (strategies) (Zimmerman, 2001). Research on strategic reading became embedded in SRL because researchers increasingly realized that the effective use of reading strategies closely relied on the awareness of the knowledge of how and when to use which strategies, as well as motivation and self-efficacy (Paris & Paris, 2001).

Zimmerman (2001) summarized three important features of the SRL models: (a) the purposive use of strategies to improve academic learning; (b) a self-generated feedback loop, i.e., a cyclical process in which students consciously monitor the usefulness of strategies and make appropriate adjustments during learning; and (c) motives for being self-regulated (e.g., achievement success, goal accomplishment and self-esteem).

Because the discussion of SRL seems to greatly center on strategies, it might be mistakenly assumed that SRL simply replaced the term learning strategies. Oxford (personal communication, November 14, 2006) clarified the misconception and asserted that SRL is an overarching metacognitive framework that guides the reader or learner in (a) setting goals; (b) deploying different types of strategies to accomplish tasks related to those goals; (c) judging when, how and why strategies are used; and (d) determining the degree of success in completing tasks and reaching goals.

A few recent scholars (e.g., Oxford & Schramm, in press) discuss the notion of SRL from two perspectives—psychological views and sociocultural views. Even though both psychological and sociocultural views provided important insights on strategic reading, the current study draws greatly on information processing theory (i.e., Winne and Hadwin's SRL Model), a psychological perspective on SRL, because the focus of this study is on how L2 readers proactively select, adjust, and structure their thoughts and behaviors in their own reading process with the goal of achieving comprehension.

However, some concepts associated with sociocultural views such as egocentric speech proposed in Vygotsky's theory and self-efficacy in social cognitive theories (see Bandura, 1997; Schunk & Zimmerman, 2007) also guide me to examine individual differences in learning and using strategies while taking motivational variables into consideration.

Winne and Hadwin's SRL Model

Winne and Hadwin's (1998) SRL model was designed to examine how one processes information with the goal to learn some or all of whatever information is presented. In this model, information that comes from a learner or is available in the environment plays four roles: as a condition, a product, an evaluation, or a standard, which are interrelated in the four phases of the SRL process. The four phases are described in the context of reading.

In phase one, a reader first defines a reading task from the task condition, i.e., external information available in the environment (e.g., the requirements of the task) and the cognitive condition, i.e., internal information retrieved from long-term memory (e.g., the reader's own knowledge and prior experiences). After generating external and internal information about the reading task, the reader sets up standards, based on which he or she determines the success of accomplishing a task. In phase two, the reader incorporates all the information to set goals and plans for the task, thus making decisions. The reader decides what the goals are, which tactics¹¹ are relevant, and how the plan should be formed. As long as the reader applies tactics and strategies to the current reading task, the reader transits to phase three. In this phase, the reader combines the relevant tactics with

¹¹ Winne (2001) made a distinction between tactics and strategies. A tactic is represented as a condition (if)-action (then) rule. If the current task has particular features, then a particular action is carried out. A strategy extends the if-then rule to the if-then-else rule, which coordinates a set of tactics to approach a higher level goal.

the current conditions in working memory to generate cognitive (e.g., guessing the meaning of unknown vocabulary) products and behaviors (e.g., writing a question mark next to unknown vocabulary). When the reader monitors cognitive products, the reader might generate internal feedback (e.g., confirming the meaning from the context); when behavioral products are monitored, external feedback (e.g., peer assistance in explaining the meaning) might come to be available. In the final phase, which is optional, the reader might adapt some strategies that he or she use based on their current experiences.

Even though Winne and Hadwin's model clearly illustrates how one processes information that is presented in a task, the term *product* used in Winne and Hadwin's mode is not commonly used in that fashion by most SRL researchers in L1 and L2. Winne and Hadwin used the term *product* to refer to certain cognitive thoughts and behaviors (strategies) generated by an individual during a reading or learning task. However, *product* is a questionable term. As Oxford (forthcoming) argued, the product of learning should be considered, for example, as new knowledge or the level of language proficiency that one achieves, not the strategies for attaining that new knowledge or reaching that level of proficiency. Strategies then are actions that an individual uses to learn. Oxford (forthcoming) emphasizes, "Strategies are conscious, goal-directed, self-regulated actions, and actions are processes rather than outcomes or products" (p. 47). This can be adapted to reading, not just learning.

Throughout the phases of Winne and Hadwin's model, metacognitive monitoring is central. Metacognitive monitoring produces information that self-regulated readers use to examine their current progress toward their goals and to adjust their use of strategies. The emphasis on metacognitive monitoring within the feedback loops appeals to me because

the existing L1 and L2 reading research has reported that metacognition plays an important role in cognitive reading processes and distinguishes between distinguishes effective and less effective readers (Hardin, 2001; Paris & Myers, 1981).

Winne and Hadwin's model allows examination of the dynamic interaction among reading tasks, metacognitive and cognitive processes, and motivational attributes because the model emphasizes the active role of successful readers, who intentionally put forth a creative effort in an attempt to understand and accomplish a reading task. In addition, the model emphasizes learning as an *event*. Winne and Perry (2000) explained, "An event is like a snapshot that freezes activity in motion, a transient state embedded in a larger, longer series of states unfolding over time" (p. 534). Based on this assumption, the complex reading process involving actions and thoughts can be observed, analyzed, and inferred.

Vygotsky's Views on SRL

Different from Winne and Hadwin's (1998) model, which fully focuses on the individual, and metacognitive and cognitive SRL processes, Vygotsky's view emphasizes the necessity of the social dimension in the SRL (McCaslin & Hickey, 2001). In his theory, language plays an important role in the SRL process in which learning begins from social speech, through egocentric speech to inner speech. Social speech occurs in the dialogue, in which an individual communicates with others, usually more competent people, through language. Egocentric speech consists of word spoken aloud by an individual to himself to herself, and does not require responses from other. Inner speech involves turning words into thoughts. The developmental sequence of the three types of speech performs two distinct functions: communication with others and self-direction

(self-regulation) (Zivin, 1979). Learning begins by communicating with more capable others, such as teachers, and appears to be regulated by a series of social dialogues with others. Through social dialogue, learners cognitively develop with more able others, mutually regulating the Zone of Proximal Development (ZPD), which refers to the difference between learners' current level and potential level that can be achieved with appropriate scaffolding from the more capable person. Gradually, learners transform and internalize linguistic signals into thoughts. This inner speech can become self-regulation (Oxford & Schramm, in press). Egocentric speech, in Vygotsky's point of view, is the transition between social speech and inner speech. Vygotsky maintained that egocentric speech is self-directive and can become "an instrument in the seeking and planning of a solution to a problem" (McCaslin & Hickey, 2001, p. 233).

The notion of egocentric speech is closely relevant to the current study, whose research purpose is to investigate how L2 readers self-regulate their thoughts and behaviors in their reading processes. Vygotsky thought that egocentric speech, which learners can use when facing a difficult, novel or frustrating task, can be observed. Through those observations, the self-regulation process of a reader can be inferred (McCaslin & Hickey, 2001).

Social Cognitive Views on SRL

Similar to Vygotsky's views on SRL that the social dimension plays an important role in the self-regulation process, the social cognitive theorists further emphasized reciprocal relationships among personal, behavioral and environmental influences (Bandura, 2001; Zimmerman, 2001). These three aspects of self-regulation were presented in Bandura's (1997) social cognitive model. For example, one's personal

beliefs about L2 reading might influence reading behaviors, such as choices of reading topics, the amount of effort, and ways of reading. Those beliefs might also have an impact on one's choice of environment. For instance, one might need more concentration while reading a text in the L2 and thus choose to read in a quiet environment.

From social cognitive viewpoints, self-efficacy and outcome expectations are two important affective sources that help determine one's motivation to self-regulate or to be involved at all. Self-efficacy refers to the perceived ability needed for learning or performing actions to reach designated levels (Bandura, 1997). Students with high self-efficacy for performing a task to a given level of quality tend to be more willing to work, to spend effort, and to persist on a difficult task (Schunk & Zimmerman, 2007). In addition, outcome expectations, which refer to the consequences that one expects to receive after performing an action, are also influential because students prefer to engage in a task that they believe will produce a positive outcome (Schunk & Zimmerman, 2007). In other words, the utility value of learning affects behaviors. Moreover, social cognitive theorists mention modeling as an effective means of developing self-regulation and raising self-efficacy. Modeling refers to a social process in which observers (learners) change cognitively, affectively and behaviorally after observing successful models (Schunk, 2001).

Relationships between motivational issues and modeling are often cited in discussions of reading strategies. For example, McCrudden et al. (2005) found that the self-efficacy of at-risk fourth graders increased after receiving explicit modeling and practice of reading strategies. The relationship between motivational factors and reported strategy use is a focus of this present study. Part of this study was designed to examine

how overall reported strategy use is related to personal variables including motivation factors (e.g., self-rated reading achievement and self-rated usefulness of reading strategies) among the L2 readers, because self-rated reading achievement is a reflection of self-efficacy, and self-rated usefulness of reading strategies is a manifestation of how L2 readers determine the utility value of strategies.

Linguistic Interdependence Hypothesis

In addition to the theoretical and research literature presented so far, Cummins' (1979a) Linguistic Interdependence Hypothesis sheds light on the relationship between the L1 and the L2 reading. Cummins (1991) claimed that every learner has two types of language proficiencies in the L1 and the L2. These proficiencies are basic interpersonal communication skills (BICS) and cognitive/academic language proficiency (CALP). BICS, such as oral conversations, is viewed as a contextualized language that develops in an environment where many situational and paralinguistic cues are abundant to support language processing. CALP, such as academic reading, is considered as a less contextualized language that develops in an environment where situational and paralinguistic cues are less abundant.

Cummins (1979b) reviewed several studies investigating the relationship between CALP in the L1 and CALP in the L2, and suggested that there is a moderate correlation between the L1 and the L2 CALP. For instance, the findings reported that literacy-related functions that are learned in the L1 significantly predict future learning of these functions in the L2 (Cummins, 1979b). These findings explain why bilingual children with strong L1 CALP achieve L2 CALP more efficiently than those bilingual children who lack L1 support. This hypothesis also accounts for the transfer of reading strategies across

languages. As showed in some empirical studies (see Hardin, 2001; Jiménez et al., 1996), good L2 readers used similar strategies when reading L1 and L2 texts.

Empirical Studies on Reported Strategy Use of L2 Readers

This section summarizes the empirical studies examining strategies reported using by L2 readers in Taiwan and other countries, in addition to presenting research on the investigation of cross-language transfer of reading strategies. Three sets of empirical studies concerning reported strategy use of L2 readers are reviewed. The first set of studies examines the reported strategy use by reading proficiency. The second set of studies investigates reported strategy use in relation to reading proficiency and reading tasks. The third set of studies inspects the relationships among two personal variables, i.e., gender and motivation, with reported strategy use. Followed by the review of empirical studies, my own empirical pilot study that preceded this dissertation is presented.

Relationship between Reported Strategy Use and Reading Proficiency

In one study, Chamot and El-Dinary (1999) analyzed think-aloud data collected from eight third-grade and fourth-grade students in French, Japanese, and Spanish immersion classrooms while working on academic reading tasks, and they compared reported strategy use between highly effective and less effective students. Even though there was no significant difference in the total number of reported reading strategies between these two groups, the proportion of types of strategy employed differed. For the highly effective readers, metacognitive strategies, such as planning and monitoring, represented 22 % of the total reading strategies. The higher-level cognitive, top-down strategies (e.g., making inferences and predicting) accounted for 51 %, and the language-based, bottom up strategies, such as decoding and identifying cognates,

comprised 27% of their reported strategy use. In contrast, for the less effective readers reported, metacognitive strategies only represented 6% of the reading strategies. The cognitive strategies comprised 36%, and the bottom-top strategies, especially decoding, accounted for 58% of their reported strategy use. The findings suggested that the effective readers employed a range of reading strategies (bottom-up or top-down strategies) flexibly for accomplishing a reading task. The effective readers also used metacognitive strategies to monitor their reading comprehension or to adjust their reading actions. In contrast, the less effective readers seemed to focus too much on details rather than the whole meaning of a text.

In another study, Jiménez et al. (1996) examined the reported strategy use by 14 sixth-and seventh-grade readers—eight who were identified as successful Latino students, three who were identified as marginally successful Latino students, and three who were monolingual Anglo students. They were asked to do the think-aloud tasks—reading several English and Spanish texts and talking aloud their thoughts. In addition, they were also interviewed with regards to some questions dealing with general aspects of reading and some directed to understand their L1 and L2 reading process. Consistent with the findings of Chamot and El-Dinary (1999), the successful Latino students used various strategies including metacognitive strategies (e.g., monitoring comprehension), cognitive strategies (e.g., making inferences), and language-based strategies (e.g., searching for cognates). Most of these strategies were similar to what the three monolingual Anglo students produced while reading English texts. However, the marginally successful Latino students often got stuck on unknown vocabulary and used relatively few strategies to resolve vocabulary problems.

Jiménez et al. (1996) also found that successful Latino bilingual readers took advantage of L1 (Spanish) and L2 (English) strategies to comprehend a text and combined those strategies to help them understand a text. Such strategies were: (a) searching for cognates, a reading strategy to resolve problems of unknown vocabulary in English; (b) translating from one language to the other in order to comprehend the text; and (c) transferring information across languages. Most poor L2 readers, on the other hand, did not view the L1 as an asset for L2 reading because they considered L1 reading and L2 reading to be separate processes. For such students, this belief decreased the probability of transferring reading strategies across languages. Therefore, how reading strategies are used in one language and across languages differs among less successful L2 readers.

Reported Strategy Use Associated with Reading Proficiency and Reading Tasks

Another set of studies examined L2 reading strategy use according to two factors: reading proficiency and reading task. Oxford et al. (2004) used a task-based reading strategy questionnaire to examine the effect of task difficulty and proficiency level on the self-reported frequency of strategy use by 36 ESL college students (L2 readers of English). They found that within the three task conditions (no task, easy task and difficult task), the high-proficiency readers reported lower mean frequency of the overall strategies than the low-proficiency readers in the difficult task condition, but such differentiation was not found within the no task and easy task conditions. An explanation suggested by Oxford et al. (2004) was that the high-proficiency readers appeared not to find the difficult reading text to be a serious obstacle, resulting in a less need to employ as many strategies as did the low-proficiency readers who might have greater difficulty

comprehending the text. They also pointed out that many strategies that the low-proficiency readers used were of a more mechanical, bottom-up nature that focused on linguistic elements of a text. Even though those bottom-up strategies were found to be useful, if used alone, they were insufficient for successfully comprehending a text according to the interactive perspective on reading.

Another study (Young & Oxford, 1997) compared the reported strategy use of 49 native English college students who encountered reading tasks written in two different languages: English (L1) and Spanish (L2). Young and Oxford (1997) classified the strategies that were reported using in the think-aloud tasks into two broad categories: local and global. By their definition, local (bottom-up) strategies involved sound letter, word-meaning, sentence syntax while global (top-down) strategies related to background knowledge and text organization. Based on think-aloud protocols, results showed that the students reported almost twice as many strategies when reading Spanish (L2) texts than reading English (L1) texts. Young and Oxford (1997) further indicated that the students reported using as many as global strategies when reading in both L1 and L2, but more local, bottom-up strategies were employed when reading the L2 texts. The findings suggested that L2 reading might be more linguistically dense than L1 reading, and thus the readers had to invoke more bottom-up, localized strategies to process the linguistic elements of a L2 text.

Slightly different findings were found in the study of Chern (1994), who employed semi-structured interviews to examine reported strategy use by 28 Taiwanese college students. The analysis involved two variables, reading tasks of Chinese (L1) and English (L2), and L2 proficiency. Results showed that when facing unfamiliar L2 words both

high-L2-proficiency and low-L2-proficiency students reported that checking a dictionary and asking others were the strategies often reported using. However, some of the low-L2-proficiency readers also reported to use context cues to solve L2 vocabulary problems. This finding contradicts with expectations and other studies, which have found that high-proficiency L2 readers tended to use a range of reading strategies to solve reading difficulties. One possible explanation was that the high-L2-proficiency readers were less tolerant of ambiguity in learning unknown L2 words, and thus they preferred to look up the unknown L2 words or ask more knowledgeable others to learn the accurate meanings.

Yang's (1997) study also compared reported strategy use by 191 Taiwanese college students in Chinese reading (L1) and English reading (L2). Yang employed a reading strategy questionnaire in her study. Results demonstrated that the high-achieving L2 readers considered understanding the purpose of the author (a top-down strategy) the most efficient reading strategy for L1 and L2 reading, but the low-achieving L2 readers did not. Moreover, the high-achieving L2 readers also reported analyzing prefixes, suffixes and roots (a bottom-up strategy) to guess the meaning of unknown words in the L1 and L2. The findings suggested that the high-achieving L2 readers integrated both top-down and bottom-up strategies when comprehending L1 and L2 texts, which corresponds to the interactive perspective on successful reading. However, the low-achieving L2 readers reported that seeking help from others was also an efficient reading strategy for them. So, although seeking help from others could be useful for some readers, relying on others' help alone could be problematic.

Kuo (1993) also investigated L1 (Chinese) and L2 (English) reported strategy use

between high- and low-achieving L2 readers. This study included 466 secondary Taiwanese students. Results showed that the high-achieving L2 readers reported using more strategies than average-achieving readers. When reading in L1, compared to L2 reading, the whole group reported employing more strategies and displayed a greater metacognitive awareness in L1 reading. Kuo suggested that when the L2 readers encountered the L2 text, intensive linguistic demands seemed to short-circuit the metacognitive awareness and regulation of reading strategies that had developed in L1. Kuo also observed a significant relationship between reported strategy use and motivation. Readers who were highly motivated to learn tended to have higher achievement and show a higher frequency in using strategies when reading in either language, Chinese or English.

Reported Strategy Use Associated with Personal Variables

The third set of empirical studies focuses on the relationships among personal variables with reported strategy use. Of the variables, gender and motivation have been mostly discussed in the research studies on reading strategies and general language learning strategies.

Gender: Sheorey and Mokhtari (2001) employed a reading strategy questionnaire to examine differences in reported strategy use of native (L1) and non-native (L2) English readers in the U.S., while reading academic materials in English. A total of 302 college students (150 L1 readers and 152 L2 readers) participated. Two factors related to reported strategy use were investigated: gender and self-rated reading ability. The findings about gender differences in reported strategy use are presented here, and the findings about self-rated reading ability are reviewed later along with other studies focusing on the

relationship between motivation and reported strategy use. Results indicated that gender differences in overall reported strategy use were significant within L1 readers, and more specifically, female L1 readers showed higher frequency in overall reported strategy use than male L1 readers. The findings are consistent to other studies, which examined the gender effect on general language learning strategies (Green & Oxford, 1995; Lan, 2004). However, no significant difference in overall reported strategy use was found between L2 male readers and L2 female readers. One possible reason for the lack of gender effect for L2 readers could be the uneven distribution between male and female L2 readers included in the study. There were 92 male L2 readers, but only 60 female L2 readers in their sample.

Another study by Poole (2005) employed a reading strategy inventory to examine gender differences in reading strategies reported using by advanced L2 college students who learned English in the United States. A total of 248 participants (male =138; female = 110) participated. Consistent to the findings about L2 readers in Sheorey and Mokhtari (2001), Poole's study also revealed that the L2 readers showed no significant gender differences in overall reported strategy use. In addition, by closely examining each strategy, only two of the 30 strategies significantly differed by gender. Poole (2005) explained that the strong connection between advanced language proficiency of the L2 college readers and active use of strategies largely neutralized gender differences in reported strategy use that would exist at lower proficiency levels. The findings suggest that the effect of reading proficiency level on reported strategy use was likely to override the gender effect on reported strategy use.

However, different from the studies of Sheorey and Mokhtari (2001) and Poole

(2005) specifically concerning reading strategies, Green and Oxford (1995) examined general language strategies reported using by 374 prebasic, basic, and intermediate college students (female = 178; male = 196) at the University of Puerto Rico by using Oxford's *Strategy Inventory for Language Learning (SILL)*. Green and Oxford found that nearly one-third of the strategies on the *SILL* (15 of 50) differed between female and male students. Among the 15 strategies, female students showed more frequent use of 14 strategies than male students, and half of the strategies were affective and social strategies. Green and Oxford (1995) suggested that those strategies reflected females' social conversational behavior that was characterized by rapport-seeking, negotiations of meanings, and elicitation of comments by the speaker. The other five strategies which female students reported using more frequently than male students were classified as metacognitive strategies. Green and Oxford (1995) explained that female learners often preferred to use nonanalytic, global strategies, such as searching for the main idea and guessing from multiple contextual clues when some information is missing.

Another study of Lan (2004) included 1191 Taiwanese L2 elementary students to examine several factors related to general language learning strategies by using a language learning strategy inventory and interviews. There were 613 boys and 578 girls in the study. Results indicated that female students reported significantly higher frequency in overall strategies than male students, which was also observed in Green and Oxford (1995).

The studies reported the inconsistent findings about the relationship between gender and reported strategy use. Therefore, more research needs to be done in order to examine whether there are significant gender differences in reported strategy use,

specifically in reading.

Motivation. In addition to gender, motivation is another significant factor related to strategies. In the study of Lan (2004) discussed above, she examined the relationships among several factors with reported strategy use among 1191 Taiwanese L2 elementary students. Besides gender, Lan also found that enjoyment of learning the L2 and self-rated L2 proficiency, two motivation-related factors, had strong and positive relationships with reported strategy use in L2 language learning. Enjoyment of learning the L2 was closely related to students' motivation in learning, and thus more actions or strategies would be generated in order to successfully achieve learning goals. In addition, results also demonstrated that self-rated L2 proficiency was a significant factor to reported strategy use. As noted before, self-rated proficiency can be considered a reflection of self-efficacy. Therefore, the high self-rated proficiency students were those who likely had high self-efficacy. These highly effective students tended to be highly motivated and worked hard to learn the L2. Thus, more thoughts and actions (strategies) were reported using in the language learning process. The findings about the positive relationship between motivation and reported strategy use in language learning are also congruent with those in the studies of reading strategies.

In the study of 302 college students (150 L1 readers and 152 L2 readers) discussed earlier, Sheorey and Mokhtari (2001) indicated that both L1 and L2 readers who rated their reading ability as high reported using metacognitive and cognitive reading strategies more frequently than those who perceived themselves as low-ability readers. In other words, the self-rated high-ability L1 and L2 readers not only showed a higher awareness of which strategies to use, but they also demonstrated better ability to regulate their

strategies during reading. The findings not only supported differences in the reported strategy use between more effective and less effective readers, which has been found in L1 and L2 reading studies, but also exemplified the influence of self-efficacy on reported strategy use. As noted before, self-rated reading ability can be considered a reflection of self-efficacy. Therefore, the high self-rated ability L1 and L2 readers were those who likely had high self-efficacy. These highly effective readers tended to be highly motivated, be more actively engaged in reading, and worked hard to accomplish a reading task. Thus, more strategies were invoked for comprehending a text efficiently.

Moreover, the positive effects of motivation-related variables (i.e., self-rated reading ability and enjoyment of L2 reading) on L2 reading were observed in a study of Brantmeier (2005). In her study, 88 L2 college students from seven different sections of an advanced level Spanish grammar and composition course completed a questionnaire about general L2 reading abilities and enjoyment, and three Spanish reading comprehension assessments (i.e., a reading passage, a written recall task, and multiple-choice questions). Results indicated that self-rated reading ability and enjoyment of L2 reading showed significant, positive relationships with all L2 reading comprehension assessments except for multiple-choice questions. Moreover, Brantmeier (2005) also found that levels of self-rated reading ability were positively correlated with levels of enjoyment. Specifically, if L2 readers had higher self-ratings about their L2 reading ability, they tended to enjoy and be engaged in L2 reading. Even though Brantmeier (2005) did not examine the relationship between motivational factors directly with reported reading strategy use, her findings could imply that motivated L2 readers tended to be actively engaged in the reading process and willing to spend efforts to

achieve reading goals. Therefore, they would invoke more metal-processing thoughts and actions to help themselves comprehend a text. Those mental-processing thoughts and actions, i.e., strategies, have found to significantly improve reading comprehension in either L1 or L2.

Chuang's Pilot Study of Taiwanese Eighth Graders

In addition to the empirical studies conducted by other L2 reading researchers, my own pilot study that preceded this dissertation was conducted in 2006 to examine reading strategies reported using by 146 eighth-grade Taiwanese middle-school students in Chinese reading (L1) and in English reading (L2). All of the participants responded to the *Task-Based Reading Strategy Inventory*, and six students participated in think-aloud reading tasks and interviews. The pilot study combined the two lines of research on L2 reading: (a) an investigation of reported reading strategy use and (b) cross-language transfer of reading strategies.

Quantitative results indicated that the students with high self-rated L1 and L2 reading achievement reported using reading strategies more frequently and diversely compared to the students with low self-rated L1 and L2 reading achievement, regardless of language of the text. These results echoed those studies (Jiménez et al., 1996; Hardin, 2001). In addition, quantitative results indicated that the readers with high self-rated L1 and L2 reading achievement reported using most of the reading strategies rather consistently across L1 reading and L2 readings. In other words, those readers displayed a similar pattern of strategic schema when approaching both L1 and L2 texts.

In the qualitative results, however, one major difference in reported strategy use between L1 and L2 reading was found among the three readers with high self-rated L1

and L2 reading achievement. All of them reported using vocabulary strategies (bottom-up strategies) to solve word problems more frequently when reading the L2 text than when reading the L1 text. The reported using strategies were guessing the meaning from contextual clues, checking a dictionary and analyzing parts of a word. Additionally, they reported using the translation strategy on some difficult L2 sentences, which were often written in complex structures such as relative clauses. It is worthy indicating that they rarely translated word-for-word into the L1, but they often translated the overall meaning of those difficult L2 sentences into the L1.

In contrast, the readers with low self-rated L1 and L2 achievement showed inconsistent use of reading strategies between L1 and L2 reading. The quantitative results indicated that there were significant differences in half of the total 43 reading strategies. Most of them were reported more often for L1 reading than L2 reading. The qualitative results also demonstrated a similar finding. The few strategies reported using in L1 reading by the readers with low self-rated L1 and L2 achievement were almost completely absent when they read the L2 text.

Both the quantitative and qualitative results suggested that even though the writing systems of the L1 and the L2 are sharply different, L2 readers who attain a certain level of reading achievement seemed to approach a text in the L2 with a similar pattern. These findings further support Cummins' (1979) Linguistic Interdependence Hypothesis which states that cognitive academic aspects of language proficiency, such as reading strategies, can be transferred across languages. However, such transference mostly occurred in one direction, i.e., from the L1 (the stronger language) to the L2 (the weaker language). Finally, the results implied that reading achievement and even language proficiency

might influence the transference because reading achievement and language proficiency are closely dependent.

Summary

This chapter reviewed theories related to the reading process, reading strategies and SRL. It also discussed Cummins' Linguistic Interdependence Hypothesis that sheds light on the relationship between L1 and L2 reading.

Taken together, the literature on strategies reported using by L2 readers suggests that some key factors in reading strategies of the L1 and the L2 are (a) reading proficiency, (b) language proficiency, (c) languages of the text, (d) gender, and (e) motivation. The first three factors might also affect the transfer of reading strategies across languages.

To better understand the strategic reading process of L2 readers and the cross-language transfer of reading strategies, this research study extends beyond the scope of previous reading strategy studies to investigate how L2 readers monitor, regulate, and control their thoughts and actions to comprehend text in two languages, Chinese and English, while considering the dissimilarity of the L1 and the L2 writing systems and the level of reading achievement. Also considered are personal variables such as motivational issues related to reported strategy use among eighth-grade Taiwanese students.

In the next chapter, the research design and its justification are presented. Participants and educational settings are described, followed by introduction of materials and instruments. Descriptions of the data collection procedure and the data analysis are provided at the end.

Chapter 3: Methodology

Introduction

This chapter presents a detailed description of the research methodology of this mixed-methods study. This investigation used quantitative and qualitative methodologies to analyze eighth-grade Taiwanese readers' reported strategy use and other related factors. The first section presents the rationale of employing the mixed-methods design, according to four factors suggested by Creswell (2003)—implementation, priority, integration, and theoretical perspective. The second section describes participants and their educational settings. The third section addresses materials used in this study. There are four expository texts—two in English and two in Chinese. The fourth section presents four instruments employed in this study: the *Task-Based RSI*, the *Background Questionnaire*, think-alouds, and semi-structured interviews. The first two were used to collect quantitative data, and the last two were employed to collect qualitative data. The fifth section concerns the data collection procedures, and the final section introduces data analysis techniques for each research question.

Nine research questions guide this study. The first six are quantitative questions that were addressed by the *Task-Based RSI* and the *Background Questionnaire*. The last three are qualitative questions that were examined via think-aloud protocols and semi-structured interviews. The nine questions are:

RQ 1: What are the underlying factors in the English version of the *Task-Based RSI*?

RQ 2: How does overall reported strategy use differ by reading achievement status (high reading achievement in both Chinese and English, average reading achievement in both Chinese and English, or low reading achievement in both Chinese and

English) between reading a Chinese expository text and reading an English expository text?

RQ 3: How does reported strategy use in specific categories differ by reading achievement status (high reading achievement in both Chinese and English, average reading achievement in both Chinese and English, or low reading achievement in both Chinese and English) between reading a Chinese expository text and reading an English expository text?

RQ 3.1: Does reported strategy use in the metacognitive strategy category differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 3.2: Does reported strategy use in the problem-solving strategy category differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 3.3: Does reported strategy use in the grammatical/morphological strategy category differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 3.4: Does reported strategy use in the support strategy category differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 3.5: Does reported strategy use in the skipping strategy category differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 3.6: Does reported strategy use in the purpose-emphasizing strategy category

differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

RQ 4: Does reported strategy use in the translation strategy category differ by reading achievement status in reading an English expository text?

RQ 5: Which of the following personal variables significantly predict overall reported strategy use for Chinese reading?

- a. gender
- b. students' self-rated Chinese reading achievement
- c. enjoyment of reading in general
- d. enjoyment of reading in Chinese
- e. amount of daily reading time in any language
- f. students' rating of effectiveness of strategies for Chinese reading

RQ 6: Which of the following personal variables significantly predict overall reported strategy use for English reading?

- a. gender
- b. students' self-rated English reading achievement
- c. enjoyment of reading in general
- d. enjoyment of reading in English
- e. amount of daily reading time in any language
- f. students' rating of effectiveness of strategies for English reading

RQ 7: Which reading strategies are reported using by three high-reading-achieving Taiwanese students and three low-reading-achieving Taiwanese students in Chinese reading, according to think-aloud reading protocols and semi-structured

interviews?

RQ 8: Which reading strategies are reported using by three high-reading-achieving Taiwanese students and three low-reading-achieving Taiwanese students in English reading, according to think-aloud reading protocols and semi-structured interviews?

RQ 9: How do three high-reading-achieving Taiwanese students and three low-reading-achieving Taiwanese students describe their views on Chinese and English reading tasks, reading processes, and reading strategies, according to semi-structured interviews?

Research Design and Rationale

Creswell (2003) presents four factors that go into selecting a mixed-methods approach: (a) implementation, (b) priority, (c) integration, and (d) theoretical perspective. Each of these factors is relevant to the design of the research employed in this study. First, implementation means that quantitative and qualitative data are collected either sequentially or concurrently depending on the initial intent of a researcher. I collected the quantitative data from the *Task-Based RSI* and the *Background Questionnaire*, and I also expanded my understanding of reported strategy use of Taiwanese readers by collecting qualitative think-aloud and interview data. Second, the priority given to either quantitative or qualitative data might be equal or might be skewed toward one or the other, depending on a researcher's interest. I valued the quantitative and qualitative data equally during the whole research process, even though more quantitative research questions were asked in this study. Third, quantitative and qualitative data can be integrated into one, some or all of the stages in a research process from data collection to data analysis to

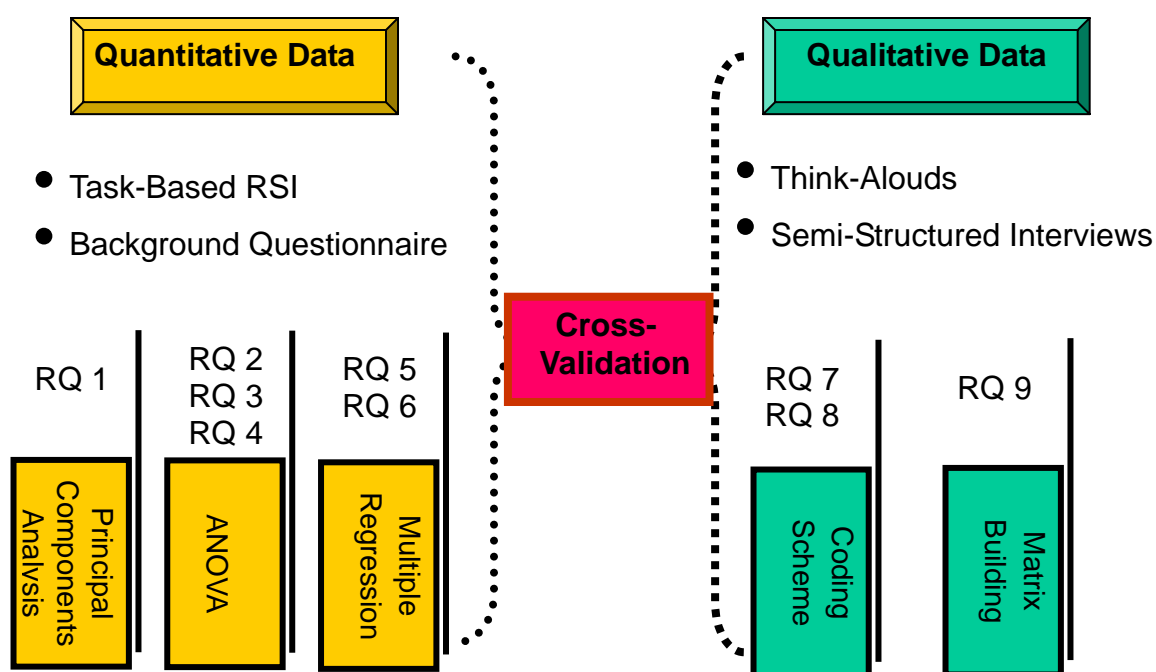
data interpretation. I integrated both types of data in the data interpretation stage and triangulated them to confirm or compare the results. Finally, and most basic, is the use of a theoretical perspective to guide a study. I designed this dissertation based on the interactive reading processing, reading strategies, SRL theories, and the Linguistic Interdependence Hypothesis as I investigated the Chinese (L1) and English (L2) reading strategies of Taiwanese readers. The mixed-methods research design allows to confirm, cross-validate, or corroborate findings from quantitative and qualitative data on the complicated reading process of L2 readers, and it is also used to “offset the weakness inherent within one method with the strengths of the other method” (Creswell, 2003, p.217).

In this study, the *Task-Based RSI* and the *Background Questionnaire* were administrated to a larger group, the whole sample, and the quantitative data generated from the instruments were analyzed by statistical techniques to yield general patterns of reported strategy use by Taiwanese readers with three levels of the reading achievement. They reported their use of strategies after reading a Chinese (L1) expository text and an English (L2) expository text. However, if I had only employed the *Task-Based RSI*, I could not have discover precisely how strategies were used and in what situations at which reading stage. Therefore, think-alouds, also known as verbal protocol analysis, were used for this study. Qualitative data collected from this method not only help me clarify the dynamic interaction between strategies but also help me infer the reasons why readers use a particular strategy. In addition, this study included the qualitative data from interviews, which provided access to readers’ own point of views toward reading tasks, reading strategies, and the L1 and L2 reading process.

By triangulate both types of data, the results not only help strengthen the rigorousness of the findings about similarities or differences between the L1 and L2 strategic patterns of Taiwanese readers with three levels of the reading achievement status, but also to help explain any lack of convergence that may result. Figure 3.1 illustrates the procedures used in implementing the concurrent triangulation approach.

Figure 3.1

Illustration of the Mixed-Methods Research Design



Participants and Educational Setting

This study involved 345 eighth-grade EFL Taiwanese students, 176 girls and 169 boys, all Chinese native speakers. Each participant was enrolled in one of three middle schools in southern Taiwan. Two schools were located in similar middle-class

communities, and one school was located in a lower-middle class area. The mean age of the participants was 13.9 years. Approximately 92% of the students reported that they had learned English for at least three years. The mean length of time studying English was 5.7 years.

As noted in Chapter 1, the reasons why eighth-grade Taiwanese students were chosen are as follows. First, little research has focused on this L2 population at the middle-school age ranges. Second, the dissimilarity between Chinese and English can further support the hypothesis that reading strategies can transfer across languages. Third, English education is mandated starting in the fifth-grade curriculum for all public schools in Taiwan, so most of the eighth-grade subjects had learned English for at least three years and had acquired a certain level of English proficiency.

For part of the quantitative data analyses (RQ 2 through RQ4), the participants were divided into three groups: (a) high-reading-achieving Taiwanese students, (b) average-reading-achieving Taiwanese students, and (c) low-reading-achieving Taiwanese students, based on standardized, school-made assessments¹² on Chinese and English. These research questions examined the relationships between reported reading strategy use and reading achievement status. The students with mixed levels of Chinese and English reading achievement were excluded. Students' scores from the first two Chinese and English assessments, taken in September 2006 and in November 2006, were given by the chiefs of instruction of the three participating schools. The scores were averaged and

¹² The standardized, school-made assessment for Chinese and English is grade-specific (e.g., eighth-grade) and is held three times each semester. It consists of items aimed at evaluating vocabulary knowledge, syntactic processing, and text comprehension. Grammatical knowledge, which concerns grammatical rules of sentence formation, is an additional theme unique in the standardized, school-made English assessment. The forms of items are multiple-choice and short-answer.

used in this study as indicators of Chinese and English reading competence.

High-reading-achieving Taiwanese students were defined in this study as those whose Chinese assessment scores were in the top one-third of all Chinese assessment scores in this sample *and* whose English assessment scores were in the top one-third of all English assessment scores in this sample. A total of 72 students were in the high-reading-achieving group. The mean of their Chinese achievement scores was 92%, and the mean of their English reading achievement scores was 95%.

Average-reading-achieving Taiwanese students are those whose Chinese assessment scores were in the middle one-third of all Chinese reading assessment scores in this sample *and* whose English assessment scores were in the middle one-third of all English assessment scores in this sample. There were 47 participants defined as average-reading-achieving students. The mean of their Chinese achievement scores was 79%, and the mean of their English reading achievement scores was 81%.

Low-reading-achieving Taiwanese students were those whose Chinese assessment scores were in the bottom one-third of all Chinese assessment scores in this sample *and* whose English assessment scores were in the bottom one-third of all English assessment scores in this sample. A total of 64 participants were in the low-reading-achieving students. The mean of their Chinese achievement scores was 50%, and the mean of their English reading achievement scores was 43%. Clearer patterns of reported strategy use are often shown among the L2 readers with similar reading achievement levels in both L1 and L2. A later study could examine strategic patterns of students with mixed levels of Chinese and English reading achievement (e.g., high reading achievement in Chinese and low reading achievement in English). A special interest would be those L2 readers whose

Chinese reading achievement was low, but English reading achievement was high.

From the high-reading-achieving group and the low-reading-achieving group, six participants (three high-achieving Taiwanese readers and three low-achieving Taiwanese readers) were selected to participate in think-aloud reading tasks and in semi-structured interviews for the qualitative data analyses (RQ 7 through RQ 9). A detailed profile of the six students is described in Chapter 5. As noted in Chapter 1, the purpose of comparing the extreme cases is to understand actions that distinguish students who have high reading achievement from those whose reading achievement is low.

Materials

In this study, to control for the possible effects of reading genres, I used four expository texts, two in English and two in Chinese, ranging from 200 to 300 words in length. The two English texts were taken from the *Strategies to Achieve Reading Success* series (2000). To match the text features of Chinese texts, I inserted relevant pictures were inserted into the English text. The two Chinese texts were taken from an encyclopedia published by Reader's Digest in 2003. See Appendix A through B for the texts.

The texts were selected based on two criteria: topic familiarity and difficulty level. The topics of the selected texts were somewhat unfamiliar to the participants, and the content and linguistic levels of the texts were a little beyond students' current reading abilities. Unfamiliar or difficult information presented in texts triggers the participants to use reading strategies in order to help themselves comprehend and learn (Chamot & O'Malley, 1994b). Moreover, a challenging reading task stimulates participants to think and thereby avoid unconscious, automatic, and habitual behavior. An unchallenging

reading task is easy for readers to comprehend without generating intermediate steps in short-term memory, and thus readers greatly speed up the reading process. As a result, for unchallenging tasks, the strategies are absent in short-term memory, and in such a situation it would be impossible to get valid verbal reports (Ericsson & Simon, 1993). There was the empirical evidence from the pilot study showing that the four texts used in this study were not familiar to the Taiwanese middle school students and also the difficulty levels of the texts were a little beyond their current reading abilities.

As noted in Chapter 1, the two expository texts (see Appendix A and B) used for the *Task-Based RSI* focus on comparison among ideas (comparing one reptile with another and comparing two types of advertising with each other). The two expository texts (see Appendix C and D) used in the think-aloud reading tasks provide descriptive, detailed information (about Florida sea mammals and about planet science).

Instruments

This section centers on instruments that were used in this study. Quantitative instruments include the *Task-Based RSI* and *Background Questionnaire*, and qualitative instruments are think-aloud protocols and semi-structured interviews.

Task-Based Reading Strategy Inventory (Task-Based RSI)

The *Task-Based RSI* is a task-oriented strategy assessment. An advantage to use the *Task-Based RSI* is that reading strategies reported using by readers can be measured in a specific context. It is different from general strategy assessment, which involves identifying the typical strategies that one employs. As noted by Oxford (forthcoming), one serves the “micro” view and one offers the “macro” view. In other words, task-based and general strategy assessments simply serve different contrasting purposes. In this study,

the purpose is to examine reported strategy use regarding to reading tasks, and thus the *Task-Based RSI* was employed.

To construct the *Task-Based RSI* (see Appendix E), I combined strategy items adapted from two reading strategy questionnaires: the *Metacognitive Awareness of Reading Strategies Inventory (MARS)* (Mokhtari & Reichard, 2002) and the *Reading Strategy Questionnaire (RSQ)* (Oxford et al., 2004). Both were used with permission. Both the *MARS* and the *RSQ* used a Likert scale of 0 to 5: 0 (almost never used), 1 (rarely used), 2 (fairly used), 3 (often used), 4 (always used) and 5 (almost always used). The *MARS* (20 items) assessed adolescent and adult readers' awareness of metacognitive and cognitive¹³ strategies reported using while reading academic or school-related materials. The *MARS* was validated using a large student sample (n=825) from grade 6 to grade 12 with similar linguistic, cultural and socioeconomic backgrounds from 10 different school districts in five states of the United States. The internal consistency for the overall scale was .93 using Cronbach's alpha (Mokhtari & Reichard, 2002). The *RSQ* included 35 reading strategy items arranged into phases: before, during, and after reading. The *RSQ* showed .78 determined by Cronbach's alpha with a sample of 36 students from ESOL classes in three New York City educational institutions (Oxford et al., 2004).

After combining the *MARS* and the *RSQ*, there were a total of 55 items. Then, any items that measured similar reading strategies were compared carefully, combined, and slightly adapted in order to make the combination meaningful. For example, the *MARS* item, "When text becomes difficult, I reread to increase my understanding" and the *RSQ*

¹³ The *MARS*'s title emphasizes metacognition. However, the instrument includes cognitive as well as metacognitive strategies.

item, “I go over difficult parts several times,” were combined and adapted to create the new item, “I reread difficult parts several times.” The combination reduced the total items from 55 to 46. Then a new strategy, “connecting what I read in Chinese (or English) to help understand English reading (or Chinese reading)” was added. Therefore, 47 items constituted the *Task-Based RSI*. This full version was used for assessing the frequency of strategies used in English reading. The version of the *Task-Based RSI* used for Chinese reading contained only 43 items due to the exclusion of four translation strategies. Because participants in this study were native Chinese speakers, there was no need to use translation strategies when they read a Chinese text.

A second adaptation (simplification) then occurred. Since the participants in this study were middle-school students, the wording of all the *Task-Based RSI* items needed to be simplified. For instance, the item, “I adjust my reading speed according to what I’m reading,” was changed to “I slow down or speed up depending on how difficult the text is.” Similar simplification was done for all other items. As suggested by Oxford et al. (2004), the items in the *Task-Based RSI* were arranged according to how well each strategy fitted the stages of a reading task: before, during and after reading the text.

After the *Task-Based RSI* was finalized, it was translated into Chinese. To ensure that the Chinese translation of the *Task-Based RSI* accurately represented the English *Task-Based RSI*, “back translation” was employed after the initial translation. I first translated the English *Task-Based RSI* into Chinese, and then a Taiwanese graduate student, In-Wen Hsu, was asked to translate the Chinese translation of the *Task-Based RSI* back to English. Afterwards, Ms. Hsu and I collaborated to compare the meanings of an item between the original English *Task-Based RSI* with the translated English *Task-Based*

RSI. If slightly different meanings of a certain item were detected, we discussed them and modified the Chinese translation of that item to make it totally clear. Back translation is important because it minimizes the nuances resulting from translation, thus improving the reliability and validity of the instrument.

Reliability of the Task-Based RSI. Reliability refers to “the degree of precision or accuracy of scores on an instrument” (Oxford, 1996, p. 31). An appropriate index to estimate the reliability for continuous data such as the Likert-type scale in the *Task-Based RSI* is Cronbach’s coefficient alpha, a measure of internal consistency (Oxford, 1996). In the pilot study, the *Task-Based RSI* was used to measure reading strategies utilized by 146 eighth-grade Taiwanese students when they read an English expository text and a Chinese expository text. The internal consistency index (alpha) for the overall scale was .93 when the *Task-Based RSI* was used to report strategies employed in the English reading task. When the same students accomplished the Chinese reading task and then reported the strategies they used in that task, the internal consistency index (alpha) of the *Task-Based RSI* was .90. Both of these (.93 and .90) are considered reflection of high reliability.

Validity of the Task-Based RSI. Validity refers to “the degree to which an instrument measures what it purports to measure” (Oxford, 1996, p. 32). Of many manifestations of validity, construct validity is considered the most central (Chapelle, 1994). It refers to the degree to which a variable measures the conceptual variable that it is designed to assess (Stangor, 2004). Oxford (1996) suggests that the construct validity of a questionnaire can be partially shown in the relationship between the questionnaire and the behavioral performance. To assess construct validity, based on the data collected from the pilot study, a Pearson correlation analysis was conducted to examine the relationship between the

Task-Based RSI (meaning reported strategy use) and reading comprehension performance on the reading tasks in the pilot study. The Pearson correlation between mean frequency of reported reading strategy use and English reading comprehension scores was .29, $p < .01$; the Pearson correlation between mean frequency of reported reading strategy use and Chinese reading comprehension scores was .40, $p < .01$. The results showed that there was a significant relationship between the reported strategy use on the *Task-Based RSI* and reading comprehension achievement. These results also suggested that other unmeasured factors besides reading strategies were at play.

In addition, the construct validity of the *Task-Based RSI* was assessed in the pilot study based on the relationship between reported strategy use and self-rated reading achievement levels. I conducted a split-plot repeated measures ANOVA. Results showed that there was a significant main effect for reading achievement ($F(3,88) = 2.948, p < .05$), indicating that mean frequency of reported reading strategy use significantly differed across the four reading achievement combinations. The Dunnett procedure was used to examine whether the frequency of reported strategy use for the “low self-rated L1 and L2 reading achievement” group significantly differed from other groups (i.e., the “high self-rated L1 and L2 reading achievement” group, the “low self-rated L2 reading achievement and high self-rated L1 reading achievement” group, and the “low self-rated L1 reading achievement and high self-rated L2 reading achievement” group). The mean frequency of reported reading strategy use differed significantly only between the group with “high self-rated L1 and L2 reading achievement” and the group with “low self-rated L1 and L2 reading achievement.” The mean frequency of reported reading strategy use in the “high self-rated L1 and L2 reading achievement” group (mean = 3.37) was

significantly higher than the mean frequency of reported reading strategy use in the “low self-rated L1 and L2 reading achievement” (mean = 2.90), $p < .05$. In other words, those students who rated themselves high achievement in both Chinese and English reading reported using more reading strategies compared to those who rated themselves low achievement in both Chinese and English reading, regardless of language of the text.

Think-Alouds

The think-aloud is a protocol in which individuals can verbalize mental thoughts and strategies while reading a text (Pressley & Afflerbach, 1995; Winne & Perry, 2000). Think-alouds provide researchers access to unobservable thoughts and behaviors (strategies) invoked by reading tasks. Think-alouds have often been used as an instrument in L1 and L2 reading research to elicit readers’ verbal reports about their thinking processes when they read a text (Jiménez, 1995). Theoretical underpinnings of the think-aloud protocol strongly focus on two constructs: long-term memory and short-term memory (Ericsson & Simon, 1993). Long-term memory contains declarative knowledge and procedural knowledge. The knowledge stored in long-term memory is vast but often organized (Pressley & Afflerbach, 1995), and it can be accessed either by recognition or by association. Association can bring the similar information from long-term memory into short-term memory when the reader receives new information from an external stimulus. The amount of information retained in short-term memory at one time is limited to a small number of familiar chunks. The information in short-term memory is heeded or attended to; it is currently in consciousness, quickly accessible, and reportable either concurrently or retrospectively (Ericsson & Simon, 1993). A major concern on using think-aloud protocol is that some readers might not be conscious about what strategies

they were using. In other words, they might automatize their mental thoughts and thereby those mental thoughts are not heeded and accessible.

To avoid the automatic mental processes of L2 readers and to elicit adequate verbal reports for reading tasks, I followed four methodological recommendations provided by Pressley and Afflerbach (1995). The suggestions are:

1. It is the researcher who should make inferences and categorize cognitions rather than the reader. Because verbal reports that reflect what is being thought are not expected to be fully coherent, readers should be informed that they should not attempt to report coherently.
2. Mental thoughts that are heeded in the short-term memory are the only information available for self-reporting. Fully automatic (unconscious) processes are difficult to self-report, so it is imperative for a researcher to slow down the processing of a reader so that the reader has time to retrieve into consciousness.
3. Readers should be discouraged from reporting “why” they are using a process because such explanations have shown to influence subsequent processing.
4. Researchers should request that readers make their self-reports as accurate and complete as possible whenever they are required to generate the nature of mental images or specific types of information that interest researchers.

One English expository text and one Chinese expository text were used for the think-aloud part of this study. Following the methodological recommendations for slowing down readers' thinking processes (Ericsson & Simon, 1993; Pressley & Afflerbach, 1995), I put a red dot in the interval of two sentences to signal the participants to stop and report what they are thinking about, although they were free to verbalize their

thoughts at anytime during the reading.

Before conducting the think-aloud, a 30-minute training was provided to the participants. Appendix F presents the guideline of the training. I first introduced what the think-aloud task is and then demonstrated the think-aloud procedure. Before demonstrating, I explicitly explained to the participants that what was demonstrated was how I read the text—thoughts or behaviors that were generated in my mind while reading the text. I explained that this did not mean my ways were more correct or efficient than others'. I kept emphasizing that everyone has his or her own preferences about how to read a text, and I strongly encouraged the students to honestly, accurately and completely report what they were thinking while they were reading the text. In the training, I emphasized again that their performance in the think-alouds would not be graded or influence teachers' judgments.

Throughout the think-aloud phase, the participants were encouraged to report in whichever languages (i.e., Chinese, English, or both) with which they felt comfortable and confident. In this study, more accurate and complete reports can be generated, and the pattern of translation and transferring can be observed. Participants were informed that the whole think-aloud procedure would be audiotaped.

Semi-Structured Interviews

As Glesne and Peshkin (1992) stated, "The opportunity to learn about what you cannot see and to explore alternative explanations of what you do see is the special strength of interviewing in qualitative inquiry" (p. 65). Unlike the think-aloud technique, semi-structured interviews provide researchers an opportunity to search for explanations of "why" an event happened. Only through an interview can researchers get participants'

detailed explanations, confirm what they infer from observations of participants, and learn about participants' probable future behaviors. A semi-structured interview can also reveal participants' unobservable opinions, perceptions and attitudes (Glesne & Peshkin, 1992). Therefore, I used the semi-structured interview, in which I asked seven major questions modified from Jiménez et al. (1996) and Chern (1994) to probe and expand participants' responses. The semi-structured interview included two sets of open-ended questions: (a) retrospective questions about the think-aloud reading tasks and (b) general questions designed to elicit information about participants' perceptions of reading itself and reading strategies that participants typically used in Chinese and English reading (see Appendix G).

A semi-structured interview in which specific questions are asked with responses open, has an advantage over a totally open interview which involves a broad and general topic without specific, predetermined themes of interest. A semi-structured interview results in standard data across participants and thus opens up the possibility of systematic comparisons across participants. Additionally, greater depth of understanding the participants' perceptions can be achieved in a semi-structured interview.

Background Questionnaire

A self-report *Background Questionnaire* (see Appendix H) was designed to elicit participants' general information, such as age and gender. In addition, the *Background Questionnaire* asked participants to provide information about English learning experiences, such as the length of time studying English, reasons for learning English, and attendance at a private institution for additional English instruction. The *Background Questionnaire* also required information about reading experiences, such as degree of

enjoying reading and preferred language of reading for pleasure. Finally, the *Background Questionnaire* asked students to rate themselves in both Chinese reading achievement and English reading achievement and rate the usefulness of L1 and L2 reading strategies.

Data Collection Procedures

Before collecting the data, I trained the teachers. To do this, I scheduled a meeting with the middle-school principals and the chiefs of instruction of the involved schools to explain the purpose and benefits of the study. After getting the contact information of the teachers who were interested in participating in this study, I met with them in groups or individually to explain again the purpose of the study and to distribute the teachers' guideline for administering the *Task-Based RSI*. The guideline (see Appendix I) included the description of the study and detailed the steps that the teachers had to take when administering the *Task-Based RSI*. In addition, both the written guideline and my oral explanations asked the teachers to inform their students that they were encouraged but not required to participate. Students who were willing to participate and whose parents signed the Parental Permission Form were involved in the study, and I obtained their scores on the two Chinese and English reading assessments from the chiefs of the instruction in their schools.

The study contained two types of data: quantitative and qualitative (see Table 3.1). The quantitative data collection took two days. On the first day, the participants first answered the *Background Questionnaire*. Then, they read an expository text first in one language (i.e., English or Chinese) and responded to the *Task-Based RSI*, associated with the task of reading the expository text in that language. Two days later, participants read a different expository text in the other language and responded to the *Task-Based RSI*,

associated with the task of reading the expository text in that language. The inventory gave students the chance to report the strategies that they used for reading the immediately preceding expository texts. The total time for the quantitative part was approximately 45 minutes. The quantitative data were collected based on intact classrooms not the individuals. It is necessary because of practical situations of the schools.

In quantitative part, a counterbalance procedure was applied. In other words, based on the random selection, half of the classes read an English text and responded to the associated *Task-Based RSI* first, and two days later they read a Chinese text and responded to the associated *Task-Based RSI*. The other half of the classes read a Chinese text and responded to the associated *Task-Based RSI* first, and two days later they read an English text and responded to the associated *Task-Based RSI*. To minimize carryover effect on responding the *Task-Based RSI*, a two-day interval was requested when the second *Task-Based RSI* was administered. A two-day interval was the maximal amount of time that could be placed between these two reading tasks due to the approaching final examination.

Six students among all participants were involved individually in the qualitative part. Each participant was asked to “think-aloud” while reading two additional expository texts, one in English and one in Chinese, and be interviewed individually about his or her attitudes and perceptions regarding to reading tasks, reading processes and reading strategies. The six selected participants had received a 30-minute training session about the think-aloud procedure before the qualitative data collection began. The procedure is described in detail as follows.

On the first day of the qualitative part, participants read an expository text in either English or Chinese, and simultaneously talked their thoughts aloud. During the think-aloud procedure, verbal prompts like “What are you thinking about?” and visual prompts as the red dots placed in the text were used to elicit participants’ responses when they silently read the text. The think-aloud task took 20 minutes.

On the second day of the qualitative part, participants read another expository text in the other language, using the same procedure. After the think-aloud reading task, each participant was interviewed for 25 minutes about their attitudes and perceptions regarding to reading tasks, reading processes and reading strategies. The think-alouds and the interviews were recorded by audiotape. For each of the six participants, the total time for the qualitative part was approximately 95 minutes, including the 30-minute training on the think-aloud process.

In qualitative part, a counterbalance procedure was also applied. In other words, three participants did the think-aloud for an English task first and, and two days later they did the think-aloud for a Chinese task. The other three participants did the think-aloud for a Chinese task, and two days later they did the think-aloud for an English task. To minimize carryover effect on thinking aloud tasks, a two-day interval was placed between the two think-aloud tasks for each participant.

Table 3.1

Description of the Data Collection Procedures

Quantitative Data (345 participants)	
Instruments	Data Collection Procedure
	<p><u>Two days:</u></p> <p>On the first day, they first answered the <i>Background Questionnaire</i> in 5 minutes. Then they read an expository text in one language (Chinese or English) in 10 minutes, and completed the <i>Task-Based RSI</i> in 10 minutes.</p> <p>Two days later, they read another expository text in the other language in 10 minutes, and completed the <i>Task-Based RSI</i> in 10 minutes.</p> <p>A counterbalance procedure was applied. Based on the random selection, half of the classes responded to the <i>Task-Based RSI</i> associated with the English text first, and two days later they responded to the <i>Task-Based RSI</i> associated with the Chinese text. The other half of the classes responded to the <i>Task-Based RSI</i> associated with the Chinese text first, and two days later they responded to the <i>Task-Based RSI</i> associated with the English.</p>
<i>Task-Based RSI</i> <i>Background Questionnaire</i>	
Qualitative Data (6 participants)	
Instruments	Data Collection Procedure
	<p><u>Two days:</u></p> <p>On the first day, they read an expository text in one language (Chinese or English) and did the think-aloud task for 20 minutes.</p> <p>On the second day, they read another expository text in the other language and did the think-aloud for 20 minutes. Then they were interviewed for about 25 minutes.</p> <p>A counterbalance procedure was also applied. In other words, three participants did the think-aloud for an English task first, and two days later they did the think-aloud for a Chinese task. The other three participants did the think-aloud for the Chinese task first, and two days later they did the think-aloud for the English task.</p>
Think-aloud Semi-Structured Interview	

Data Analysis Procedures

This mixed-methods study included quantitative data from the *Task-Based RSI* and the *Background Questionnaire*, and qualitative data from the think-aloud protocols and the semi-structured interviews. Quantitative data were analyzed by means of a statistical software program, the Statistical Package for the Social Sciences (SPSS). Significant level was set at .05. Qualitative data were analyzed based on a coding scheme which was modified and elaborated from a coding system generated by Chamot and El-Dinary (1999), and through matrix-building, a qualitative analysis technique recommended by Miles and Huberman (1994). These procedures are explained below.

Quantitative Data Analysis

To address the quantitative research questions (RQ 1 through RQ6), three statistical methods were employed: principal components analysis, analysis of variance (ANOVA), and multiple regression. Principal components analysis was employed to explore underlying factors of the *Task-Based RSI* (RQ 1). ANOVA was utilized to test significance of relationships between reported strategy use of the *Task-Based RSI* and reading achievement on the schools' standardized reading assessment (RQ 2 through RQ 4). Multiple regression was conducted to identify significant predictors to overall reported strategy use and to compare the relative importance of the predictors (RQ 5 and RQ 6).

Principal components analysis is one of the techniques for exploratory factor analysis, which can be used when a researcher wants to explore the internal structure of an established instrument that is administered to a specific group (Pett, Lackey, & Sullivan, 2003). Principal components analysis is the default technique of extracting

factors in many popular statistical software packages such as SPSS, and it can reduce a great number of independent variables to a smaller set of variables that are more conceptually coherent (Dunteman, 1989). With principal components analysis, possible categories (i.e., factors) that contain conceptually related strategy items in the *Task-Based RSI* were extracted. The extracted factors were required to have eigenvalues greater than one based on the Kaiser-Guttman rule. An oblique rotation was applied because some correlations among factors were expected. The goal of rotation is to simplify and clarify the data structure, which produces more easily interpretable results (Costello & Osborne, 2005). The required loading for defining a factor is at least .30, which is suggested by principal components analysis studies (Pet et al., 2003).

ANOVA is a statistical technique to test mean differences on a single outcome variable across two or more groups. The dependent variable must be continuous. Because participants in this study were repeatedly measured on the same variable (i.e., reported strategy use for reading in Chinese reading and in English reading), a split-plot repeated measures ANOVA, a special type of ANOVA, was used to answer RQ 2 and RQ 3. The split-plot repeated measures ANOVA allows us to uncover the main effects of the independent variable (i.e., language of the text and reading achievement status) and the interaction effect of these independent variables on the dependent variable (i.e., reported strategy use overall and in specific strategy categories identified by the principal components analysis). Once significant main effects were found, post hoc analyses were conducted. If interaction effects were statistically significant, simple effects were examined via follow-up tests (post-hoc analyses). The follow-up tests of simple effects aim at investigating the nature of the interaction by examining the difference between

groups within each level of the independent variables. The post hoc techniques employed in this study were Student-Newman-Keuls and paired *t*-tests.

Multiple regression analysis was the third statistical tool used in this study. This technique is used to predict the variance of a continuous dependent variable (e.g., the overall reported strategy use) based on linear combinations of independent variables, which can be categorical or continuous. In addition, this technique can yield standardized regression coefficients or beta weights associated with each independent variable, which allows the comparison of the relative importance in prediction of the dependent variable (Pedhazur, 1997).

Qualitative Data Analysis

RQ 7 through RQ 9 were answered by carefully triangulating the transcripts of the think-aloud data and the interview data. Triangulation, as commonly stressed in qualitative research, refers to use of many data sources and multiple methods in order to provide a more complete description of part of the phenomenon.

To analyze the audiotaped think-aloud data, the data were first transcribed verbatim. The coding reference established by Chamot and EL-Dinary (1999) served as an initial scheme of codes to identify the strategies appearing in the think-aloud reading tasks. This scheme was slightly revised during analysis of think-aloud data. Revision included deleting the codes (strategies) that were not used by the participants in this study and creating the codes, such as translation strategies and vocabulary strategies. Appendix J presents the final coding scheme used in this study, including strategy terms, descriptions, and examples. The think-aloud transcripts without the names of participants were read to minimized possible bias. When one particular strategy was identified in the transcripts, I

labeled a strategy term that best described the segment. Afterwards, I established a table to recode tallies of the codes for each of the six participants so as to compare the patterns of strategies that emerged through the think-aloud tasks.

The interview data were also analyzed without the presence of participants' names to minimize possible bias. For the interview data, I used *matrix building*, a qualitative analytical method suggested by Miles and Huberman (1994) to understand the data. According to their advice on building a matrix, I first decided on the three main themes: reading tasks, the L1 and L2 reading processes, and reading strategies (see Appendix K). The three themes were placed in columns, and the pseudo names of each of the six participants were written in sequential rows. This matrix cells contained direct quotes or paraphrased descriptions from the interview transcriptions.

Both the think-aloud and interview data were constantly compared to look for commonalities and counterexamples across the participants. The interpretation of quantitative and qualitative results occurred by means of careful review of both types of results.

Summary

In Chapter 3, the rationale for a mixed-methods approach was presented. Such an approach provides a more comprehensive understanding of reported strategy use by middle-school Taiwanese readers. Second, participants were described in this chapter as 345 Taiwanese middle-school students with different levels of reading achievement. Third, the instruments that were employed were explained. Instruments offered various types of information. The *Task-Based RSI* provided information on strategy frequency associated with specific reading tasks. The *Background Questionnaire* collected the

participants' general information and the information related to language learning and reading. The think-alouds offered an access to unobservable reading strategies used in reading tasks. The semi-structured interviews gave information of why certain strategies were used in a given reading task, and revealed participants' unobservable perceptions of reading tasks, reading processes and reading strategies. In addition, the data collection procedure was described in detail. Techniques for data analysis (principal components analysis, ANOVA, multiple regression analysis, qualitative coding, and qualitative matrix-building) were presented.

Results are provided in Chapter 4 and Chapter 5 based on each research question. Chapter 4 presents quantitative results, and Chapter 5 offers qualitative results.

Chapter 4: Quantitative Results

Introduction

This chapter presents quantitative results from the *Task-Based RSI* and the *Background Questionnaire*. Quantitative analyses addressed RQ 1 through RQ 6. For clear presentation of the results, the six research questions were conceptually divided into three parts. Part A contains RQ 1, which explored underlying factors in the English version of the *Task-Based RSI*. Part B includes RQ 2, RQ 3, and RQ 4. These three questions examined the relationship between reading achievement status (high reading achievement in both Chinese and English, average reading achievement in both Chinese and English, low reading achievement in both Chinese and English) and reported strategy use in overall or in each of the identified strategy categories across languages. Part C contains RQ 5 and RQ 6, which investigated significant predictors to overall reported strategy use. To address each research question, appropriate statistical methods (e.g., principal components analysis, split-plot repeated measures ANOVA and multiple regression analysis) were employed to analyze the quantitative data. The results are reported accordingly. (See Chapter 5 for qualitative results, i.e., Part D of the study).

Part A: Exploring Underlying Factors in the Task-Based RSI

Part A contains only one question, RQ 1, which was designed to explore the underlying factors in the English version of the *Task-Based RSI*. The *Task-Based RSI* for English reading and the one for Chinese reading were almost the same, except that the four translation strategies were excluded in the Chinese version¹⁴ for reasons explained

¹⁴ Even though the *Task-Based RSI* associated with the Chinese reading was not included in the Part A of this study due to the exclusion of four translation strategies, the underlying factors were explored by the principal components analysis and its results were attached in the Appendix M.

earlier. Therefore, the English version of the *Task-Based RSI*, which contains all 47 items, was used to explore underlying factors (strategy categories).

RQ 1: What are the underlying factors in the English version of the Task-Based RSI?

To explore the structure of the English version of the *Task-Based RSI*, principal components analysis, a common statistical technique for extracting potential factors (Costello & Osborne, 2005), was employed. As noted in Chapter 3, principal components analysis can reduce a great number of independent variables to a smaller set of variables that are more conceptually coherent (Dunteman, 1989). After running the principal components analysis, seven factors with eigenvalues greater than one were extracted based on the Kaiser-Guttman rule. This would mean that these factors accounted for more than their share of the total variance in the items (Pett et al., 2003). The Kaiser-Guttman rule was suggested to an approach to determine the number of initial factors for explorative factor analysis. After this seven factors were identified, and an oblique rotation was applied because some correlations among factors were expected. As explained in Chapter 3, the goal of rotation is to simplify and clarify the data structure so as to produce more easily interpretable results (Costello & Osborne, 2005).

An item that loaded higher on a factor than on others was decided to place in that factor. Four items loaded quite equally on multiple factors, so the decision to place each of the four items on a particular factor based on theoretical and conceptual coherence with other items on that factor. As a result, in this seven-factor model, the loading of each item was at least .30 or above on their placed factors except for one item in Factor Two. Appendix L presents factor loadings from the rotated factor structure matrix for the *Task-Based RSI*. As suggested by Pett et al. (2003), three or four items with the highest

loadings on a factor were selected to define a factor. I then studied those items and based on reading strategy theories, and I provided each factor an interpretable name to represent all the items loaded on each of those factors.

These seven factors for the *Task-Based RSI* are: Factor One, *metacognitive strategies*; Factor Two, *grammatical/morphological strategies*; Factor Three, *skipping strategies*; Factor Four, *translation strategies*; Factor Five, *support strategies*; Factor Six, *problem-solving strategies*; and Factor Seven, *purpose-emphasizing strategies*. Table 4.1 through 4.7 present the content and the loading of every strategy that loaded moderately to highly on that factor. The seven factors explained 59.9% of the total variance.

Cronbach's alpha reliability for the *Task-Based RSI* in the present study was .96.¹⁵

Factor One, metacognitive strategies, contains 20 items which represent a set of reading strategies used to plan, organize, evaluate and monitor what will be or is read and one translation-related strategy (see Table 4.1). Examples of planning strategies in this factor include considering what type of text it is, skimming the text first, and using text features such as, pictures, typographical aids, and tables. Such strategies often occur in the beginning of the reading stage, and they help identify requirement of a reading task and lay out a plan for comprehending the text. Organizing strategies in this factor, such as connecting what is already known, using context clues, and finding relationships among ideas in the text, are techniques allowing readers to consciously activate relevant prior knowledge and deliberately combine prior knowledge with new information in a suitable, meaningful structure. Some other strategies in Factor One involve monitoring, such as

¹⁵ In the pilot study, alpha was .93 when the *Task-Based RSI* was applied with the English reading task, and it was .90 when the *Task-Base RSI* was applied with the English task.

asking oneself questions, detecting unknown parts, and guessing the meanings by context clues. Additional strategies in this factor are used for evaluating, such as thinking whether the text fits the reading purpose, critically evaluating the information, and checking the correctness of a guess. In addition to the 20 items that loaded positively on Factor One, the translation-related strategy, translating each sentence into Chinese, showed a negative relationship with this factor. One possible explanation is that L2 readers often translate difficult L2 sentences into their native languages, and this translation occupies a certain amount of working memory. As a result, the frequency of metacognitive strategies is likely to decrease because working memory is partially taken up by translating.

Factor One encompasses these generalized, intentional reading strategies by which readers can exert conscious control over reading acts and thinking processes in a manner appropriate to meet their individual needs. The Cronbach's alpha reliability for this subscale was .92.

Table 4.1

Factor One: Metacognitive Strategies

Item #	Content	Loading
19	I connect what I read in Chinese (English) to help me understand a text written in English (Chinese).	0.64
41	I check my understanding when I come across conflicting information.	0.64
45	I critically analyze and evaluate the information presented in the text.	0.56
46	I check to see if my guess about the text is right or wrong.	0.56
35	I use tables, figures and pictures in a text to increase my understanding.	0.50
16	I connect the content with what I already know.	0.49
39	I use typographical aids like boldface and italics to identify key information.	0.48

2	I consider what type of text it is, such as a story, an informational text or a newspaper.	0.45
3	I skim the text first to look for the main idea and later I read for details.	0.44
8	If I don't understand something, I guess its meaning using clues from the text.	0.43
44	I think about whether the content of the text fits my reading purpose.	0.43
1	I use the title or pictures to guess what I would read.	0.42
22	I make a picture in my mind about what the text is saying.	0.42
37	I use context clues to help me better understand what I am reading.	0.41
43	I summarize it in my own words.	0.39
27	I figure out the main idea of each paragraph.	0.38
40	I go back and forth in the text to find relationships such as cause and effect or comparison among ideas in it.	0.36
33	I decide what to read closely and what to ignore.	0.35
7	I pay attention to the beginning and the end of each paragraph.	0.30
42	I ask myself questions while reading the text.	0.30
*13	I translate each sentence into Chinese.	-0.30

Note. Item 13 was not included in RQ 3 (see RQ 3 results later). RQ 3 examined how reported strategy use in the metacognitive strategy category differs by reading achievement status across a Chinese expository text and an English expository text. The decision was made because the item was not presented in the version of the *Task-Based RSI* associated with the Chinese expository reading task.

Factor Two, grammatical/morphological strategies, is characterized by five highly language-related strategies and one additional strategy, guessing what will come next (see Table 4.2). The five highly related strategies all involve the use of linguistic knowledge, especially in morphology (i.e., knowledge of word formation) and syntax (i.e., grammatical knowledge of sentence structure), to decompose words, analyze sentence structures, and use grammatical rules to process linguistic elements in a text. These five strategies include: focusing on the tense of a verb, checking pronoun reference, paying attention to sentence structure, dividing a sentence grammatically, and dividing unknown words into parts. Only one strategy, guessing what will come next, seems not to fit into the group conceptually even though it loaded moderately on Factor Two. The only feasible link is that this strategy involves analytic hypothesis-testing, i.e., establishing a guess and checking to see if it is correct as further data emerge. However, this is speculative. As a result, the decision to exclude this item from Factor Two was made. The Cronbach's alpha reliability for this subscale was .83.

Table 4.2

Factor Two: Grammatical/Morphological Strategies

Item #	Content	Loading
11	I pay attention to sentence structure, such as subjects and objects.	0.83
12	I use slashes to divide a sentence grammatically.	0.67
4	I focus on the tense of a verb, such as present tense and past tense.	0.61
9	I check what each pronoun refers to.	0.57
*24	I guess what will come next.	0.51
18	I divide an unknown word into parts to figure out the meaning.	0.27

Note. Item 24 was excluded from Factor Two because it appeared to be conceptually irrelevant to the five other strategies which are aimed at dealing with linguistic elements. The loading of Item 18 (.27) almost reached the decisive level, .30, and it seemed to be coherent conceptually with other items in this factor.

Thus, the decision of including this item was made. It was the only item whose loading was below .30.

Factor Three, skipping strategies, contains two items which loaded highly on it (see Table 4.3). The two strategies that clustered together to form the third factor are skipping a sentence when a reader cannot understand it and skipping unknown words. These two strategies can be employed when readers encounter word-level information or larger sentence-level chunks that they do not understand and for which they are unable to figure out the meaning. Skipping strategies are useful if the reader does not skip so much that the thread of meaning is lost. The Cronbach's alpha reliability for this subscale was .71.

Table 4.3

Factor Three: Skipping Strategies

Item #	Content	Loading
10	When I cannot understand a sentence, I skip that sentence.	0.89
23	I skip unknown words.	0.87

Factor Four, translation strategies, consists of three strategies that seem to be oriented to a cross-language mode of information processing (see Table 4.4). These three strategies include: doing all one can to understand what is read without translating it word-for-word into Chinese, trying to understand the meaning without translating into Chinese and thinking only in English. These strategies in Factor Four can be thought of as providing conscious control for processing L2 texts by using the L2 itself and not refereeing to the L1. The Cronbach's alpha reliability for this subscale was .66.

Table 4.4

Factor Four: Translation Strategies

Item #	Content	Loading
26	I try to understand the meaning without translating the text into Chinese.	0.70
30	I think only in English.	0.56
21	I do all I can to understand what I read without translating it word-for-word into Chinese.	0.40

Factor Five, support strategies, is characterized by (a) the use of some practical, self-activated visual actions and (b) the use of an outside resource to help the reader comprehend the text (see Table 4.5). The visual support strategies include: marking or underlining important parts, taking notes or writing down key words, and visualizing information. The outside-resource support strategy is using dictionaries to help understand what is read. The Cronbach's alpha reliability for this subscale was .76.

Table 4.5

Factor Five: Support Strategies

Item #	Content	Loading
17	I mark or underline important parts by using colored pens or drawing starts.	0.82
25	I take note or write down key words while reading.	0.74
47	I picture or visualize information to help me remember what I read.	0.74
34	I use dictionaries to help me understand what I read.	0.63

Factor Six, problem-solving strategies, consists of the use of localized, focused strategies that are invoked when text becomes difficult or when other problems occur (see Table 4.6). Factor Six contains nine strategies. Two strategies involve adjusting speed, such as slowing down or speeding up based on difficulty and reading slowly but carefully. Four strategies involve reflection: doing everything to get back on track, restating ideas in one's own words and stopping time to time, focusing on every word, and thinking about what is read. Three strategies involve responses to difficulty (without mentioning speed): reading aloud or whisper the difficult parts, continue reading even if one has difficulties, and rereading difficult parts. The Cronbach's alpha reliability for this subscale was .90.

Table 4.6

Factor Six: Problem-Solving Strategies

Item #	Content	Loading
32	When I lose concentration, I do everything I can to get back on track.	0.68
15	I slow down or speed up depending on how difficult a text it is.	0.65
5	I read aloud or whisper the difficult parts of a text.	0.58
6	I focus on every word in the text to understand its meaning.	0.57
14	I continue reading even if I have difficulties.	0.47
20	I reread difficult parts several times.	0.44
31	I read slowly but carefully to be sure I understand what I am reading.	0.42
38	I restate ideas in my own words to better understand what I read.	0.41
36	I stop from time to time and think about what I am reading.	0.34

The last factor, purpose-emphasizing strategies (negative), consists of two strategies: having a purpose in mind when one reads and reading the comprehension questions first and then reading the text (see Table 4.7). These two strategies seem to be oriented around reading for a broad purpose (e.g., learning new information) or a specific purpose (e.g., seeking answers for the comprehension questions). Nevertheless, these two strategies negatively loaded on this factor, which meant that these two items had the negative correlation with this factor. Therefore, Factor Seven should have been labeled as non-purpose emphasizing reading. However, because these two items were found to be effective strategies to reading comprehension, it is reasonable conceptually to name this factor as “purpose-emphasizing strategies.” The Cronbach’s alpha reliability for this subscale was .59.

Table 4.7

Factor Seven: Purpose-Emphasizing Reading Strategies (Negative)

Item #	Content	Loading
28	I read the comprehension questions first and then read the text.	-0.67
29	I have a purpose in mind when I read.	-0.38

Part B: Relationships between Reading Achievement Status and Reported Strategy Use across Languages

This part contains three research questions (RQ 2 through RQ 4). This part compares strategy use in overall and in specific strategy categories among students at three different achievement statuses (i.e., high-, average-, and low-reading achievement in both Chinese and English) in reading expository texts in Chinese and English.

RQ 2 investigates *overall* reported strategy use by reading achievement status for both Chinese and English reading. RQ 3 and RQ 4 examine reported strategy use in seven *specific* strategy categories: metacognitive strategies, grammatical/morphological strategies, skipping strategies, translation strategies, support strategies, problem-solving strategies, and purpose-emphasizing strategies. These seven strategy categories were identified based on the principal components analysis in RQ 1. RQ 3 investigates how reported strategy use in those specific strategy categories differs by reading achievement status for both Chinese and English reading, except for the translation strategy category. Because the three items in the translation strategy category were not included in the *Task-Based RSI* for Chinese reading¹⁶, reported strategy use in the translation strategy category could not be compared across languages. Therefore, investigation of reported strategy use in the translation strategy category was asked as a separate question (RQ4).

Table 4.8 presents the preliminary descriptive profile: the means and standard deviations for reported frequency of overall and each strategy category for Chinese reading and English reading. To examine whether mean differences were statistically significant by reading achievement status and across languages, inferential statistical

¹⁶ There were four translation strategies, but only three loaded on the translation strategy factor.

analyses were further conducted to test the mean differences.

Table 4.8

Means and Standard Deviations for the Overall and Each Strategy Categories by Reading

Achievement Status within Each Language

		High-Achieving (n = 64)		Average-Achieving (n = 47)		Low-Achieving (n = 72)		Whole Group (n = 183)	
		<i>M</i>	<i>SD</i> ^a	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Overall									
	Chinese	3.10	.61	2.56	.78	2.44	.83	2.73	.79
	English	3.11	.57	2.48	.88	2.01	.98	2.56	.94
Metacognitive									
	Chinese	3.42	.67	2.75	.89	2.59	.96	2.96	.91
	English	3.47	.66	2.64	1.12	2.13	1.14	2.79	1.13
Problem-Solving									
	Chinese	3.55	.74	3.01	.93	2.72	.97	3.12	.94
	English	3.58	.78	2.88	1.05	2.24	1.25	2.93	1.18
Grammatical/Morphological									
	Chinese	2.36	1.04	2.01	.96	1.94	1.06	2.12	1.04
	English	2.71	.93	2.05	1.14	1.63	1.19	2.17	1.17
Support									
	Chinese	2.63	1.21	2.11	1.07	2.29	1.14	2.38	1.17
	English	2.77	1.30	2.18	1.22	1.73	1.27	2.26	1.30
Skipping									
	Chinese	2.64	1.55	2.29	1.23	2.55	1.31	2.52	1.39
	English	2.92	1.29	2.96	1.16	2.86	1.74	2.91	1.43
Purpose-Emphasizing									
	Chinese	2.72	1.27	2.36	1.31	2.24	1.31	2.46	1.30
	English	2.56	1.35	2.18	1.33	1.71	1.25	2.16	1.35
Translation									
	English	2.53	1.09	2.09	.95	1.50	1.19	2.05	1.17

^a*SD stands for standard deviation associated with the mean.*

RQ 2: How does overall reported strategy use differ by reading achievement status (high reading achievement in both Chinese and English, average reading achievement in both Chinese and English, or low reading achievement in both Chinese and English) between reading a Chinese expository text and reading an English expository text?

To answer this question, a split-plot repeated measures ANOVA was conducted. The dependent variable was overall reported strategy use. The within-subjects independent variable was language of the text (English and Chinese). The between-subjects independent variable was reading achievement status: (a) high reading achievement in both Chinese and English, (b) average reading achievement in both Chinese and English, and (c) low reading achievement in both Chinese and English. Use of the split-plot repeated measure ANOVA allows the examination of two main effects: (a) whether reported strategy use differs by reading achievement status and (b) whether reported strategy use differs based on the language of text. It also allows us to test whether there is an interaction effect between reading achievement status and language of the text on reported strategy use. If the interaction effect is statistically significant, it is suggested to examine simple effects via follow-up tests (post-hoc analysis). The follow-up tests of simple effects aim at investigating the nature of the interaction by examining the difference between groups within each level of the independent variables.

Table 4.9 provides the summary of RQ 2 results. The results for the mean frequency of the overall reported strategy use indicated significant main effects for the reading achievement status ($F(2, 180) = 26.648, p < .000$) and for language of the text ($F(1, 180) = 15.274, p < .000$) on overall strategy use. Moreover, the interaction effect

between reading achievement status and language of the text was also statistically significant ($F(2, 180) = 10.786, p < .000$).

Table 4.9

Summary of Split-Plot Repeated Measures ANOVA with Comparisons of *Overall* Reported Strategy Use by Reading Achievement Status between Chinese Reading and English Reading

<i>Source</i>	<i>df</i>	<i>F</i>	<i>p</i>	<i>Interpretation</i>
<u>Between subjects</u>				Frequency of overall reported reading strategy use:
Reading achievement status	2	26.648	.000*	<i>Post hoc main effects:</i> <ul style="list-style-type: none"> High-achieving > Average-achieving > Low-achieving (see post hoc test in Table 4.10)
<u>Within subjects</u>				
Language of text	1	15.274	.000*	<ul style="list-style-type: none"> Chinese reading > English reading
Language of text X Reading achievement status	2	10.786	.000*	<i>Post hoc simple effects:</i> Reading achievement status simple effect: <ul style="list-style-type: none"> Within Chinese reading: <ul style="list-style-type: none"> High-achieving > Average-achieving High-achieving > Low-achieving Within English reading: <ul style="list-style-type: none"> High-achieving > Average-achieving > Low-achieving (see post hoc tests in Table 4.10)
Error	180			Language of the text simple effect: <ul style="list-style-type: none"> Within high- and average-achieving readers: <ul style="list-style-type: none"> Chinese reading = English reading Within low-achieving readers: <ul style="list-style-type: none"> Chinese reading > English reading (see post hoc tests in Table 4.11)

* $p < .05$

Post hoc main effects. As shown in Table 4.9 above, the mean frequency of overall reported reading strategy use significantly differed by reading achievement status. A post hoc analysis, the Student-Newman-Keuls multiple comparison procedure, was conducted to determine where specific significant differences lay. The results showed that all pairwise comparisons were statistically significant at the .05 level. More specifically, the reported mean frequency of the overall reported strategy use for the students with high reading achievement (mean = 3.11) was significantly higher than those with average reading achievement (mean = 2.52) and those with low reading achievement (mean = 2.22). Moreover, the mean frequency of the overall reported strategy use for the students with average-reading achievement was also significantly higher than the students with low-reading achievement. To present a clear picture of the overall reported reading strategy use by reading achievement status in each condition (i.e., in Chinese reading, in English reading, and in reading regardless of language), the results of the Student-Newman-Keuls post hoc analyses are summarized in Table 4.10.

In addition, the main effect for language of the text was also statistically significant. It indicated that the mean frequency of the overall strategy for Chinese reading (mean = 2.73) was significantly higher than English reading (mean = 2.56). In other words, the students reported using strategies more frequently in reading the Chinese expository text than in reading the English expository text.

Post hoc simple effects. As show in Table 4.9 above, a significant interaction effect between reading achievement status and language of the text on the overall reported strategy use was found. Figure 4.1 shows the existence of the significant interaction effect. To further examine the interaction effect, how overall reported strategy use differed by

reading achievement status in each language (i.e., the simple effect of reading achievement status) and how the overall reported strategy use differed across languages within each reading achievement group (i.e., the simple effect of language of the text) were investigated.

Figure 4.1

Graph of the Interactions between Reading Achievement Status and Language of the Text on *Overall* Reported Strategy Use



With regard to the simple effect of reading achievement status within each language, Student-Newman-Keuls post hoc analysis was used to identify specifically where significant differences occurred between reading achievement statuses within each language. As shown in Table 4.10, within Chinese reading, the mean frequency of overall reported strategy use for high-reading-achieving students (mean = 3.10) was significantly

higher than for average-reading-achieving students (mean = 2.56) and for low-reading-achieving students (mean = 2.44). However, the mean difference in overall reported strategy use was not statistically significant between the average-reading-achieving students and the low-reading-achieving students. Within English reading, the mean differences in overall reported strategy use were all significant between each possible pairing. High-reading-achieving students showed the highest reported mean frequency of overall reported strategy use (mean = 3.11); average-reading-achieving students were in the middle (mean = 2.48); and low-reading-achieving students had the lowest reported mean frequency of the overall reported strategy use (mean = 2.01).

Table 4.10

Post Hoc Analyses: Mean Frequency of *Overall* Reported Strategy Use by Reading Achievement Status Regardless of Language and within Each Language

	Mean Frequency of Overall Reported Strategy Use		
	Regardless of Language ^a	Chinese ^b	English ^c
High Reading Achievement Status	3.11 ^A	3.10 ^A	3.11 ^A
Average Reading Achievement Status	2.52 ^B	2.56 ^B	2.48 ^B
Low Reading Achievement Status	2.22 ^C	2.44 ^B	2.01 ^C

Note. Means in the same column that do not share subscripts differ at the .05 level in the Student-Newman-Keuls tests.

^aEstimates of effect size for significant mean differences by reading achievement status regardless of language: (H—A) = .92; (H—L) = 1.32; (A—L) = .37

^bEstimates of effect size for significant mean differences by reading achievement status in Chinese: (H—A) = .71; (H—L) = .91

^cEstimates of effect size for significant mean differences by reading achievement status in English: (H—A) = .90; (H—L) = 1.40; (A—L) = .50

Moreover, to examine the simple effect of language of the text, three paired *t*-tests were conducted to compare the overall reported strategy use between Chinese reading and English reading at each reading achievement status. Because of running three *t*-tests, the adjusted alpha, .017, was set (using Bonferroni correction)¹⁷. As Table 4.11 shows,

¹⁷ Bonferroni correction is a mathematical correction used to control Type I error (rejecting a true null hypothesis), thus reducing falsely significant results.

only students with low-reading achievement showed a significant difference in overall reported strategy use between languages ($t(63) = -4.627, p < .001$). They demonstrated higher mean frequency of the overall reported strategy use for Chinese reading (mean = 2.44) than for English reading (mean = 2.01). Students with high reading achievement and students with average reading achievement showed no significant differences in overall reported strategy use between Chinese reading and English reading.

Table 4.11

Paired t -tests for the Simple Effect of Language of the Text: Comparison of Mean Frequency of *Overall* Reported Strategy Use between English reading and Chinese reading within Each Reading Achievement Status

Paired t -tests	High Reading Achievement Status		Average Reading Achievement Status		Low Reading Achievement Status ^a	
	English	Chinese	English	Chinese	English	Chinese
Mean	3.11	3.10	2.48	2.56	2.01	2.44
t	.236		-1.308		-4.627**	
df	71		46		63	

Note. Because of running three t -tests, the adjusted alpha, .017, was set.

^aEstimate of effect size for the significant mean difference across languages within low-achieving readers:

$$(E-C) = .44$$

** $p < .001$

RQ 3: How does reported strategy use in specific categories differ by reading achievement status (high reading achievement in both Chinese and English, average reading achievement in both Chinese and English, or low reading achievement in both Chinese and English) between reading a Chinese expository text and reading an English expository text?

With the principal components analysis, seven underlying factors were identified for the *Task-Based RSI*: metacognitive strategies, grammatical/morphological strategies, skipping strategies, translation strategies, support strategies, problem-solving strategies, and purpose-emphasizing strategies. Except for the translation strategy category, how reading achievement status relates to reported strategy use in the other six strategy categories between Chinese reading and English reading is addressed in the following subquestions.

RQ 3.1: Does reported strategy use in the metacognitive strategy category¹⁸ differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

To answer this question, a split-plot repeated measures ANOVA was conducted. The results regarding the mean frequency of the reported metacognitive strategy use indicated significant main effects for reading achievement status ($F(2, 180) = 29.051, p < .000$) and for language of the text ($F(1, 180) = 13.133, p < .000$). Moreover, the interaction effect between reading achievement status and language of the text was also statistically significant ($F(2, 180) = 10.696, p < .000$). Table 4.12 presents the results.

¹⁸ Based on exploratory factor analysis, this contains all the strategies from the first factor except for item 13. This streamlined factor explains 40.1% of the variance. Sample strategies are connecting what one reads in Chinese (English) to help understand a text written in English (Chinese), considering what type of text it is, and checking the correctness of a guess.

Table 4.12

Summary of Split-Plot Repeated Measures ANOVA with Comparisons of Reported
Metacognitive Strategy Use by Reading Achievement Status between Chinese Reading
 and English Reading

<i>Source</i>	<i>df</i>	<i>F</i>	<i>p</i>	<i>Interpretation</i> Frequency of reported metacognitive reading strategy use:
<u>Between subjects</u>				<i>Post hoc main effects:</i>
Reading achievement status	2	29.051	.000*	<ul style="list-style-type: none"> High-achieving > Average-achieving > Low-achieving (see post hoc test in Table 4.13)
<u>Within subjects</u>				
Language of text	1	13.133	.000*	<ul style="list-style-type: none"> Chinese reading > English reading
Language of text X Reading achievement status	2	10.696	.000*	<i>Post hoc simple effects:</i> Reading achievement status simple effect: <ul style="list-style-type: none"> Within Chinese reading: High-achieving > Average-achieving High-achieving > Low-achieving Within English reading: High-achieving > Average-achieving > Low-achieving (see post hoc tests in Table 4.13)
				Language of the text simple effect: <ul style="list-style-type: none"> Within high- and average-achieving readers: Chinese reading = English reading Within low-achieving readers: Chinese reading > English reading (see post hoc test in Table 4.14)
Error	180			

* $p < .05$

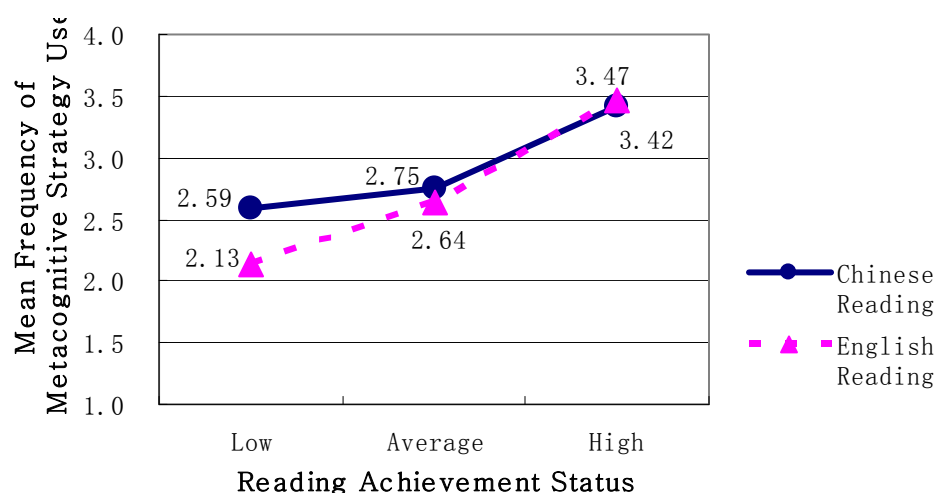
Post hoc main effects. As shown in Table 4.12 above, the mean frequency of reported metacognitive strategy use significantly differed by reading achievement status. Results of the post hoc analysis, the Student-Newman-Keuls, showed significant differences in all pairwise comparisons. Students with high reading achievement had the highest mean frequency of reported metacognitive strategy use (mean = 3.44); students with average reading achievement displayed the second highest mean frequency (mean = 2.69); students with low reading achievement showed the lowest mean frequency (mean = 2.36). Table 4.13 (presented later) summarizes reported strategy use in the metacognitive strategy category by reading achievement status in each condition (i.e., in Chinese reading, in English reading, and in reading regardless of language,) according to Student-Newman-Keuls post hoc analyses.

Moreover, the main effect for language of the text was also significant. The mean frequency of reported strategy use in the metacognitive category for Chinese reading was significantly higher than English reading (mean = 2.96, mean = 2.79, respectively).

Post hoc simple effects. The results indicated a significant interaction effect between reading achievement status and language of the text. Figure 4.2 illustrates the presence of the significant interaction effect. To examine which comparisons were statistically significant under a certain condition, post hoc analyses were conducted to determine the simple effect of reading achievement status (testing mean frequency of reported metacognitive strategy use across reading achievement status within each language) and to identify the simple effect of language of the text (testing mean frequency of reported metacognitive strategy use between two languages at each reading achievement status).

Figure 4.2

Graph of the Interactions between Reading Achievement Status and Language of the Text on Reported *Metacognitive Strategy Use*



To examine the simple effect of reading achievement status, Student-Newman-Keuls, a post hoc analysis, was employed to determine where specific differences in reported metacognitive strategy use by reading achievement status occurred within each language. Table 4.13 presents the summary of the results. Within Chinese reading, the mean frequency of reported metacognitive strategy use for high-reading-achieving students (mean = 3.42) was significantly higher than for average-reading-achieving students (mean = 2.75) and for low-reading-achieving students (mean = 2.59) at the .05 significance level. However, no significant difference in reported metacognitive strategy use was found between the average-reading-achieving students and the low-reading-achieving students.

Within English reading, all pairwise comparisons of the mean differences in

reported metacognitive strategy use were significant. High-reading-achieving students showed the highest mean frequency of reported metacognitive strategy use (mean = 3.47); the mean frequency of metacognitive strategy use for average-reading-achieving students was the second highest (mean = 2.64); low-reading-achieving students had the lowest mean frequency of reported metacognitive strategy use (mean = 2.13).

Table 4.13

Post Hoc Analyses: Mean Frequency of Reported *Metacognitive* Strategy Use by Reading Achievement Status Regardless of Language and within Each Language

	Mean Frequency of Reported Metacognitive Strategy Use		
	Regardless of Language ^a	Chinese ^b	English ^c
High Reading Achievement Status	3.44 ^A	3.42 ^A	3.47 ^A
Average Reading Achievement Status	2.69 ^B	2.75 ^B	2.64 ^B
Low Reading Achievement Status	2.36 ^C	2.59 ^B	2.13 ^C

Note. Means in the same column that do not share subscripts differ at the .05 level in the Student-Newman-Keuls tests.

^aEstimates of effect size for significant mean differences by reading achievement status regardless of language: (H—A) = .98; (H—L) = 1.38; (A—L) = .34

^bEstimates of effect size for significant mean differences by reading achievement status in Chinese: (H—A) = .88; (H—L) = 1.01

^cEstimates of effect size for significant mean differences by reading achievement status in English: (H—A) = .97; (H—L) = 1.47; (A—L) = .45

Table 4.14 presents the results for the simple effect of language of the text. This analysis compared reported metacognitive strategy use between languages at each reading achievement status. Similar to the findings for overall reported strategy use, only students with low reading achievement showed a significant difference in reported metacognitive strategy use between Chinese reading and English reading ($t(63) = -4.448$, $p < .001$). For these students, the mean frequency of reported metacognitive strategy use was higher in Chinese reading (mean = 2.59) than in English reading (mean = 2.13). Students with high reading achievement and students with average reading achievement did not reveal significant differences in reported metacognitive strategy use between Chinese reading and English reading.

Table 4.14

Paired t -tests for the Simple Effect of Language of the Text: Comparison of Mean Frequency of Reported *Metacognitive* Strategy Use between English reading and Chinese Reading within Each Reading Achievement Status

Paired t -tests	High Reading Achievement Status		Average Reading Achievement Status		Low Reading Achievement Status ^a	
	English	Chinese	English	Chinese	English	Chinese
Mean	3.47	3.42	2.64	2.75	2.13	2.59
T	.777		-1.298		-4.448**	
Df	71		46		63	

Note. Because of running three t -tests, the adjusted alpha, .017, was set.

** $p < .001$

^aEstimate of effect size for the significant mean difference across languages within low-achieving readers:

(E—C) = .98

RQ 3.2: Does reported strategy use in the problem-solving strategy category¹⁹ differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

A split-plot repeated measures ANOVA was conducted to answer this research question. As Table 4.15 shows, statistically significant differences were observed in the main effects for reading achievement status ($F(2, 180) = 27.851, p < .000$) and for language of the text ($F(1, 180) = 8.407, p < .004$). Moreover, a significant interaction effect between reading achievement status and language of the text was also found ($F(2, 180) = 5.787, p < .004$).

¹⁹ Based on exploratory factor analysis, this contains all the strategies from the sixth factor, which explains 2.5% of the variance. Sample strategies are reading aloud or whispering the difficult parts of a text, adjusting reading speed depending on the difficulty of the text and doing everything one can to get back on track.

Table 4.15

Summary of Split-Plot Repeated Measures ANOVA with Comparisons of Reported
Problem-Solving Strategy Use by Reading Achievement Status between Chinese Reading
 and English Reading

<i>Source</i>	<i>df</i>	<i>F</i>	<i>p</i>	<i>Interpretation</i> Frequency of reported problem-solving strategy use:
<u>Between subjects</u>				<i>Post hoc main effects:</i>
Reading achievement status	2	27.851	.000*	<ul style="list-style-type: none"> High-achieving > Average-achieving > Low-achieving (see post hoc test in Table 4.16)
<u>Within subjects</u>				
Language of text	1	8.407	.004*	<ul style="list-style-type: none"> Chinese reading > English reading
Language of text X Reading achievement status	2	5.787	.004*	<i>Post hoc simple effects:</i> Reading achievement status simple effect: <ul style="list-style-type: none"> Within Chinese reading: <ul style="list-style-type: none"> High-achieving > Average-achieving High-achieving > Low-achieving Within English reading: <ul style="list-style-type: none"> High-achieving > Average-achieving > Low-achieving (see post hoc tests in Table 4.16)
				Language of the text simple effect: <ul style="list-style-type: none"> Within high- and average-achieving readers: <ul style="list-style-type: none"> Chinese reading = English reading Within low-achieving readers: <ul style="list-style-type: none"> Chinese reading > English reading (see post hoc tests in Table 4.17)
Error	180			

* $p < .05$

Post hoc main effects. A significant main effect occurred for reading achievement status on the mean frequency of reported strategy use in the problem-solving category (see Table 4.15 above). Further, based on the results of Student-Newman-Keuls, a post hoc analysis, mean differences in all of the pairwise comparisons between reading achievement statuses showed significant at the .05 level. Similar to the findings for the reported metacognitive strategy use, high-reading-achieving students had the highest mean frequency of reported problem-solving strategy use (mean = 3.56). Average-reading-achieving students showed the next highest mean frequency of reported problem-solving strategy use (mean = 2.94). Low-reading-achieving students reported the lowest mean frequency of reported problem-solving strategy use (mean = 2.48). The post hoc results about the reported problem-solving strategy use by reading achievement status regardless of language and for each language are shown in Table 4.16.

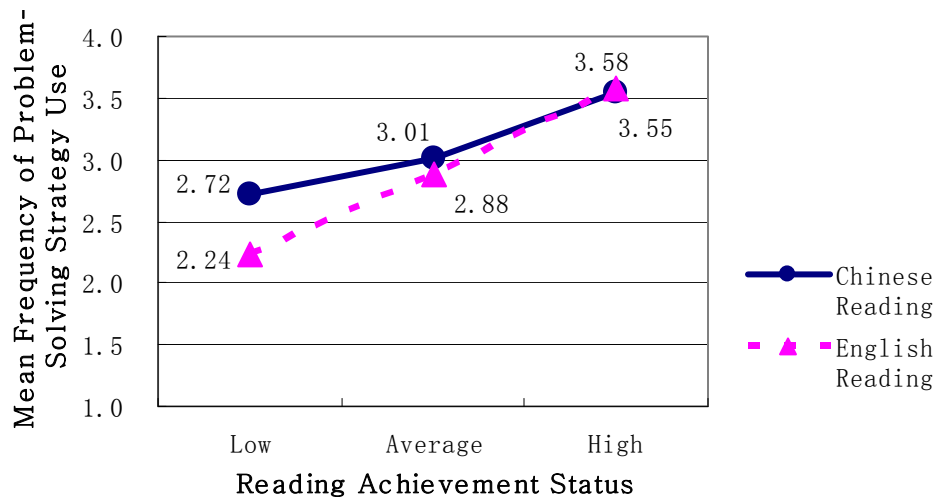
Additionally, a significant main effect for language of the text was also found. The results indicated that the mean frequency of reported problem-solving strategy use was higher for Chinese reading (mean = 3.12) than for English reading (mean = 2.93).

Post hoc simple effects. The results indicated a significant interaction effect between reading achievement status and language of the text. Figure 4.3 demonstrates the existence of the significant interaction effect. The interaction effect suggested that significant mean differences occurred given certain conditions. To inspect which comparisons were statistically significant under which certain condition, post hoc analyses were conducted for the simple effect of reading achievement status (testing mean frequency of problem-solving reported strategy use across reading achievement status within each language) and for the simple effect of language of the text (testing

mean frequency of reported problem-solving strategy use between languages at each reading achievement status).

Figure 4.3

Graph of the Interactions between Reading Achievement Status and Language of the Text on Reported *Problem-Solving* Strategy Use



To examine the simple effect of reading achievement status, Student-Newman-Keuls was conducted to identify which reading achievement status comparisons were significant within Chinese reading and within English reading. Table 4.16 presents the summary of the Student-Newman-Keuls post hoc analyses. Within Chinese reading, students with high reading achievement showed higher mean frequency of reported problem-solving strategy use (mean = 3.55) than students with average reading achievement (mean = 3.01) and students with low reading achievement (mean = 2.72). The mean difference between average-reading-achieving students and

low-reading-achieving students was not statistically significant.

Within English reading, mean differences in all pairwise comparisons were again statistically significant. The mean frequency of reported problem-solving strategy use for high-achieving readers was the largest (mean = 3.58); next was the mean for average-achieving readers (mean = 2.88); the lowest mean frequency of reported problem-solving strategy use was displayed by the low-achieving readers (mean = 2.24).

Table 4.16

Post Hoc Analyses: Mean Frequency of Reported *Problem-Solving* Strategy Use by Reading Achievement Status Regardless of Language and within Each Language

	Mean Frequency of Reported Problem-Solving Strategy Use		
	Regardless of Language ^a	Chinese ^b	English ^c
High Reading Achievement Status	3.56 ^A	3.55 ^A	3.58 ^A
Average Reading Achievement Status	2.94 ^B	3.01 ^B	2.88 ^B
Low Reading Achievement Status	2.48 ^C	2.72 ^B	2.24 ^C

Note. Means in the same column that do not share subscripts differ at the .05 level in the Student-Newman-Keuls tests.

^aEstimates of effect size for significant mean differences by reading achievement status regardless of language: (H—A) = .81; (H—L) = 1.34; (A—L) = .48

^bEstimates of effect size for significant mean differences by reading achievement status in Chinese: (H—A) = .66; (H—L) = .96

^cEstimates of effect size for significant mean differences by reading achievement status in English: (H—A) = .78; (H—L) = 1.30; (A—L) = .55

Table 4.17 presents the results for the simple effect of language of the text as determined by running three paired *t*-tests. Of all the pairwise comparisons in mean frequency of reported problem-solving strategy use between languages, only low-reading-achieving students showed a significant difference ($t(63) = -3.453, p < .001$). Students with low reading achievement reported using more problem-solving strategies for Chinese reading (mean = 2.72) than for English reading (mean = 2.24). Mean differences in reported problem-solving strategy use were not statistically significant between Chinese reading and English reading for students with high reading achievement and for students with average reading achievement.

Table 4.17

Paired *t*-tests for the Simple Effect of Language of the Text: Comparison of Mean Frequency of Reported *Problem-Solving* Strategy Use between English Reading and Chinese Reading within Each Reading Achievement Status

Paired <i>t</i> -tests	High Reading Achievement Status		Average Reading Achievement Status		Low Reading Achievement Status ^a	
	English	Chinese	English	Chinese	English	Chinese
Mean	3.58	3.55	2.88	3.01	2.24	2.72
<i>T</i>	.311		-1.209		-3.453**	
Df	71		46		63	

Note. Because of running three *t*-tests, the adjusted alpha, .017, was set.

** $p < .001$

^aEstimate of effect size for the significant mean difference across languages within low-achieving readers:

(E—C) = .97.

RQ 3.3: Does reported strategy use in the grammatical/morphological strategy category²⁰ differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

A split-plot repeated measures ANOVA was employed to answer this research question. The results indicated a significant main effect for reading achievement status ($F(2, 180) = 10.832, p < .000$) on reported grammatical/morphological strategy use. However, the results indicated no significant main effect for language of the text. In other words, the mean frequency of reported grammatical/morphological strategy use did not differ significantly between Chinese reading and English reading. The results, presented in Table 4.18, also illustrated the significant interaction effect between the reading achievement status and language of the text on reported grammatical/morphological strategy use ($F(2, 180) = 9.516, p < .000$).

²⁰ Based on exploratory factor analysis, this contains all the strategies from the second factor except for item 24. This streamlined factor explains 5.4% of the variance. Sample strategies are focusing on the tense of a verb, paying attention to sentence structure and checking what each pronoun refers to.

Table 4.18

Summary of Split-Plot Repeated Measures ANOVA with Comparisons of Reported
Grammatical/Morphological Strategy Use by Reading Achievement Status between
 Chinese Reading and English Reading

<i>Source</i>	<i>df</i>	<i>F</i>	<i>p</i>	<i>Interpretation</i> Frequency of reported grammatical/morphological reading strategy use:
<u>Between subjects</u>				<i>Post hoc main effect:</i>
Reading achievement status	2	10.832	.000*	<ul style="list-style-type: none"> • High-achieving > Average-achieving • High-achieving > Low-achieving (see post hoc test in Table 4.19)
<u>Within subjects</u>				
Language of text	1	.164	.686	
Language of text X Reading achievement status	2	9.516	.000*	<i>Post hoc simple effects:</i> Reading achievement status simple effect: <ul style="list-style-type: none"> • Within Chinese reading: High-achieving = Average-achieving = Low-achieving • Within English reading: High-achieving > Average-achieving > Low-achieving (see post hoc tests in Table 4.19)
				Language of the text simple effect: <ul style="list-style-type: none"> • Within high-achieving readers: English reading > Chinese reading • Within average-achieving readers: Chinese reading = English reading • Within low-achieving readers: Chinese reading > English reading (see post hoc tests in Table 4.20)
Error	180			

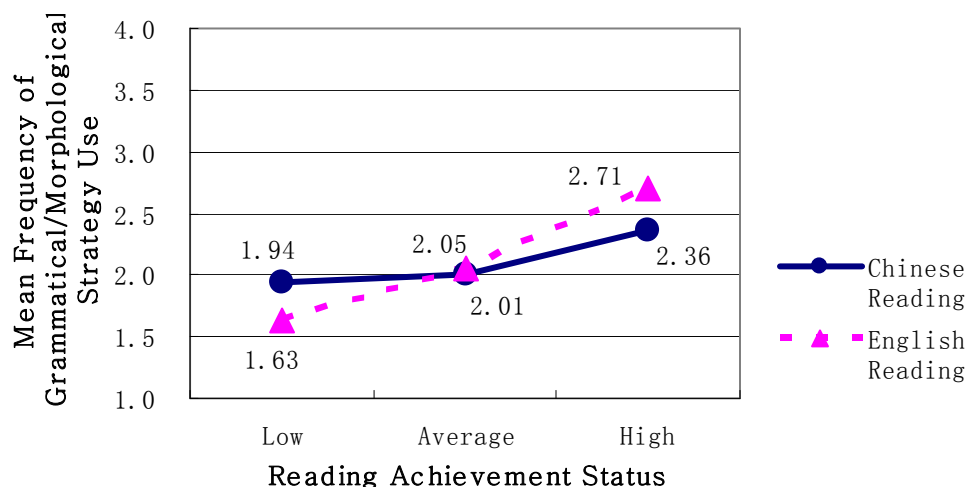
* $p < .05$

Post hoc main effect. As shown in Table 4.18 above, the significant main effect for reading achievement status indicated that the mean frequency of reported grammatical/morphological strategy use varied by reading achievement status. Further, the results of Student-Newman-Keuls, a post hoc analysis, showed that high-reading-achieving students had higher mean frequency of reported grammatical/morphological strategy use (mean = 2.54) than average-reading-achieving students (mean = 2.03) and low-reading-achieving students (mean = 1.79). The mean difference between the average-reading-achieving students and the low-reading-achieving students was not statistically significant. To present a clear picture of the reported grammatical/morphological strategy use by reading achievement status, the results of the reported strategy use regardless of language and for each language are summarized in Table 4.19.

Post hoc simple effects. A significant interaction effect between reading achievement status and language of the text was also found. Figure 4.4 illustrates the presence of the significant interaction effect. To determine which comparisons are statistically significant given certain conditions, post hoc analyses were conducted for the simple effect of reading achievement status (testing mean frequency of reported grammatical/morphological strategy use by reading achievement status within each language) and for the simple effect of language of the text (testing mean frequency of reported grammatical/morphological strategy use between languages at each reading achievement status).

Figure 4.4

Graph of the Interactions between Reading Achievement Status and Language of the Text on Reported *Grammatical/Morphological* Strategy Use



To examine the simple effect of reading achievement status, Student-Newman-Keuls, a post hoc analysis, was conducted to identify which comparisons were significant within English reading. Table 4.19 presents the summary of the Student-Newman-Keuls post hoc analyses. Within English reading, mean differences in all pairwise comparisons were statistically significant. The mean frequency of reported grammatical/morphological strategy use was largest for high-reading-achieving students (mean = 2.71); the mean frequency of reported grammatical/morphological strategy use was the next highest for average-reading-achieving students (mean = 2.05); the mean frequency of reported grammatical/morphological strategy use was the smallest for low-reading-achieving students (mean = 1.63).

Table 4.19

Post Hoc Analyses: Mean Frequency of Reported *Grammatical/Morphological* Strategy Use by Reading Achievement Status Regardless of Language and within Each Language

	Mean Frequency of Reported Grammatical/Morphological Strategy Use		
	Regardless of Language ^a	Chinese ^b	English ^c
High Reading Achievement Status	2.54 ^A	2.36 ^A	2.71 ^A
Average Reading Achievement Status	2.03 ^B	2.01 ^A	2.05 ^B
Low Reading Achievement Status	1.79 ^B	1.94 ^A	1.63 ^C

Note. Means in the same column that do not share subscripts differ at the .05 level in the Student-Newman-Keuls tests.

^aEstimates of effect size for significant mean differences by reading achievement status regardless of language: (H—A) = .56; (H—L) = .79

^bEven though there is no need to conduct post hoc analysis within Chinese reading due to no significance in mean differences, the information presented here is for readers' convenience.

^cEstimates of effect size for significant mean differences by reading achievement status in English: (H—A) = .65; (H—L) = 1.01; (A—L) = .36

Table 4.20 summarizes the results derived from three paired *t*-tests for the simple effect of language of the text. Among the comparisons in mean frequency of reported grammatical/morphological strategy use between languages, significant differences were found within the high-achieving readers ($t(71) = 3.319, p < .000$) and the low-achieving

readers ($t(63) = -2.850, p < .006$). To be more specific, students with high reading achievement reported using more grammatical/morphological strategies for English reading (mean = 2.71) than for Chinese reading (mean = 2.36). In contrast, the low reading-achieving students showed using more grammatical/ morphological strategies for Chinese reading (mean = 1.94) than for English reading (mean = 1.63). No significant difference in reported grammatical/morphological strategy use between these two languages was found for students with average reading achievement.

Table 4.20

Paired t -tests for the Simple Effect of Language of the Test: Comparison of Mean Frequency of Reported *Grammatical/Morphological* Strategy Use between English reading and Chinese Reading within Each Reading Achievement Status

Paired t -tests	High Reading Achievement Status ^a		Average Reading Achievement Status		Low Reading Achievement Status ^b	
	English	Chinese	English	Chinese	English	Chinese
Mean	2.71	2.36	2.05	2.01	1.63	1.94
T	3.319**		.297		-2.850*	
Df	71		46		63	

Note. Because of running three t -tests, the adjusted alpha, .017, was set.

^aEstimate of effect size for the significant mean difference across languages within high-achieving readers:

$$(E-C) = .79$$

^bEstimate of effect size for the significant mean difference across languages within low-achieving readers:

$$(E-C) = .62$$

* $p < .05$. ** $p < .001$

RQ 3.4: Does reported strategy use in the support strategy category²¹ differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

To answer this question, a split-plot repeated measures ANOVA was employed. The results indicated a significant main effect for reading achievement status ($F(2, 180) = 8.125, p < .000$). In other words, the mean frequency of reported support strategy use was significantly different by reading achievement status. However, the main effect for language of the text was not statistically significant, which means that the mean frequency of reported support strategy use did not differ between Chinese reading and English reading. In addition, a significant interaction effect between reading achievement status and language of the text was observed ($F(2, 180) = 7.838, p < .001$). Table 4.21 presents the results.

²¹ Based on exploratory factor analysis, this contains all the strategies from the fifth factor, which explains 2.8% of the variance. Sample strategies are marking or underlining important parts, taking notes or writing down key words, using dictionaries and picturing or visualizing information.

Table 4.21

Summary of Split-Plot Repeated Measures ANOVA with Comparisons of Reported
Support Strategy Use by Reading Achievement Status between Chinese Reading and
 English Reading

<i>Source</i>	<i>df</i>	<i>F</i>	<i>p</i>	<i>Interpretation</i> Frequency of reported support reading strategy use:
<u>Between subjects</u>				<i>Post hoc main effect:</i>
Reading achievement status	2	8.125	.000*	<ul style="list-style-type: none"> • High-achieving > Average-achieving • High-achieving > Low-achieving (see post hoc test in Table 4.22)
<u>Within subjects</u>				
Language of text	1	1.919	.168	
Language of text X Reading achievement status	2	7.838	.001*	<i>Post hoc simple effects:</i> Reading achievement status simple effect: <ul style="list-style-type: none"> • Within Chinese reading: High-achieving > Average-achieving • Within English reading: High-achieving > Average-achieving High-achieving > Low-achieving (see post hoc tests in Table 4.22)
Error	180			Language of the text simple effect: <ul style="list-style-type: none"> • Within high- and average-achieving readers: Chinese reading = English reading • Within low-achieving readers: Chinese reading > English reading (see post hoc tests in Table 4.23)

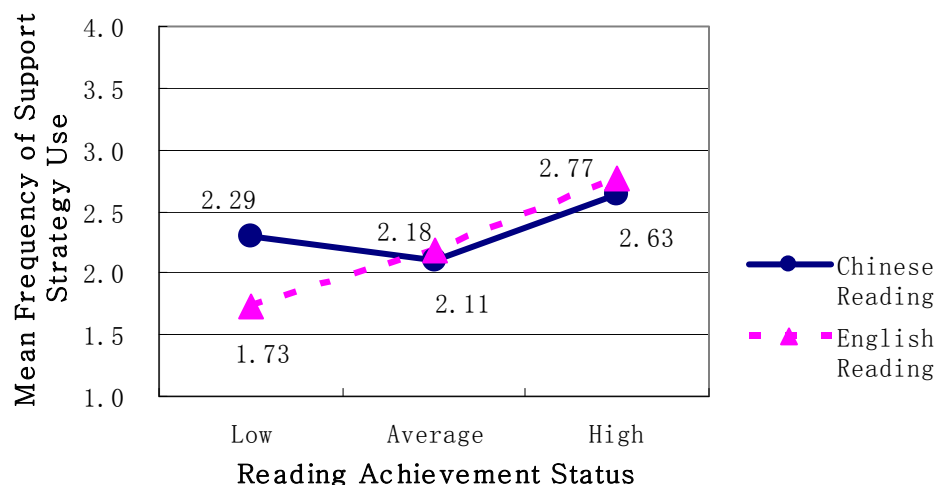
* $p < .05$

Post hoc main effect. Because the main effect of reading achievement status was significant, Student-Newman-Keuls, a post hoc analysis, was conducted to examine where significant differences occurred among the pairwise comparisons. The results of Student-Newman-Keuls showed that significant mean differences existed between high-reading-achieving students with average-reading-achieving students and low-reading-achieving students. To be more specific, the mean frequency of reported support strategy use for students with high reading achievement (mean = 2.70) was significantly higher than for students with average reading achievement (mean = 2.14) and for students with low reading achievement (mean = 2.01). The mean difference in the reported support reading strategy use between average-reading-achieving students and low-reading-achieving students was not significant. The results of Student-Newman-Keuls post hoc analyses are summarized in Table 4.22 to illustrate the whole picture of reported support strategy use regardless of language and within each language.

Post hoc simple effects. The results indicated that the interaction effect between reading achievement status and language of the text was statistically significant. Figure 4.5 shows the existence of the significant interaction effect. To identify which comparisons were statistically significant given certain conditions, post hoc analyses were employed for the simple effect of reading achievement status (testing mean frequency of reported support strategy use by reading achievement status within each language) and for the simple effect of language of the text (testing mean frequency of reported support strategy use between languages at each reading achievement status).

Figure 4.5

Graph of the Interactions between Reading Achievement Status and Language of the Text on Reported *Support* Strategy Use



To examine the simple effect of reading achievement status, Student-Newman-Keuls was conducted to identify which comparisons were significant within each language. Table 4.22 presents the summary of the Student-Newman-Keuls post hoc analyses. Within Chinese reading, the mean difference in reported support strategy use between the high-reading-achieving students and the average-reading-achieving students was significant. The mean frequency of reported support strategy use for high-reading-achieving students was larger (mean = 2.63) than that of average-reading-achieving students (mean = 2.11). The remaining pairwise comparisons were not statistically significant.

Within English reading, the mean frequency of reported support strategy use for students with high reading achievement was higher (mean = 2.77) than students with

average reading achievement (mean = 2.18) and students with low reading achievement (mean = 1.73). No significant mean difference in reported support strategy use was found between students with average reading achievement and students with low reading achievement.

Table 4.22

Post Hoc Analyses: Mean Frequency of Reported *Support* Strategy Use by Reading Achievement Status Regardless of Language and within Each Language

	Mean Frequency of Reported Support Strategy Use		
	Regardless of Language ^a	Chinese ^b	English ^c
High Reading Achievement status	2.70 ^A	2.63 ^A	2.77 ^A
Average Reading Achievement status	2.14 ^B	2.11 ^B	2.18 ^B
Low Reading Achievement status	2.01 ^B	2.29 ^{AB}	1.73 ^B

Note. Means in the same column that do not share subscripts differ at the .05 level in the Student-Newman-Keuls tests.

^aEstimates of effect size for significant mean differences by reading achievement status regardless of language: (H—A) = .51; (H—L) = .65

^bEstimates of effect size for significant mean differences by reading achievement status in Chinese: (H—A) = .45

^cEstimates of effect size for significant mean differences by reading achievement status in English: (H—A) = .47; (H—L) = .81

Table 4.23 presents the results for the simple effect of language of the text based on three paired *t*-tests. The results indicated that only low-reading-achieving students showed a significant difference between languages ($t(63) = -3.199, p < .002$). Specifically, students with low reading achievement reported using more support strategies for Chinese reading (mean = 2.29) than for English reading (mean = 1.73). Mean differences in reported support strategy use were not statistically significant between Chinese reading and English reading for student with high reading achievement and students with average reading achievement.

Table 4.23

Paired *t*-tests for the Simple Effect of Language of the Text: Comparison of Mean Frequency of Reported *Support* Strategy Use between English reading and Chinese Reading within Each Reading Achievement Status

Paired <i>t</i> -tests	High Reading Achievement status		Average Reading Achievement status		Low Reading Achievement status ^a	
	English	Chinese	English	Chinese	English	Chinese
Mean	2.77	2.63	2.18	2.11	1.73	2.29
<i>T</i>	1.298		.572		-3.199*	
Df	71		46		63	

Note. Because of running three *t*-tests, the adjusted alpha, .017, was set.

^aEstimate of effect size for the significant mean difference across languages within low-achieving readers:

$$(E-C) = 1.04$$

* $p < .05$

RQ 3.5: Does reported strategy use in the skipping strategy category²² differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

A split-plot repeated measures ANOVA was employed. As Table 4.24 shows, only the main effect for language of the text was significant ($F(2, 180) = 13.786, p < .000$). However, no significant main effect of reading achievement status and also no significant interaction effect were found.

Table 4.24

Summary of Split-Plot Repeated Measures ANOVA with Comparisons of Reported *Skipping* Strategy Use by Reading Achievement Status across Chinese Reading and English Reading

<i>Source</i>	<i>df</i>	<i>F</i>	<i>p</i>	<i>Interpretation</i> Frequency of reported skipping strategy use:
<u>Between subjects</u>				
Reading achievement status	2	.240	.787	
<u>Within subjects</u>				
Language of text ^a	1	13.786	.000*	• English reading > Chinese reading
Language of text X Reading achievement status	2	1.129	.325	
Error	180			

^aEstimate of effect size for the significant mean difference across languages regardless of reading

achievement level: $(E - C) = .62$

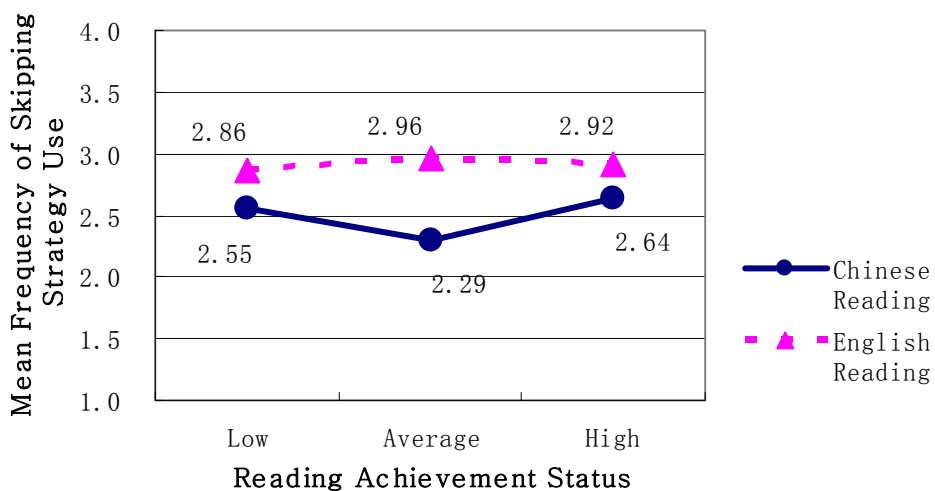
* $p < .05$

²² Based on exploratory factor analysis, this contains all the strategies from the third factor, which explains 3.8% of the variance. These two strategies are skipping the sentence that one cannot understand and skipping unknown words.

Figure 4.6 clearly illustrates the main effect of language of the text on reported skipping strategy use. All of the students reported using more skipping strategies for English reading (mean = 2.91) than for Chinese reading (mean = 2.52).

Figure 4.6

Graph of the Main Effect of Language of the Text on Reported *Skipping* Strategy Use



RQ 3.6: Does reported strategy use in the purpose-emphasizing strategy category²³ differ by reading achievement status between reading a Chinese expository text and reading an English expository text?

A split-plot repeated measures ANOVA was employed to answer this research question. The results indicated significant main effects for reading achievement status ($F(2, 180) = 5.982, p < .003$) and for language of the text ($F(1, 180) = 8.236, p < .005$). However, no significant interaction effect occurred between reading achievement status and language of the text on reported purpose-emphasizing strategy use (see Table 4.25).

Table 4.25

Summary of Split-Plot Repeated Measures ANOVA with Comparisons of Reported Purpose-Emphasizing Strategy Use by Reading Achievement Status between Chinese Reading and English Reading

<i>Source</i>	<i>df</i>	<i>F</i>	<i>p</i>	<i>Interpretation</i> Frequency of reported purpose-emphasizing strategy use:
<u>Between subjects</u>				<i>Post hoc test for main effect:</i>
Reading achievement status	2	5.982	.003*	• High-achieving > Low-achieving (see post hoc test in Table 4.26)
<u>Within subjects</u>				
Language of text ^a	1	8.236	.005*	• Chinese reading > English reading
Language of text X Reading achievement status	2	1.514	.223	
Error	180			

^aEstimate of effect size for the significant mean difference across languages regardless of reading achievement level: $(E-C) = .51$

* $p < .05$

²³ Based on exploratory factor analysis, this contains all the strategies from the seventh factor, which explains 2.5% of the variance. Sample strategies are having a purpose in mind when one reads and reading comprehension question first and then read the text later.

Post hoc main effects. With regard to the main effect of reading achievement status, Student-Newman-Keuls, a post hoc analysis, was further conducted to identify which comparisons were significant. As Table 4.26 shows, a significant mean difference in reported purpose-emphasizing strategy use was only found between high-reading-achieving students and low-reading-achieving students.

Table 4.26

Post Hoc Analyses: Mean Frequency of Reported *Purpose-Emphasizing* Strategy Use by Reading Achievement Status Regardless of Language

	Mean Frequency of Reported Purpose-Emphasizing Strategy Use Regardless of Language ^a
High Reading Achievement Status	2.64 ^A
Average Reading Achievement Status	2.27 ^{AB}
Low Reading Achievement Status	1.98 ^B

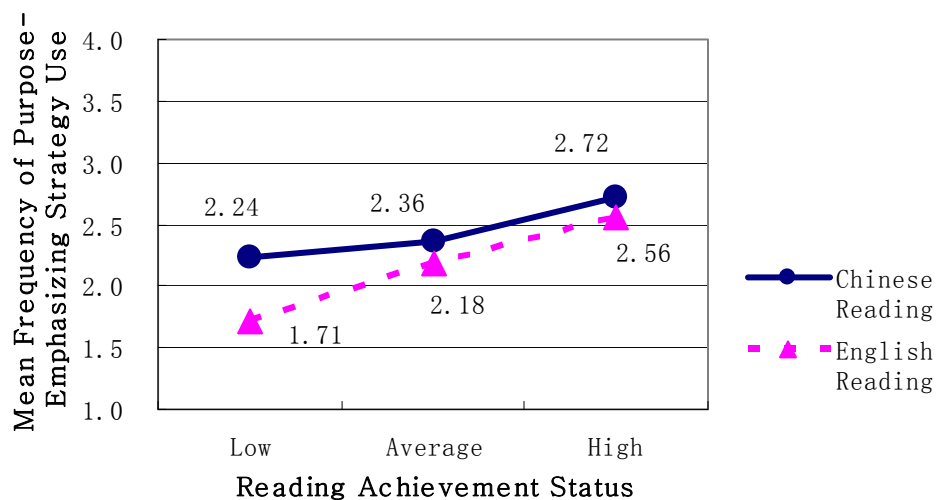
Note. Means in the same column that do not share subscripts differ at the .05 level in the Student-Newman-Keuls tests. Because of no significant interaction effect, no follow-up tests were conducted to test pairwise comparisons within each language.

^aEstimates of effect size for significant mean differences by reading achievement status regardless of language: (H—L) = .60

Figure 4.7 demonstrates the significant main effects by graph. The mean frequency of reported purpose-emphasizing strategy use for high-reading-achieving students (mean = 2.64) were significantly higher than for students with low-reading achievement (mean = 1.98). The remaining pairwise comparisons were not significant. As to the main effect of language of the text, the mean frequency of purpose-emphasizing use appeared to be significantly higher for Chinese reading (mean = 2.46) than for English reading (mean = 2.16). Because of no significant interaction effect, no follow-up tests were conducted to determine the simple effects.

Figure 4.7

Graph of the Main Effect of Reading Achievement Status and the Main Effect of Language of the Text on Reported *Purpose-Emphasizing* Strategy Use



RQ 4: Does reported strategy use in the translation strategy category²⁴ differ by reading achievement status in reading an English expository text?

A one-way ANOVA was conducted to answer this question. The independent variable is reading achievement status and the dependent variable is reported translation strategy use. As Table 4.27 presents, the mean frequency of reported translation strategy use was significantly different between the three reading achievement statuses ($F(2, 180) = 15.204, p < .000$).

Table 4.27

Summary of One-Way ANOVA with Comparisons of Reported *Translation* Strategy Use by Reading Achievement Status for English Reading

<i>Source</i>	<i>df</i>	<i>F</i>	<i>p</i>	<i>Interpretation</i>
				Mean frequency of reported translation strategy use:
Between Groups	2	15.204	.000*	• High-achieving >
Reading achievement status				Average-achieving >
				Low-achieving
Error	180			(see post hoc test Table 4.28)

* $p < .05$

²⁴ This is asked as a separate research question because four translation strategies are not included in the Chinese version of the *Task-Based RSI*. The reason not to include translation strategies is that Chinese is the participants' native language, so there is no translation needed for reading in Chinese. Based on exploratory factor analysis, this contains all the strategies from the fourth factor, which explains 2.9% of the variance. Strategies are doing all one can to understand what is read without translating it word-for-word, understanding the meaning without translating the text and thinking only in English.

To further examine which pairwise comparisons were statistically significant, Student-Newman-Keuls procedure was applied. Table 4.28 shows that all comparisons were statistically significant. High-reading-achieving students demonstrated the highest mean frequency of reported translation strategy use (mean = 2.53). The average-reading-achieving students showed the next highest mean frequency of reported translation strategy use (mean = 2.09). Low-reading-achieving students had the lowest mean frequency of reported translation strategy use (mean = 1.49).

Table 4.28

Post Hoc Analyses: Mean Frequency of Reported *Translation* Strategy Use by Reading Achievement Status in English Reading

	Mean Frequency of Reported Translation Strategy Use
	English ^a
High Reading Achievement Status	2.53 ^A
Average Reading Achievement Status	2.09 ^B
Low Reading Achievement Status	1.49 ^C

Note. Means in the same column that do not share subscripts differ at the .05 level in the

Student-Newman-Keuls tests.

^aEstimates of effect size for significant mean differences by reading achievement status in English:

(H—A) = .43; (H—L) = .90; (A—L) = .54

Part C: Prediction of Overall Reported Strategy Use

In this part, six personal variables were used to determine which one(s) significantly predict overall reported strategy use. The descriptive information (e.g., means and standard deviations) of each predictor are presented in Table 4.29. This part contained two research questions: prediction of overall reported strategy use for Chinese reading and prediction of overall reported strategy use for English reading. A multiple regression analysis was conducted to answer RQ 5 and RQ 6.

Table 4.29

Summary of Descriptive Statistics of Each Predictor

Predictors		Frequency	<i>M</i>	<i>SD</i>
1. Gender ^a				
	Male	169		
	Female	176		
2. Enjoyment of reading in general ^b			2.91	.72
3. Enjoyment of reading in ^b :				
	Chinese		3.18	.63
	English		2.37	.66
4. Amount of daily reading time (minutes)			105	93.76
5. Students' self-rated reading achievement ^b of:				
	Chinese		2.43	.73
	English		1.89	.68
6. Students' rating of effectiveness of reading strategies for ^b :				
	Chinese		2.74	.78
	English		2.68	.82

Note. Except for gender, all other variables were significantly and positively correlated with overall reported strategy use for Chinese reading and for English reading at the .01 level.

^aMale was coded 1 and Female was coded 0. ^bThe scale points ranged from 1 to 4.

RQ 5: Which of the following personal variables significantly predict overall reported strategy use for Chinese reading?

- a. gender*
- b. students' self-rated Chinese reading achievement*
- c. enjoyment of reading in general*
- d. enjoyment of reading in Chinese*
- e. amount of daily reading time in any language*
- f. students' rating of effectiveness of strategies for Chinese reading*

The six personal variables were entered simultaneously to conduct a multiple regression analysis for prediction of overall reported strategy use for Chinese reading. The predictors were the six personal variables, while the criterion variable was overall reported strategy use for Chinese reading. As shown in Table 4.30, the six personal variables yielded an R square of .24, ($F(6, 281) = 14.583, p < .000$). This indicated that 24% of variance in overall reported strategy use for Chinese reading could be explained by the linear combination of the six variables.

Table 4.30

Model Summary for Multiple Regression Analysis of Overall Reported Strategy Use on All Six Personal Variables for Chinese Reading

R	R Square	Adjusted R Square	Std. Error of the Estimate
.49	.24	.22	.70

Table 4.31 presents unstandardized regression coefficients (B), the standard error of unstandardized regression coefficients ($SE\ B$), and standardized regression coefficients (β) of each personal variable. Because the personal variables were expressed using different measurement scales, standardized regression coefficients were employed to compare the relative importance of the predictor variables to the criterion variable.

Among the six personal variables, students' rating of effectiveness of strategy use for Chinese reading was found to be the best significant predictor (.29) for overall reported strategy use for Chinese reading, which explained 8% of the total variance while controlling for other variables. This meant that a one-standard-deviation increase in students' rating of effectiveness of strategy use would result in a .29-standard-deviation increase in overall reported strategy use for Chinese reading while controlling for other predictors. The next most significant predictor was students' self-rated Chinese reading achievement (.22), which explained 4% of the total variance while controlling for other variables. This indicated that a one-standard-deviation increase in students' self-rated Chinese reading achievement would result in a .22-standard-deviation increase in overall reported strategy use for Chinese reading while controlling for other predictors. The last significant predictor was the amount of daily reading time in any language (.15), which explained 2% of the total variance while controlling for other variables. It meant that a one-standard-deviation increase in daily reading time would result in a .15-standard-deviation increase in overall reported strategy use for Chinese reading while controlling for other predictors. In other words, students who valued strategies use, rated themselves as good readers, and spent more time reading in any language reported using reading strategies more frequently. The rest of the variables (i.e., gender, enjoyment

of reading in general, and enjoyment of reading in Chinese) did not provide a significant unique contribution toward predicting overall reported strategy use for Chinese reading.

Table 4.31

Regression Coefficients of Six Personal Variables in Predicting Overall Reported Strategy Use for Chinese Reading

Predictors	<i>B</i>	<i>SE B</i>	β
Constant	1.54	.18	
Gender	-.08	.08	-.05
Enjoyment of reading in general	.12	.07	.11
Enjoyment of reading in Chinese	-.01	.09	-.01
Amount of daily reading time in any language	.001*	.0004	.15*
Students' self-rated Chinese reading achievement	.23**	.06	.22**
Students' rating of effectiveness of strategies for Chinese reading	.30**	.06	.29**

* $p < .05$. ** $p < .01$.

RQ 6: Which of the following personal variables significantly predict overall reported strategy use for English reading?

- a. gender*
- b. students' self-rated English reading achievement*
- c. enjoyment of reading in general*
- d. enjoyment of reading in English*
- e. amount of daily reading time in any language*
- f. students' rating of effectiveness of strategies for English reading*

The six personal variables (the predictors) were entered simultaneously to conduct a multiple regression analysis for the prediction of overall reported strategy use for English reading (the criterion variable). The linear combination of the six personal variables significantly predicted overall reported strategy use for English reading ($F(6, 272) = 31.053, p < .000$) and yielded an R square of .41 (see Table 4.32). This indicated that 41% of variance in overall reported strategy use for English reading could be explained by a linear combination of the six personal variables together.

Table 4.32

Model Summary for Multiple Regression Analysis of Overall Reported Strategy Use on All Six Personal Variables for English Reading

R	R Square	Adjusted R Square	Std. Error of the Estimate
.64	.41	.40	.67

Table 4.33 provides the results regarding unstandardized regression coefficients (B), the standard error of unstandardized regression coefficients ($SE\ B$), and standardized regression coefficients (β) for each personal variable. Similar to RQ 5, standardized regression coefficients (β) were used to compare the relative importance of the predictor variables to the criterion variable because the predictor variables were measured using different scales. The first two significant predictors of overall reported strategy use for English reading were students' rating of effectiveness of strategy use for English reading (.30), which explained 7% of the total variance while controlling for other variables, and students' self-rated English reading achievement (.27), which explained 6% of the total variance while controlling for other variables. The pattern was similar to that for Chinese reading. However, different from Chinese reading, enjoyment of reading in English (.22), which explained 4% of the total variance while controlling for other variables, was shown as the third significant predictor. The last significant predictor was the amount of daily reading time in any language (.13), which explained 1% of the total variance while controlling for other variables. Because the coefficients of these four predictors were positive, increasing the value in each predictor would result in increasing value in overall reported strategy use for English reading. In other words, students who recognized the usefulness of reading strategies, viewed themselves as good readers, enjoyed reading in English, and spent more time on reading were likely to use strategies more frequently for English reading. The rest of the variables (i.e., gender and the enjoyment of reading in general) did not provide a significant unique contribution to predict overall reported strategy use for English reading.

Table 4.33

Regression Coefficients of Six Personal Variables in Predicting Overall Reported
Strategy Use for English Reading

Predictors	<i>B</i>	<i>SE B</i>	β
Constant	.98	.15	
Gender	.06	.08	.04
Enjoyment of reading in general	.11	.07	.09
Enjoyment of reading in English	.30**	.07	.22**
Amount of daily reading time in any language	.001*	.0004	.13*
Students' self-rated English reading achievement	.34**	.06	.27**
Students' rating of effectiveness of strategies for English reading	.31**	.05	.30**

* $p < .05$. ** $p < .01$.

Summary

This chapter presented all quantitative results for RQ 1 through RQ6. In RQ 1, seven underlying factors for the English version of the *Task-Based RSI* were identified: Factor One, *metacognitive strategies*; Factor Two, *grammatical/morphological strategies*; Factor Three, *skipping strategies*; Factor Four, *translation strategies*; Factor Five, *support strategies*; Factor Six, *problem-solving strategies*; and Factor Seven, *purpose-emphasizing strategies*. Table 4.34 presents a summary of the underlying factors of the *Task-Based RSI*. The table includes the name of each factor, the description of each factor and the number of items in each factor.

Table 4.34

Summary of the Underlying Factor Structure of the *Task-Based RSI*

Factor extracted	Name of factors	Description	Number of items
Factor One	Metacognitive Strategies	A set of reading strategies used to plan, organize, evaluate, and monitor what will be or is read.	20
Factor Two	Grammatical /Morphological Strategies	A set of reading strategies involving the use of linguistic knowledge to decompose words, analyze sentence structures, and use grammatical rules to process linguistic elements in a text.	5
Factor Three	Skipping Strategies	Two reading strategies involving skipping unknown parts of the text.	2
Factor Four	Translation Strategies	A set of strategies entailing a cross-language mode of information processing.	3
Factor Five	Support Strategies	A set of strategies characterized by use of some practical actions or outside resources to assist in comprehending the text.	4
Factor Six	Problem-Solving Strategies	A set of localized, focused techniques invoked when a text is difficult or when other problems occur.	9
Factor Seven	Purpose-Emphasizing Strategies	Two strategies oriented to reading for a broad purpose or a specific purpose.	2

RQ 2, RQ 3, and RQ 4 examined the relationships between reading achievement status and (a) overall reported strategy use and (b) reported use of strategy in the seven strategy categories. (The seven strategy categories were identified by the principal components analysis in RQ 1.) High-reading-achieving students, compared to the average- and low-reading-achieving students, showed the highest mean frequency of overall reported strategy use in both Chinese reading and English reading. High- and average-reading-achieving students did not show significant differences in the mean frequency of overall reported strategy use between Chinese reading and English reading, but low-reading-achieving students demonstrated a higher mean frequency of overall reported strategy use for Chinese than for English. For reported strategy use within all the strategy categories, there were significant main effects for either reading achievement status or language of the text, or both. Reported strategy use within four strategy categories (all categories except skipping strategies and purpose-emphasizing strategies) indicated significant interaction effects. Students with high reading achievement, compared to the average-reading-achieving students and the low-reading-achieving students, showed the highest frequency of reported translation strategy use. Table 4.35 summarizes the results.

Table 4.35

Summary of Comparisons of Mean Frequency of Overall Reported Strategy Use and Reported Strategy Use in Each Strategy Category by Reading Achievement Status and by Language of the Text

Strategy Categories	Main Effects		Interaction Effects				
	Reading Achievement Status	Language of the Text	Simple Effect of Reading Achievement Status		Simple Effect of Language of the Text		
			Chinese	English	High Reading Achievement status	Average Reading Achievement status	Low Reading Achievement status
Overall	H > A > L	C > E	H > A H > L	H > A > L	C = E	C = E	C > E
Metacognitive Strategies	H > A > L	C > E	H > A H > L	H > A > L	C = E	C = E	C > E
Problem-Solving Strategies	H > A > L	C > E	H > A H > L	H > A > L	C = E	C = E	C > E
Grammatical /Morphological Strategies	H > A H > L	C = E	H = A = L	H > A > L	C < E	C = E	C > E
Support Strategies	H > A H > L	C = E	H > A	H > A H > L	C = E	C = E	C > E
Skipping Strategies	H = A = L	C < E	—	—	—	—	—
Purpose-Emphasizing Strategies	H > L	C > E	—	—	—	—	—
Translation Strategies	H > A > L	—	—	—	—	—	—

Note. H = high-reading-achieving students; A = average-reading-achieving students; L = low-reading-achieving students;

C = Chinese reading; E = English reading.

The last part of the quantitative analysis examined how well the six personal variables predicted the overall reported strategy use in Chinese and English reading (RQ 5 and RQ 6). Among the six personal variables, students' rating of effectiveness of reading strategies, students' self-rated reading achievement, and the amount of daily reading in any language were three significant predictors of overall reported strategy use for both Chinese reading and English reading. An additional variable, enjoyment of reading in English, significantly predicted the overall reported strategy use only for English reading. Only gender and enjoyment of reading in general were not significant predictors of overall reported strategy use for either language (see Table 4.36).

Table 4.36

Summary of Multiple Regression Analysis: Regression Coefficients of Six Personal Variables in Predicting Overall Reported Strategy Use for Chinese Reading and English Reading

	Overall Reported Strategy Use for Chinese Reading	Overall Reported Strategy Use for English Reading
Gender	-.05	.04
Enjoyment of reading in general	.11	.09
Enjoyment of reading in Chinese/English	-.01	.22**
Amount of daily reading time in any language	.15*	.13*
Students' self-rated Chinese/English reading achievement	.22**	.27**
Students' rating of effectiveness of strategies for Chinese reading/English reading	.29**	.30**

Note. The values in the table are standardized coefficients (Beta weights).

* $p < .05$. ** $p < .01$.

Chapter 5: Qualitative Results

Introduction

This chapter presents the qualitative results based on think-aloud protocols and semi-structured interviews conducted with six eighth-grade participants. Three were selected to represent high-reading-achieving students and three were chosen to represent low-reading-achieving students. Reading achievement status was based on school-made, standardized reading assessment scores. The qualitative results provide deeper information about how students functioned during the study's reading tasks. Additionally, these results open up greater understanding of participants' perceptions, attitudes and opinions reading tasks, reading processes, and reading strategies. The emic perspectives (the participants' own views) can be heard in these results. Throughout this chapter, think-aloud and interview excerpts are presented and their English translations are provided to answer RQ 7 through RQ 9.

This chapter first presents a brief tabular summary of the six students' information from the *Background Questionnaire* and reading achievement scores provided by the schools (i.e., age, gender, enjoyment of reading in Chinese and in English, and reading achievement scores). Next, the Chapter presents a narrative description of each student based on the *Background Questionnaire* and the semi-structured interviews. Significant themes emerging constant comparisons of verbatim transcriptions are presented for RQ 7 through RQ 9.

Tabular Description of the Six Participants

Table 5.1 provides description of the six students using information from the *Background Questionnaire* and reading achievement scores provided by the schools. The names of each student provided here are pseudonyms. All six reported that they enjoyed reading in Chinese, and four (three high-reading-achieving and one low-reading-achieving) even stated that they enjoyed reading in Chinese very much. However, only two students (both high- reading-achieving) said that they enjoyed reading in English, and the other four reported that they did not enjoy reading in English.

Table 5.1

Descriptions of Six Eighth-Grade Students Selected for Participation in Think-Alouds and Semi-Structured Interviews

Student (pseudonyms)	Age	Gender	Years of Studying English	Enjoyment of Reading in Chinese	Enjoyment of Reading in English	Chinese Reading Achievement Scores (school-made)	English Reading Achievement Scores (school-made)
<u>High-achieving readers</u>							
Fu-Tin	13	Female	3	Yes (very much)	Yes	99%	100%
Ching-Wu	14	Female	3	Yes (very much)	Yes	97%	95%
Yi-Chen	14	Female	5	Yes (very much)	No	90%	96%
<u>Low-achieving readers</u>							
Lin-Hung	14	Male	5	Yes	No	45%	30%
Wei-Ming	14	Male	3	Yes	No	55%	50%
Shen-Fang	14	Male	5	Yes (very much)	No	21%	9%

Narrative Description of the Six Participants

This section describes each of the six students normatively. Information came from the *Background Questionnaire*, reading achievement scores, and the semi-structured interviews.

Fu-Tin, a High-Achieving Reader

Fu-Tin was chosen to represent high-reading-achieving students, based on the scores of the school-made, standardized Chinese reading assessment (99%) and English reading assessment (100%). She first studied English in a private institute in the second grade but only for several months. In the fifth grade, English was officially introduced as one of the subjects in the school curriculum. From that time until the time of the interview, Fu-Tin had studied English for three years. In addition to the English class offered in the school, she also received additional English instruction in a private institute. According to her responses on the *Background Questionnaire*, she enjoyed learning English very much and enjoyed reading in both Chinese and English. Several motivations for learning English included her interest in the English language, the many forms of entertainment available in English, and her aspiration to interact with foreigners. Clearly, instrumental motivations were getting good grades on tests and using English in future jobs. She rated herself as an excellent Chinese reader and as a good English reader. When asked in the interview how she developed her reading skills, she replied, “For Chinese reading, I read a lot of extracurricular books and for English, I *crazily* memorize the vocabulary.” She explained that because English was not her first language, she had to work hard on learning English, especially on learning English vocabulary.

Ching-Wu, a High-Achieving Reader

Ching-Wu was another high-reading-achieving student according to the scores on the school-made, standardized Chinese reading assessment (97%) and English reading assessment (95%). She had been studying English for three years since the fifth grade. Like Fu-Tin, she also went to a private institute for additional English instruction. She served as a teaching assistant²⁵ in her English class, and her responsibility was to help the English teacher with administrative work, such as distributing materials and collecting homework, and to provide academic assistance for her classmates. Even though according to her teaching assistantship, she performed outstandingly in learning English, she reported in the *Background Questionnaire* that she did not like to learn the English language. She indicated in the interview that her only motivation to study English was to cope with English tests. However, she reported enjoying reading in either Chinese or English. In the interview she stated, “Being able to read in English makes me have a sense of fulfillment.” Although she was selected as a teaching assistant by her English teacher, she rated herself as only a poor English reader and only a fair Chinese reader. The great paradox was that she enjoyed Chinese reading and English reading, had high scores in each, and did well in learning English, but she did not enjoy learning English and felt she was not a good reader in either language.

Yi-Chen, a High-Achieving Reader

Yi-Chen was another high-achieving reader according to the scores on the school-made, standardized Chinese reading assessment (90%) and English reading

²⁵ In Taiwan middle schools, teachers usually select some students who are outstanding in major subject areas such as Math, English, and Science as teaching assistants. Those teaching assistants are often called, “*little teacher*” in Chinese.

assessment (96%). She reported that she had been learning English for five years. Last year because of her father's job, she went to the United States and had been in an ESOL class in a public middle school for one year. She transferred back to a middle school in Taiwan this year. Like Fu-Tin and Ching-Wu, she also went to a private institute for more tutoring in English. In the *Background Questionnaire*, she reported that she did not enjoy reading in English unless topics interested her; however, she enjoyed reading in Chinese very much. In the interview, she indicated that she liked to read very much because she could obtain interesting information through reading. She also said that being able to read in English had many advantages. "I can read descriptions about merchandise, and I can learn more knowledge on the Internet," stated Yi-Chen. She further explained that more information was written in English than in Chinese. Overall, she rated herself as an excellent Chinese reader and as a good English reader.

Lin-Hung, a Low-Achieving Reader

Lin-Hung was chosen to represent low-achieving readers based on the scores of the school-made, standardized Chinese reading assessment (45%) and English reading assessment (30%). He reported that he had been studying English for five years. In the *Background Questionnaire*, he indicated that he did not enjoy learning the English language or read in English at all. However, he liked reading in Chinese. The only reason that he studied English was for tests. He stated that reading in English was very difficult for him in terms of vocabulary, grammar, and content. In the interview, he said that reading English articles took him a lot of time because he had to look up the unknown vocabulary in the dictionary. Therefore, he gradually lost the motivation to read English texts. He rated himself as a good Chinese reader but as a poor English reader.

Wei-Ming, a Low-Achieving Reader

Wei-Ming was another low-achieving reader according to the scores on the school-made, standardized Chinese reading assessment (55%) and English reading assessment (50%). He reported that he had been studying English for three years and also went to a private institute for additional English education. Like Lin-Hung, he reported that he did not enjoy studying the English language or reading in English. However, he indicated that he enjoyed reading in Chinese. Unlike the other two low-reading-achieving students, he performed like a fluent reader in the English think-aloud task; he was able to pronounce the words accurately and quickly. However, he had no idea about what he had just read. “I can pronounce the words but I don’t understand them,” Wei-Ming commented in the interview. He rated himself as a good Chinese reader but only a fair English reader.

Shen-Fang, a Low-Achieving Reader

Shen-Fang was another low-reading-achieving reader based on the scores of the school-made, standardized Chinese reading assessment (21%) and English reading assessment (9%). He reported that he had been learning English for five years. He stated that he received additional English tutoring in a private institute. Similar to Lin-Hung and Wei-Ming, Shen-Fang also stated that he did not enjoy studying English or reading in English. However, he enjoyed reading Chinese texts very much. In the interview he said, “English is extremely difficult for me.” When asked which parts of English made him feel the language was difficult, he responded, “Everything. Vocabulary, grammatical rules, or phrases are all difficult.” He perceived himself as a fair Chinese reader and as a poor English reader.

Part D: Strategy-Use Differences between Three High-Reading-Achieving Students and Three Low-Reading-Achieving Students

The narrative descriptions of each of the six students have just been presented. This section (covering RQ 7 through RQ 9) offers the results of the Chinese and English think-aloud tasks and the six students' responses to the semi-structured interview.

RQ 7: Which reading strategies are reported using by three of the high-reading-achieving Taiwanese students and three of the low-reading-achieving Taiwanese students in Chinese reading, according to think-aloud reading protocols and semi-structured interviews?

This research question was answered based on think-aloud and interview results. Through careful analysis, involving comparisons and contrasts of the reading strategies of the six readers, notable patterns of reported strategy use for high-achieving and low-achieving readers were discovered. These are presented below.

High-reading-achieving students. The three high-reading-achieving students, Fu-Tin, Ching-Wu and Yi-Chen, used various metacognitive and cognitive strategies to help them derive meaning from the content. Before reading, they looked at the title and pictures and tried to predict the content. Before reading or during reading, they activated the prior knowledge relevant to the text. For example, when Yi Chen read about Newtonian mechanics in the Chinese text, she connected this topic to the laws of physics and relevant formulas that were just taught in physics and chemistry classes. She also said, "I know Newton contributed greatly to the knowledge of physics and chemistry, but I didn't know that his theories also influenced cosmology." When Ching-Wu read about Nicolaus Copernicus in Chinese, she thought of an article about Nicolaus Copernicus,

and his picture also emerged in her mind.

While reading, all of three constantly and carefully monitored their comprehension by stopping reading to think about comprehension breakdowns, by asking themselves questions, and by verifying their guesses. For example, during the think-aloud task, Fu-Tin repeated several times, “All of the planets are moving away from Earth.” When asked, “What are you thinking right now?,” she responded, “I am wondering why they are moving away.” Then she highlighted the sentence. When Yi-Chen read the same passage describing how the planets move away from Earth and also away from each other, she then asked, “So is space itself expanding?” Right after she posed this question, she read that Hubble hypothesized that the universe might be expanding, and she said, “Yes! I am right. I am so smart.”

Ching-Wu illustrated the monitoring process. She first monitored her understanding when encountering a confusing part in a Chinese text, and then she repeatedly asked herself questions to clarify her thoughts.

Ching-Wu: 哥白尼和阿里斯塔克斯是同樣觀點喔？他[哥白尼]是堅持行星繞著地球還是地球繞著行星？喔！不是吧！應該全部都繞著太陽吧？
(Does Copernicus hold the same view as Aristarchus? Did he [Copernicus] insist that the planets orbit around the Earth or the Earth orbits around the planets? Oh, No! All planets should orbit around the Sun²⁶.)

²⁶ Texts in parenthesis are the English translations of the quotes from the think-alouds and interviews.

Then she read a paragraph describing how Galileo used a telescope to observe the motion of planets in further support of the Copernican theory. Finally she verified her answers, “Yes. I am right. All planets orbit around the Sun.”

The three high-achieving readers reported using cognitive strategies, such as making inferences, connecting between parts of the text, and providing personal opinions of the text, in order to promote understanding of the content. For example, when Ching-Wu read a sentence stating that Newton’s three universal laws of motion had stood for 230 years, she paid attention to particular words and tried to make an inference.

Ching-Wu: 他說這些定律保持了兩百三十年之久。是後來被推翻的嗎？我覺得他[作者]好像是這個意思。好像就是，後來一定有人提出更好的理論。

(It said that these laws *had stood* for 230 years.

Would the laws be replaced later? I think he [the author] might mean so. I think so. I think that there must be someone who proposed a better theory.)

Later, when she read that Einstein’s general theory of relativity replaced Newton’s three laws of motion, Ching-Wu confirmed her inference and said, “Yes. Einstein’s general theory did replace Newton’s laws.”

The three high-reading-achieving students often connected parts of the text to clarify the meaning. After reading a paragraph about Galileo, they all connected this with the paragraph about Copernicus because Galileo’s and Copernicus’ theories at that time were suppressed by the Roman Catholic Church. Yi-Chen further commented, “Why did the Roman Catholic Church keep suppressing their theories? The Church could just have

treated them as reference.”

During reading, they marked the important parts as well. Fu-Tin used markers to highlight those parts; Yi-Chen and Ching-Wu circled them. All of them usually underlined parts of a sentence rather than a whole sentence or a whole paragraph. The parts that were underlined by the three high-achieving readers were often key words (e.g., *the first person* who proposed an idea) and topic-related concepts (e.g., three important laws of motion).

When they encountered difficult parts in the Chinese think-aloud task, the high-achieving readers often reread a few key words or a whole sentence. After rereading, if they still could not understand, they marked the difficult part and decided to continue reading. In interviews, when asked what they did after they reread but still could not comprehend something in a Chinese text, all three of the high-reading-achieving students said that they continued reading to see whether the following paragraphs helped solve the comprehension breakdown. If they still could not understand, they would go to ask other people such as their parents. Only Yi-Chen stated that she searched the Internet to see if there was some relevant information.

Figure 5.1 illustrates the strategies employed in common by the three high-reading-achieving students during the Chinese think-aloud task. Some strategies were reported using only in one part of the process (before, during, and after), while other strategies overlapped two phases of the process.

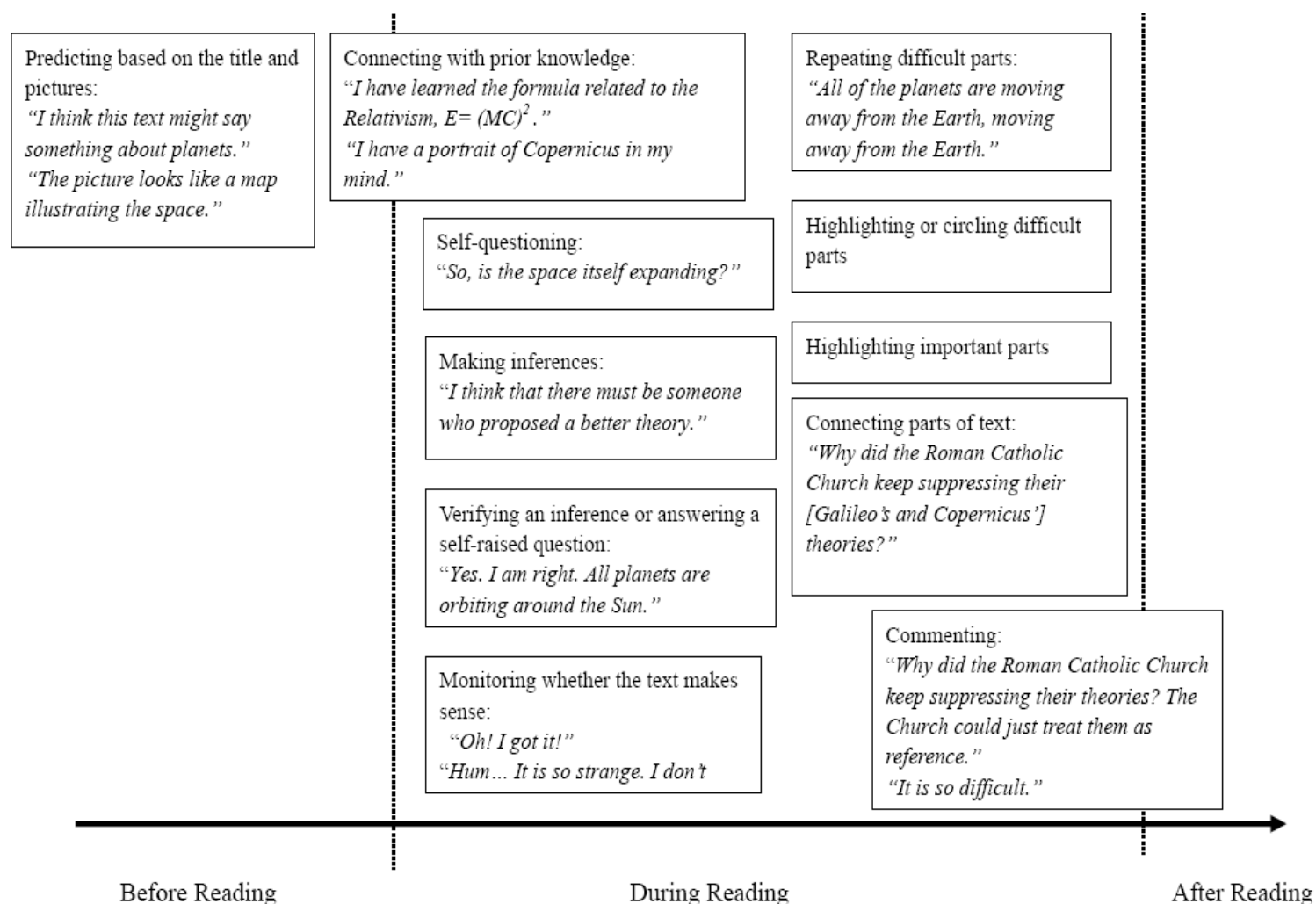


Figure 5.1 Illustration of Common Strategies Reported Using by the Three High-Reading-Achieving Students in the Chinese Think-Aloud Task.

Explanation: All three high-reading-achieving students reported using all the strategies above in the Chinese think-aloud task, and examples of their comments are shown. The strategy of connecting to prior knowledge is presented across the dotted line, indicating that this strategy was reported using in the before-reading stage and/or the during-reading stage. The strategy of commenting is presented across the dotted line, indicating that strategy was reported using in the during-reading stage and/or the after-reading stage. The strategies without comments were observed during the think-alouds, not mentioned by the students in the think-alouds.

Low-reading-achieving students. The three low-reading-achieving students, Lin-Hung, Wei-Ming and Shen-Fang, did not report using any appropriate metacognitive reading strategies in the Chinese think-aloud task. All three read almost from the beginning to the end without stopping. They seemed to rarely monitor their comprehension. When asked what they were thinking, they typically said, “I am not thinking of anything.”

Even though Lin-Hung and Shen-Fang seemed to detect comprehension breakdowns, they did not use any strategies to solve them except for the skipping strategies. For example, Lin-Hung commented, “I do not understand [the sentence]. I want to skip it.” He continued to read right after making that statement. He did not stop reading to think about the problem. Skipping reading problems, if used appropriately, would be a positive strategy because readers would not be trapped by some difficult parts of a text, resulting in losing the whole picture. However, over reliance on skipping strategies or using them even without trying to solve difficulties would be problematic, which was exemplified by the three low-achieving readers.

Although Shen-Fang occasionally tried to ask himself some questions during the reading, most of the questions were irrelevant to the text. For example, after reading a paragraph about Kepler’s assumption that the planets circled the Sun, he then asked, “What is inside the Sun?” After reading a paragraph about Copernicus’s heliocentrism, he then asked, “How do they know that the Earth is round?”

In interviews, when asked how they usually solved comprehension problems, all of the three low-achieving readers responded, “I always ask others,” such as parents, classmates and teachers. When asked what they would do if they did not have other

people to ask, Shen-Fang replied, “If I cannot understand the article, I just cannot get it by myself.” Lin-Hung and Wei-Ming said that they searched through the Internet to see if there was any relevant information, but they both stated that they rarely did that.

RQ 8: Which reading strategies are reported using by three high-reading-achieving Taiwanese students and three low-reading-achieving Taiwanese students in English reading, according to think-aloud reading protocols and semi-structured interviews?

The strategies reported by the three high-reading-achieving students and the three low-reading-achieving students for English reading are presented below. Significant themes emerging from the verbatim transcriptions of the think-alouds and the interviews are also explained.

High-reading-achieving students. The three high-reading-achieving students displayed similar patterns of reported strategy use when reading English. Before reading, they all first looked at the title and pictures and tried to predict the content. During reading, they stopped to think when having comprehension difficulties, reread difficult parts, and used context clues from surrounding sentences to figure out the meaning. In addition, they connected between different parts of the text and provided their own comments.

For these students, one major difference between Chinese and English reading was that Chinese reading difficulties were due to limited knowledge of the content, whereas English reading, comprehension breakdowns were almost always caused by limited knowledge of the language, especially vocabulary. It seemed that the primary purpose of English reading strategies for the three high-reading-achieving students was to overcome

linguistic obstacles, such as unknown vocabulary and phrases, and complex sentence structures. Vocabulary strategies not needed for Chinese reading were invoked during English reading. Such strategies were checking dictionaries, using L2 linguistic knowledge, and brainstorming L2 vocabulary to solve language problems in English reading.

Before Ching-Wu started to read the English text during the think-aloud, she quickly skimmed through the article and underlined the unknown vocabulary. Then she used the electronic dictionary to check the meanings of the English words she underlined and wrote down their Chinese translations besides the words on the text. Afterwards, she began reading for details.

Ching-Wu: 我現在先要把不知道意思的單字查出來。等一下
我會再重頭唸。

(Right now I am checking the meanings of unknown
vocabulary first. I will read it from the beginning
again later.)

Sometimes before checking the dictionary, she brainstormed the meanings of unknown words based on her L2 knowledge. For example, when she read the word *habitat*, she first connected it with the word *habit*, but she then discarded the association because she felt that the meaning of *habit* did not make sense in that context. To verify this, she then looked up the word *habitat* in the electronic English dictionary and stated that the meanings of *habit* and *habitat* were every different, even though they looked somewhat similar.

Like Ching-Wu, Fu-Tin attempted to guess the meanings of unknown words by

associating them with her L2 vocabulary knowledge before looking up those words. For example, during the English think-aloud, Fu-Tin associated the word *population* in the text with *popular*, which she learned earlier, and she connected *except* in the text with *expect*, a word she already learned. However, she still decided to check the meanings of those words in the electronic dictionary because she did not think the meanings that she guessed made sense. Fu-Tin and Ching-Wu consciously considered which definitions of a word presented in the dictionary were appropriate in the current textual context. For example, while looking up the word *grow* in the electronic dictionary, Ching-Wu looked through all the definitions and tried to select the most relevant, most appropriate definition.

Investigator: 你在看什麼?

(What are you looking at?)

Ching-Wu: 就是在想它應該要什麼意思才會比較正確，因為英文不是有很多意思嗎？而且每個意思就有不同的解釋。

(I am wondering which definition of the word is more accurate because English [words] have many meanings, don't they? And each definition results in a different interpretation.)

Unlike Fu-Tin and Ching-Wu, who tended to look up most of the unknown words, Yi-Chen was more inclined to use context clues from surrounding sentences to figure out the meaning of unknown vocabulary. For instance, when reading a sentence stating that the manatee looks like a huge potato with flippers and a tail, she used context clues to

guess the meaning of *flippers*.

Yi-Chen: 我不知道 *flippers* 是什麼意思，可是我大概猜的
出它是牠的魚鰭或是什麼之類的，因為我知道 *tail*
是指尾巴。

(I don't know what *flippers* mean but I can guess
that it might mean fin or something like that
because I know *tail* means something on the rear
part of its body.)

In interviews, when the three high-reading-achieving students were asked about what they usually did when encountering unknown vocabulary, Fu-Tin and Ching-Wu replied that they preferred to look up most of unknown words in the dictionary if time allowed, and this was observed in the think-aloud task. They also stated that they use pictures and context clues to guess the meanings of unknown vocabulary. In contrast, Yi-Chen stated, "I usually use context clues to figure out the meaning of unknown words and I use the dictionary occasionally." When Yi-Chen was asked why she looked up some words in the dictionary but not others, she stated that she only looked up the words that she felt were important. When asked how she determined which words were important, she replied,

Yi-Chen: 如果不知道那意思就會整句話或整段都不知
道，通常會去查它。如果我大概猜的出來，我就
不會去查，因為我就算去掉它，我也知道這句話
的意思是什麼。

(If I don't know the meaning of that word and it

would result in losing the whole picture of that sentence or even that paragraph, I will look it up in the dictionary. If I can guess its meaning, then I won't look up the word because I can understand the meaning of the sentence even when I ignore it.)

When both the traditional dictionary and the electronic dictionary were offered in the think-aloud task, the three high-reading-achieving students and two of the three low-reading-achieving students chose to use the electronic dictionary. When asked why they preferred to use the electronic dictionary rather than the traditional dictionary, they all replied that using the electronic dictionary saved time, was convenient and was easy to use.

When encountering long English sentences with complex sentence structures, the high-achieving readers used translation strategies to comprehend the sentences. These students did not translate word-for-word but only translated the general meaning. Also, they restated the translation in a way that made more sense in Chinese.

Yi-Chen: Manatees are shy about being watched, so they'll

swim out to deeper, colder waters, where it is harder to live. 因為他們很害羞，所以都會游進那個更深更冷的水。可是這種地方卻不適合海牛生存。

(Because they are very shy, so [they] swim into deeper and colder water. But that place is not as suitable for the manatees to live.)

In Chinese usage, *because* and *so* are used in a sentence to describe causal relationships of events. Therefore, Yi-Chen inserted the word *because*, when translating the sentence above into Chinese. Relative clauses are absent in Chinese sentence structure, so Yi-Chen translated the relative clause *where it is harder to live* into a separate sentence.

In interviews, when asked whether they translated every English word into Chinese, the three high-achieving readers' responses supported the findings observed in the think-aloud. They clearly indicated that they did not translate word-for-word unless they could not understand the sentence.

Ching-Wu: 如果一句話太多不懂，我才要一個字一個字去把它翻出來。如果都懂的話，唸過去就懂啦。

(If I cannot understand most of parts of a sentence, I need to translate word by word. If I can understand it, I just can get it after I read it.)

Like Ching-Wu, Fu-Tin and Yi-Chen said that if they could understand, they would not even translate at all. Fu-Tin stated, "If I can understand the sentence, I already know the meaning. Therefore, there is no need to translate consciously." They all stated that they consciously translated some English words into Chinese when a sentence was too difficult to understand.

The pattern of reported strategy use associated with the English think-aloud task for the high-achieving readers is illustrated in Figure 5.2. Except the strategy of commenting, all other strategies were reported using only in one part of the process (before, during, or after).

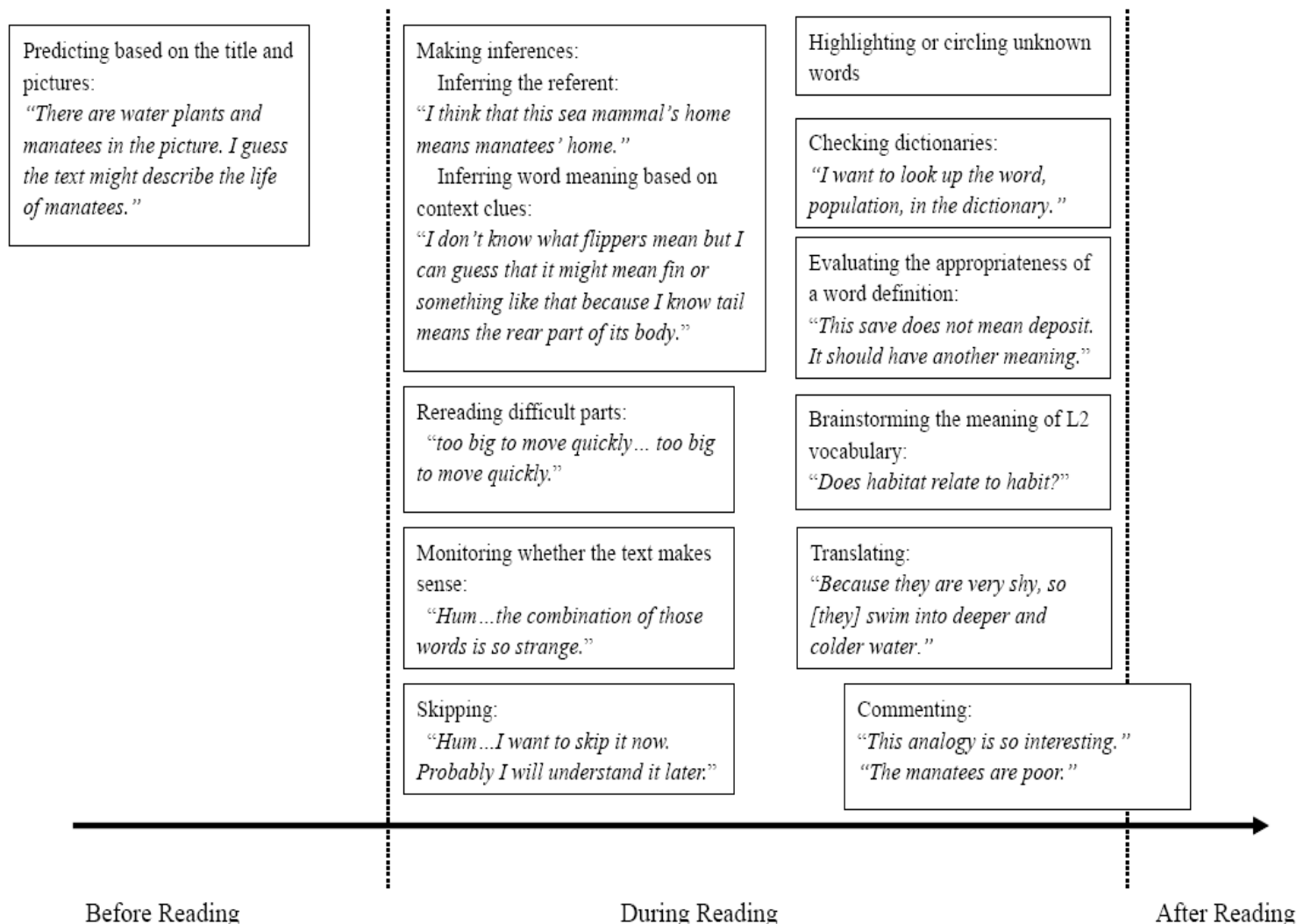


Figure 5.2. Illustration of Common Strategies Reported Using by the Three High-Achieving Readers in the English Think-Aloud Task.

Explanation: All three high-reading-achieving students reported using all the strategies above. Examples of their comments are shown. The strategy of commenting is presented across the dotted line, indicating that strategy was reported using in the during-reading stage and/or the after-reading stage. The strategy of highlighting or circling unknown words, which is presented without a comment, was observed by me in the think alouds, but not mentioned by the students in the think-alouds.

Low-reading-achieving students. The few cognitive strategies reported using by the three low-achieving readers while reading the Chinese text were almost absent while they were reading the English text. The three low-reading-achieving students, Lin-Hung, Wei-Ming and Shen-Fang, relied heavily on the guessing strategy but in very restricted and unimaginative ways. They tried to guess what the topic was about mainly by looking at the picture. They also tried to look for the few words that they could understand throughout the text in order to guess the content. Unfortunately, their vocabulary knowledge was so limited that they guessed a totally different and incorrect meaning from the text.

Lin-Hung and Shen-Fang attempted to use the electronic dictionary to look up unknown words. However, Lin-Hung was unable to determine which definition of a word was appropriate for a specific textual context and always wrote down the first definition presented in the dictionary. Moreover, Shen-Fang even tried to enter a whole sentence to the electronic dictionary in order to derive the Chinese translation of the sentence. After he realized that this method did not work, he just gave up and attempted to guess the content based on pictures and the few words that he understood. Among all six readers, Wei-Ming was the only one who did not use the electronic dictionary at all. While he was doing the English think-aloud task, I was surprised. He read the text very easily and pronounced the words accurately almost from the beginning to the end in English without stopping. However, when asked what the text was about, he said that he had no idea at all. He stated that he just knew how to pronounce the words but did not understand what they meant.

RQ 9: How do three of the high-reading-achieving Taiwanese students and three of the low-reading-achieving Taiwanese students describe their views on Chinese and English reading tasks, reading processes, and reading strategies, according to the semi-structured interviews?

The question is aimed at investigating views and attitudes of the L2 readers toward the nature of reading tasks, reading processes and reading strategies. The results provided emic perspectives of L2 readers.

Reading task. During the interviews, when asked about what made Chinese reading and English reading difficult, the three high-reading-achieving students and the three low-reading-achieving students responded that for Chinese reading, usually the content was difficult because they had not encountered it before. However, they felt that for English reading, the language itself made the text hard to understand. All six students clearly stated that limited knowledge of English vocabulary was the main problem, and they thought that if they could know vocabulary meanings, there would be no problem comprehending English text. Two students' perspectives are exemplified below. Lin-Hung is a low-reading-achieving student, and Fu-Tin is a high-reading-achieving student.

Lin-Hung: 我覺得這篇中文文章很難，因為我完全對這個內容沒有概念。英文的話，我覺得難在我都不懂它在講什麼。因為懂的單字很少，所以都看不懂。
(I feel a Chinese article is difficult because I don't have any idea about the content. For English, the difficult part is that I totally cannot understand what

it means. Because I know too few English words, I cannot comprehend it.)

Fu-Tin: 中文大都是因為內容難，從來沒有聽過那些知識。
英文就是單字難，自己認識的單字不多。

([The reading difficulties] during Chinese reading are usually due to content and knowledge I have never learned. My difficulties in English reading are usually due to vocabulary, my limited vocabulary knowledge.)

Reading process. Three high-reading-achieving students contended that they generally applied a similar, preferred strategy to both Chinese reading and English reading. Ching-Wu stated that she usually first skimmed through an article and then read for details.

Investigator: 請描述一下的英文閱讀過程。

(Please describe your typical English reading process.)

Ching-Wu: 就先快速的看過一遍，然後再每一段在講什麼。
一段一段快速的看過。然後查完單字再仔細的看每一段。

([I] first skim through the text and get the main idea of each paragraph. Skim through each paragraph. After looking up the vocabulary, I will

carefully read each paragraph again.)

Investigator: 你中文閱讀過程也一樣嗎?

(Do you approach the Chinese texts in the same way?)

Ching-Wu: 對呀!讀中文就快速看過,在仔細看一段一段,但是不用查單字。

(Yes! When reading Chinese, [I] skim through the text first and then read each paragraph carefully.

However, I do not need to look up vocabulary.)

High-achieving readers, Fu-Tin and Yi-Chen, declared that their reading processes for Chinese reading and English reading were similar. They said that they tried to use various techniques to comprehend a text in either Chinese or English, but reading in English took more time because of unknown vocabulary.

However, all three low-achieving readers thought that Chinese and English reading processes were different. They explained that they could understand Chinese texts but they could not understand English texts at all. However, when asked whether they still think Chinese and English reading processes would be different if they could master the English language as well as the Chinese language, Lin-Hung and Wei-Ming commented that if the English language problems were solved, the reading process should be similar.

Reading strategies. In the interviews, when each of the participants was asked how he or she usually solved Chinese reading difficulties and English reading problems, the three high-achieving readers mentioned many reading strategies that they usually utilized to solve reading problems. For Chinese reading, common strategies were reading slowly,

reading difficult parts repeatedly, using context clues, and asking more knowledgeable others. For English reading, in addition to the strategies just mentioned, the three high-achieving readers cited using the dictionary, guessing the meaning of unknown words from pictures or context, sounding words out as supplementary techniques to solve vocabulary problems. The self-regulated, strategic reading process described by the high-reading-achieving students was almost observed during the think-aloud tasks for each language. In contrast, the first solution that three low-reading-achieving students identified for both Chinese reading and for English reading was to ask others. Asked if there were other strategies that they usually used when there was no one to ask, Lin-Hung and Wei-Ming replied that they would search for relevant information on the Internet for Chinese reading. For English reading, in addition to asking others, only Lin-Hung said that he sometimes checked the dictionary. Wei-Ming and Shen-Fang replied that they did not use the dictionary because they were unwilling and also unable to do so.

Translation and transferring information are two important strategies unique to the L2 reading context. All three high-achieving readers and all three low-achieving readers indicated that they translated English words to Chinese to help them better understand the meaning especially when they encountered reading difficulties.²⁷ They all mentioned that they connected the information that was read in a Chinese text when reading an English text with a similar topic, but the three low-achieving readers said that this happened rarely. Yi-Chen, a high-reading-achieving student, described one of her experiences about transferring the knowledge from L1 to L2.

²⁷ As shown in the think-aloud, the three more successful readers did not translate word-for-word when having reading difficulties in the English text. They only translated the general meaning and restated the translation in a way that made sense in Chinese. In contrast, the three less successful readers translated the few words that they understood in order to guess the meaning from the English text.

Yi-Chen: 我之前上課時讀了一篇乞丐王子的英文文章，因為之前就看過它的中文故事書，所以大概就知道那篇文章在講什麼。

(In the previous class, I had to read an English article, *The Prince and The Pauper*. Because I had read the same story in Chinese, I knew nearly everything about the [English] article.)

The three high-reading-achieving students agreed that reading strategies and knowledge of the L1 helped them read in the L2, their weaker language. The three high-achieving readers also recognized the possibility of involving relevant L2 knowledge while reading a similar topic in L1. Yi-Chen clearly indicated, “Knowledge is mutual, and the only difference is language.”

Summary

Qualitative results provided relatively consistent findings, i.e., the three high-reading-achieving students reported using a range of reading strategies to make meaning from both of the Chinese and English texts, while the three low-reading-achieving students reported using only a few cognitive strategies for understanding the meaning at the word level. The majority of reading strategies reported by the three high-reading-achieving students were identified in both Chinese reading and English reading. However, the few strategies reported by the low-reading-achieving students during Chinese reading were almost absent when they read an English text. Different from strategies for Chinese reading, additional strategies such as checking the electronic dictionary and translation were employed only in reading in English by the

high- and low-achieving readers. Even though the high-reading-achieving students and the low-reading-achieving students seemed to execute similar vocabulary strategies for English reading, *how* those strategies were reported using differed. In the interviews, all six readers recognized the possibility of transferring reading strategies and knowledge across languages, but limited English proficiency seemed to disable the low-achieving readers from applying their few Chinese reading strategies to English reading.

The possible reasons behind the observed patterns of reported strategy use are discussed in the next chapter. In addition, major findings and implications for research and for practice are also presented.

Chapter 6: Discussion of Findings and Implications for Research and

Instruction

Introduction

In this final chapter, major findings synthesized from the quantitative results (Chapter 4) and the qualitative results (Chapter 5) are discussed. In the beginning of this chapter, a brief review of the quantitative and qualitative results is presented. Next, based on the results analyzed from the *Task-Based RSI*, the *Background Questionnaire*, the think-aloud protocols, and semi-structured interviews, major findings are discussed concerning four aspects: (a) reported strategy use in relation to reading achievement status, (b) reported strategy use in relation to reading achievement status in L1/L2 reading, (c) cross-language transfer of reading strategies, and (d) influence of personal variables on reported strategy use. Finally, the implications for future research and instruction are suggested.

Review of the Quantitative and Qualitative Results

This section briefly reviews quantitative and qualitative results. Quantitative results are summarized in Part A (RQ 1), Part B (RQ 2 through RQ 4) and Part C (RQ 5 and RQ 6). Qualitative results are presented in Part D (RQ 7 through RQ 9).

Results about Exploring Underlying Factors in the Task-Based RSI (Part A Quantitative)

A principal components analysis with an oblique rotation was used to explore the English version of the *Task-Based RSI*. Seven factors were identified. Factor One (metacognitive) includes 20 items which represent a set of reading strategies used to plan (e.g., considering what type of text it is), organize (e.g., going back and forth to find relationships), evaluate (e.g., checking the correctness of a guess) and monitor (e.g.,

asking oneself questions). Factor Two (grammatical/morphological) contains five strategies which involve the use of linguistic knowledge to process linguistic elements (e.g., word, pronoun referents, and sentence structures) in a text. Factor Three (skipping) includes two items that involve skipping unknown parts of a text. Factor Four (translation) involves three items that entail a cross-language mode of processing information. Factor Five (support) is characterized by four strategies which involve the use of practical actions or outside resources to enhance comprehension. Factor Six (problem-solving) includes nine localized, focused strategies which are invoked when a text is hard or comprehension breakdown occurs. Factor Seven (purpose-emphasizing) contains two strategies oriented to reading for a broad purpose or a specific purpose.

By using the principal components analysis, strategy items in the *Task-Based RSI* were reduced to the seven strategy categories (factors) that are more coherent conceptually. These seven strategy categories allowed an elaborative investigation about the relationship between reported strategy use and reading achievement status, which was a primary purpose of the study.

Results about Relationships between Reading Achievement Status and Reported Strategy Use across Languages (Part B Quantitative)

Within Chinese reading, high-reading-achieving students reported the highest mean frequencies in overall reported strategy use and reported strategy use in four strategy categories (i.e., metacognitive, problem-solving, support, and purpose-emphasizing). The students did not show significant differences in reported grammatical/morphological strategy use and reported skipping strategy use for Chinese reading.

Within English reading, mean differences were significant by reading achievement

status in overall reported strategy use and in reported strategy use of all strategy categories except for the skipping strategies. More specifically, high-reading-achieving students reported the highest mean frequencies and low-reading-achieving students showed the lowest mean frequencies. The mean frequencies for average-reading-achieving students were in the middle, but sometimes the mean frequencies were not significantly different from those of high- and low-reading-achieving students. All of the students did not show a significant difference in the mean frequency of reported skipping strategy use in English reading.

In terms of reported strategy use between Chinese reading and English reading, high- and average-reading achieving students showed no differences in the mean frequency of the overall reported strategy use between languages, but low-reading-achieving students reported a higher mean frequency of overall reported strategy use for Chinese reading than for English reading. Within each strategy category, all of the students showed a similar pattern in reported skipping strategy use and reported purpose-emphasizing strategy use. They all reported using more skipping strategies for English reading, but they showed using more purpose-emphasizing strategies for Chinese reading. In the other four strategy categories (i.e., metacognitive, grammatical/morphological, support, and problem-solving) except for grammatical/morphological strategies, high-reading-achieving students did not show significant differences between languages. However, they reported using more grammatical/morphological strategies for English reading than for Chinese reading. Average-reading-achieving students did not report significant strategy-use differences between languages in all four categories. In contrast, low-reading-achieving students

constantly reported using fewer strategies for English reading than for Chinese reading.

Results about Prediction of Overall Reported Strategy Use (Part C Quantitative)

For the six personal variables (i.e., gender, enjoyment of reading in general, enjoyment of reading in Chinese/English, amount of daily reading time, students' self-rated Chinese/English reading achievement, and students' rating of effectiveness of reading strategies for Chinese reading/English reading), three significant predictors of overall reported strategy use for both Chinese reading and English reading were (a) students' rating of effectiveness of reading strategies, (b) students' self-rated reading achievement, and (c) the amount of daily reading in any language. An additional significant predictor of overall strategy for English reading was enjoyment of reading in English. Gender and enjoyment of reading in general did not provide unique contributions for predicting the overall reported strategy use for both languages.

Results about Strategy-Use Differences between Three High-Reading-Achieving Students and Three Low-Reading-Achieving Students (Part D Qualitative)

The three high-achieving readers employed varied reading strategies to help comprehend Chinese reading and English reading. The strategies included predicting, rereading difficult parts, making inferences, and monitoring. In contrast, the three low-achieving readers reported using only a few cognitive strategies. Even though they sometimes detected comprehension breakdowns, they gave up quickly, and did not try to overcome reading difficulties. More dismally, the few strategies reported using by the low-reading-achieving students during Chinese reading were almost absent when reading in English.

The high- and low-achieving readers reported using additional strategies during

English reading, such as checking the electronic dictionary and translation, but how these strategies were reported using differed. In the interviews, all six readers recognized the possibility of transfer of reading strategies and knowledge across languages, but limited English proficiency disabled the low-achieving readers to apply their few Chinese reading strategies to English reading.

Discussion of the Major Findings

This study demonstrated significant interactions between L1 and L2 reported reading strategy use with reading achievement status. The major findings are discussed by four themes: (a) the relationship between reading strategies and reading achievement status, (b) the interaction between reported strategy use and reading achievement status in L1 and L2 reading, (c) cross-language transfer of reading strategies, and (d) significant predictors of overall reported strategy use.

Reported Strategy Use in Relation to Reading Achievement Status

The first thematic findings focus on differences in reported strategy use by reading achievement status. The findings about strategy-use differences between high- and low-achieving Taiwanese middle-school readers are consistent with those of studies involved with elementary (see Chamot & El-Dinary, 1999; Lan, 2005), secondary (see Jiménez et al., 1996; Kuo, 1993) and college readers (see Chern, 1994; Feng & Mokhtari, 1998; Sheorey & Mokhtari, 2001).

Quantitative results indicated that in overall, the high-achieving readers reported using reading strategies more frequently compared to average-reading- achieving students and low-reading-achieving students, regardless of language of the text. To examine the relationship between reading achievement status and reported strategy use deeply, the

design of this study allows the following discussion on reported strategy use in terms of each identified strategy category

In either Chinese reading or English reading, high-reading-achieving students seemed to use strategies more frequently, flexibly, and diversely to help them monitor their comprehension process, detect misunderstandings, and overcome reading difficulties. These results echoed the research findings in L1 literacy (Kletzien, 1991; Paris & Mayer, 1981) and L2 literacy (Chamot & El-Dinary, 1999; Jiménez et al., 1996; Hardin, 2001). Effective readers not only have better awareness of which strategies to use, but they also execute better regulation of how to use certain strategies depending on the problems encountered during reading. Like high-achieving readers in this study, because unfamiliar vocabulary was the primary obstacle to comprehend the English text, they reported using more grammatical/morphological (bottom-up) strategies to deal with linguistic elements more frequently for English reading than for Chinese reading, in addition to global, top-down strategies.

As noted by Dr. Roberta Lavine's personal communication on December 10, 2007, the use of powerful reading strategies not only improved L2 readers' reading achievement, but also enhanced their reading proficiency. This is a very significant insight that needs to be investigated in future research.

In addition, when asked how to solve reading problems in the interviews, high-achieving readers mentioned a variety of strategies, such as using context clues, rereading and using dictionaries depending on reading tasks. In contrast, students with low reading achievement stated relatively few strategies. The first strategy identified was to ask for other's help. Even though seeking help from others can be a positive strategy,

over reliance on others' help could be problematic. As shown in the qualitative results, even though the low-reading-achieving students could recognize their reading comprehension difficulties, they seemed to lack a strategic plan to overcome those obstacles in Chinese reading. The situation was even worse while they read in English. Therefore, awareness of strategies and the ability to use appropriate strategies characterize successful reading comprehension and language learning, which has been suggested by L1 and L2 research (Alexander & Jetton, 2000; Jiménez et al., 1996; Hardin, 2001; Oxford, 1996; Pressley, 2000).

Reported Strategy Use in Relation to Reading Achievement Status in L1/L2 Reading

The second thematic findings center on strategy-use differences in L1 and L2 reading in relation to reading achievement status. Key discussion points are provided as follows.

First, as noted above, quantitative results indicated that high-reading-achieving students reported more grammatical/morphological strategies to analyze words and sentence structures in English reading than in Chinese reading. Qualitative results also found that two of the three high-achieving readers greatly relied on the dictionary to obtain accurate meanings of unknown L2 vocabulary. Apparently, there are two forces driving more reported strategy use on linguistic elements: limited language proficiency in L2 and the nature of a language. First, as Carrell, Pharis, and Liberto (1989) has suggested, proficient L2 readers are able to compensate for limited language proficiency by increasing usage of reading strategies. Second, linguistic properties of a language may result in different language-based, bottom-up strategies.

For example, verbs in Chinese do not carry tense. In other words, the graphic

representation of a Chinese verb does not change due to the tense of a sentence. Therefore, focusing on the tense of a verb, one of the grammatical/morphological strategies, would not be useful when reading a Chinese text. Moreover, it is also predictable that another strategy of paying attention to sentence structure was reported using more frequently by high-achieving readers in English reading because the less variation in word order is allowed in the English language as compared to the Chinese language. As found in Su's study (2001) investigating of how L1 and L2 speakers of Chinese and English use cues to process sentences, the advanced L2 Taiwanese readers relied on the word order cue heavier than their beginning and intermediate counterparts. MacWhinney, Bates and Kliegel (1984)'s study also indicated that English monolinguals manifested a greater reliance on word order to process sentences.

Even though average- and low-achieving readers in this study were severely confused by unfamiliar words and difficult sentence structures in English reading, they did not use more grammatical/morphological strategies to help themselves overcome language-related difficulties in English reading. The findings are in line with the results of Chern (1994) which investigated reported strategy use among college L2 readers in a Taiwan university. The proficient L2 readers, compared to their less proficient counterparts, used the dictionary or paid more attention to local, linguistic cues in L2 reading in order to learn accurate meanings of unknown vocabulary.

Second, of the six strategy categories, only the skipping strategies were reported to use more frequently for English reading rather than for Chinese reading by all students of these three reading achievement statuses. The two strategies in this category involve skipping unknown words and sentences that one cannot understand. As mentioned

previously, the Taiwanese middle-school students learned English as a foreign language, and thus English language proficiency would be expected to be lower than the corresponding proficiency in Chinese, the L1. As a result, more unknown words or sentences were likely to occur during English reading. Therefore, it is quite reasonable that more skipping strategies were invoked for English reading than for Chinese reading.

However, it is necessary to point out that the level of reliance on these skipping strategies in English reading differed among the three reading achievement groups. Compared with mean frequencies of other strategy categories, the mean frequency of reported skipping strategy use was in the third place for high-achieving readers in English reading but it was in the *first* place for the average- and low-reading-achieving students. The findings again provide evidence that the readers with low reading achievement lacked effective strategies and easily gave up when encountering difficult parts, especially in L2 reading.

Finally, two points are worth noting about language translation. The first point is that the reading proficiency—probably also language proficiency—could influence the selection of language used to comprehend a L2 text. According to the quantitative results, high-reading-achieving students seemed to demonstrate a better ability or a higher tendency to process English text through English itself. In interviews, all of the three students with high reading achievement contended that there was no need to consciously translate words or sentences in English text into Chinese if they were able to understand them. This finding imply that when L2 readers acquire a certain level of proficiency in reading the L2, linguistic elements that are present in L2 text might directly form abstract concepts in their minds. In other words, a need to use the L1 as a mediator might be

reduced. The second point is advanced translation strategies demonstrated by high-achieving L2 readers. The qualitative results illustrated that when high-achieving readers translated parts of the English texts into Chinese, they often did not make literal translations. In other words, they attempted to translate the overall meanings of L2 difficult parts and paraphrased them into a way understandable in L1. It is quite remarkable to observe that advanced level of language translation among those high-achieving L2 readers who were still in the process of learning to read English.

Cross-Language Transfer of Reading Strategies

The third thematic findings concern cross-language transfer of reading strategies. The findings are discussed in correspondence to Cummins's Linguistic Interdependence Hypothesis.

By closely examining reported strategy use between languages within each reading achievement status, the results indicated that high- and average-achieving readers, compared to low-achieving readers, reported using reading strategies more consistently across Chinese reading and English reading. The quantitative results demonstrated that high- and average-achieving readers did not show significant differences in the use of metacognitive, problem-solving and support strategies between Chinese reading and English reading. In other words, the high- and average-achieving readers seemed to use a great number of strategies similarly when approaching both Chinese and English texts. The results are similar to those of Fen and Mokhtari (1998), who used verbal reports to investigate L1 and L2 reading strategies of 20 adult, native Chinese graduate students who studied in the U.S. Just as in the current study, Fen and Mokhtari found that majority of the strategies were identified in both Chinese reading and English reading.

In contrast, low-achieving readers reported the inconsistent use of reading strategies between Chinese reading and English reading. The quantitative results showed that significant differences were found in all six strategy categories. More specifically, low-achieving readers reported using strategies in all categories more frequently for Chinese reading than for English reading, except for skipping strategies which all students reported using more frequently in English reading. The qualitative results also demonstrated consistent findings. The few strategies that low-achieving readers reported using for Chinese reading were almost completely absent when they read an English text. The only two strategies identified by low-achieving readers in the English think-alouds were (a) guessing meaning based on pictures and on extremely limited vocabulary knowledge, and (b) using the dictionary. The former was frequently reported using but the latter was rarely reported employing.

Both quantitative and qualitative results suggest that L2 readers who reach a certain level of reading achievement in the L1 and the L2 seem to show a similar pattern of reported strategy use across languages, even though the writing system of the L2 is sharply different from that of the L1. The findings support Cummins' (1979a) Linguistic Interdependence Hypothesis which suggests that cognitive aspects of language learning, such as reading strategies, can be transferred across languages, and also are congruent with my expectation. However, evidence from this study suggests that such transfer mostly occurred from the L1 (the stronger language) to the L2 (the weaker language). Additionally, the results suggest that L2 language proficiency might influence the transfer of reading strategies. As shown in the interviews, the three low-achieving readers stated that although they recognized that they could apply what they learned or read earlier in

Chinese to English reading, they still were unable to do so because of their limited English vocabulary. Therefore, low English language proficiency, or more specifically, limited English vocabulary, seemed to be a primary factor that accounted for inconsistent use of strategies across languages, and that short-circuited the transference.

Reported Strategy Use in Relation to Personal Variables

The final thematic findings focus on discussion of significant predictors for overall strategy in Chinese reading and in English reading. Several interpretive comments are presented.

First, it is worth noting that students who rated themselves as good readers in the *Background Questionnaire* showed using reading strategies frequently. In other words, the better the students rated their reading achievement, the more strategies they reported utilizing in both Chinese reading and English reading. The findings exemplify the notion of self-efficacy, which refers to learners' perceived capabilities for learning (Bandura, 2001). Self-efficacy would influence "choice of activities, effort, expenditure, persistence and achievement" (Schunk & Zimmerman, 2007, p. 9). Therefore, the students who rated their reading achievements higher were likely to be those with high self-efficacy, and those readers tended to work harder, spent more effort, and were engaged more actively in the reading process compared to their peers, who doubted their learning capabilities. Consequently, more thoughts and actions (i.e., strategies) were likely invoked to regulate their reading process with a goal of performing a reading task efficiently.

Second, the findings also suggest that motivation (e.g., utility value of reading strategies and enjoyment of reading) seems to play a key role in the strategic reading process regardless of language. Pintrich, Marx, and Boyle (1993) defined utility value as

students' judgments about the helpfulness of academic tasks to achieve their goals. As found in this study, the higher the students valued the usefulness of reading strategies, the more strategies they reported employing. In addition, enjoyment of reading in the L2 has a great impact on overall reported strategy use for the L2 reading. A prerequisite to enjoy L2 reading is apparently L2 learning. As found in Lan's study (2005), which involved Taiwanese elementary students, enjoyment of learning English showed a significant relationship with reported strategy use. In sum, as noted by several researchers (Bandura, 2001; Oxford & Nyikos, 1989; Paris, Lipson & Wixson, 1983; Schunk & Zimmerman, 2007), a successful reader needs not only the declarative, procedural, and conditional knowledge about strategies, but also motivation to use strategies.

Third, the findings suggest that gender did not provide a significant unique contribution to predict overall reported reading strategy use in either Chinese or English. In other words, no significant gender differences in overall reported reading strategy use were observed among the L2 readers in this study. The findings are consistent to some studies on L2 reading strategies (e.g., Poole, 2005; Phakiti, 2003), but such results are at odds with previous language learning strategy research (e.g., Green & Oxford, 1995; Lan, 2004). As Poole (2005) suspected, the strong relationship between reading achievement and reading strategies likely overrode the effect of gender on the use of reading strategies (Poole, 2005). Also, the strong connection between motivation and reported reading strategy use could neutralize gender differences in reading strategies. Therefore, those L2 readers who rated themselves as having high reading achievement and were highly motivated to read reported using significantly more strategies than those who rated themselves as having low reading achievement and were less motivated, regardless of

gender.

Summary of Discussion

In general, reported strategy use is influenced by reading achievement status and language of the text. First, quantitative and qualitative results demonstrated that the high-achieving readers not only constantly monitored their comprehension, but they also employed a variety of strategies to overcome reading difficulties occurred in both L1 and L2 reading. In contrast, low-achieving readers reported using relatively few strategies in Chinese reading, and even fewer in English reading. Low-achieving readers seemed to show no attempt to think through reading problems and inability to invoke effective strategies to solve comprehension breakdowns even though they were able to detect their reading difficulties.

Second, an interesting interaction between reading achievement status and language of the text on reported strategy use was discussed. In addition to global-oriented, top-down strategies, high-achieving readers also employed more language-based, bottom-up strategies to process the linguistic elements of the L2 text, but the average- and low-achieving readers did not. Depending on features of the language, high-achieving readers reported using somewhat different localized, linguistic strategies. For instance, focusing on verb tenses and paying much attention to sentence structures were reported as being used more frequently when reading an English text. Moreover, the degree of reliance on the skipping strategies was different according to language of the text and reading achievement level. Another interesting point is that high-achieving readers appeared to show a greater tendency to comprehend the L2 text using the L2 itself. This point implies that a need to use the L1 as a mediator when reading the L2 text reduced for

high-achieving readers.

Third, both quantitative and qualitative results showed that when L2 readers reach a certain level of reading achievement, they were able to transfer reading strategies across languages. However, evidence from this study suggests that such transference mostly occurred from the L1 (their stronger language) to the L2 (their weaker language). Moreover, limited language proficiency—or more specifically, the limited L2 vocabulary seems to be a primary factor that short-circuits the transfer.

Finally, three personal variables were found to be significant predictors of overall reported strategy use for both L1 and L2 reading. An additional variable, enjoyment of reading in the L2, was another significant predictor of overall reported strategy use. In other word, L2 readers who perceived themselves as good readers, valued reading strategies, and spent more time on reading were likely to report more use of strategies. Additionally, enjoyment of reading in the target language seemed to be a particularly significant factor that influenced the reported strategy use in L2 reading.

Based on the major findings synthesized from quantitative and qualitative results, the implications for research and for instruction are presented in the next two sections.

Implications for Research

The current study presents a complex picture of how reading achievement status and language of the text affected reported strategy use by L2 readers in an EFL context. A number of implications for research are raised.

First, employing a task-based strategy inventory would be a good method to discover and compare the use of strategies by L2 learners in a specific context. It provides a more detailed, more contextualized picture of strategies reported using by L2

learners. Moreover, if the primary goal of a piece of research is to investigate reported strategy use in depth in a particular context, providing a certain task (i.e., a reading task as in this study) also helps students remind of their uses of strategies in that context before responding strategy inventories. This might be useful for young or adolescent participants because the abstract connection could be quite difficult.

Second, task-based strategy inventories are naturally associated with a certain task. It is important for researchers to carefully think through the item content of a strategy inventory. In other words, to ensure the validity, researchers who are interested in employing task-based strategy inventories as a measurement tool should consider carefully whether the strategy items included in an inventory are appropriate and adequate for measuring strategies employed for a specific task.

Third, combining task-based strategy inventories with think-aloud protocols and interview protocols provides a more detailed, contextualized picture of the strategic L2 reading process. Task-based strategy inventories present a general profile of strategic pattern for specific tasks; the think-aloud and interview protocols not only could confirm the observed pattern reflected in the inventories, but also could provide emic perspectives from readers about why, how, and when they use the strategies. Moreover, other innovative and customized strategies might be discovered in the population of interest. Through the triangulation process, research would be more rigorous, which would enhance the validity and the reliability of studies.

Fourth, factor analysis, or more specifically, principal components analysis used in this study would be a helpful statistical technique to reduce the larger items in an inventory to a smaller set of variables that are more coherent conceptually. This

technique provides sound statistical evidence to justify how a certain strategy category is formed in addition to theoretical explanations. The principal components analysis with oblique rotation yielded a clear, interpretable structure of the *Task-Based RSI*, an instrument used in this study, and the statistical information is also useful for further enhancement of the content of the *Task-Based RSI*. An additional benefit is that knowing which strategies fit together can lead to theory-building about reading strategies.

Finally, exploring the underlying structure of a strategy inventory is helpful to investigate the important interaction effect between reading achievement status and language of the text on reported strategy use because it allows us to make meaningful interpretations about the results in light of *quantity* and *quality* of reading strategies. In other words, the focal difference between self-regulated (highly strategic) readers and their peers could be examined in depth; for example, what are some strategies that are conceptually related and reported using more often by a certain type of students or in a certain language? Such findings can allow even more interesting and important discussion about why a particular phenomenon is observed. It could also be appealing for future researchers to investigate the relationship between reported strategy uses of each category with another variable—genre. Because the genre effect is not the focus of the current study, it was intended to only include expository texts.

Implications for Reading Strategy Instruction Based on This Study and Prior Research

The findings of this study raise several pedagogical implications. Before presenting the implications, it would help to refer back to the main conceptualization of interactive reading processing. The reading comprehension process in either the L1 or the L2 involves readers in coordinating both bottom-up strategies (e.g., decoding print and

encoding visual configuration) and top-down strategies (e.g., activating relevant prior knowledge and integrating ideas). Being an active reader also characterizes the interactive reading process. As found in the study, high-achieving L2 readers demonstrated both skill (ability to use strategies) and will (motivation to read and to use strategies) in their L1 and L2 reading processes.

First, as shown in the study, low-achieving readers seemed to have too few strategies to overcome comprehension obstacles, unlike the high-achieving readers. Therefore, they need strategy instruction. What kind of instruction is effective? Prior research shows that integrating explicit strategy instruction into daily lessons would be most beneficial to low-achieving readers in particular. Research has shown supporting evidence that explicit strategy instruction helps students improve their reading comprehension (Dole, et al., 1996; Hardin, 2001; Padrón, 1992; Pressley, El-Dinary, & Brown, 1992; Swicegood, 1994) and also has a positive effect on second language learning (Chamot & O'Malley, 1994a; Oxford, 1990). Prior research shows several suggestions for planning and implementing strategy instruction are as follows:

1. Inclusion of multiple strategies is considered necessary. Both bottom-up or lower-level and top-down or higher level strategies should be taught directly, and teaching students how to coordinate a variety of strategies during reading is needed.
2. Each strategy should be taught one at a time with sufficient time dedicated each one. Teachers should model how to use it and when to use it in various texts. In addition, students should be provided opportunities to practice strategies with a variety of contexts (Pressley, 2002).
3. The gradual release of responsibility from the teacher to the student is suggested

(Keene & Zimmerman, 1997). With teachers' encouragement and careful scaffolding, students should be able to move from co-regulated use of strategies to self-regulated use.

4. Systematic guided practice on strategies in a meaningful context is important. In other words, strategies should not be introduced alone, and should not be practiced out of context (Dreher, 2002).
5. Teachers' motivation of teaching and using strategies is a vital constituent to successful implementation of strategy instruction. Teachers need to be aware of the effectiveness of strategies, believe in their positive effect of them and attempt to use those strategies in their own reading (Keene & Zimmerman, 1997).

Second, as demonstrated in this study, L2 vocabulary was reported as the greatest obstacle for comprehending the L2 text, and the Taiwanese students in this study relied only on the memorizing strategy, which is satisfactory but, used alone, is insufficient and ineffective. Therefore, educators might want to explore teaching techniques to help students develop the L2 vocabulary knowledge. Prior research provides some guidelines on how new vocabulary can be taught (Alvermann, Phelps & Ridgeway, 2007). Six useful guidelines are:

1. Build new vocabulary on what students already know.
2. Provide multiple presentations (i.e., letter print, picture and animation) to new vocabulary.
3. Provide various activities for students to use new vocabulary.
4. Teach to promote transfer of words and strategies to other reading situations.
5. Include oral discussion on new vocabulary to help them process the meanings more

thoroughly.

6. Create a word-rich environment in which students are surrounded with rich literacy input.

Alvermann et al. (2007) also presented other strategies for teaching vocabulary such as morphemic analysis (studying prefix, suffix, and root), semantic mapping (placing key terms in a theme-based map), concept of definition map (discussing what it is, what it is like, and what some examples are) and vocabulary square (presenting prefix, definition, example and picture of a word in a four-square chart). In addition, using computer-assisted programs could also be considered. In a hypermedia reading environment, on-line pictures and definitions can be presented, and complex terms and concepts can be introduced through innovative representations such as animations and video clips. However, Wood (2001) suggests a caution on using the computer-assisted programs alone to foster vocabulary learning and maintains that there is a sore need for teachers to mediate the computer-assisted vocabulary learning process.

Third, as shown in this study, using the dictionary effectively is a strategy that is missing among many Taiwanese readers, especially for the low-achieving readers. It is easily assumed that students know how to use the dictionary; search for a word and read the definition. Thus, teachers might simply jump to a conclusion that there is no need to teach them the dictionary usage. However, in fact, effective use of the dictionary involves several skills: (a) analyzing a word (e.g., look up the word *run* for *running*), (b) retrieving context-appropriate definition, and (c) using relevant information of an entry such as the part of speech of a word, variant spelling, pronunciation, and synonyms and antonyms (Alvermann et al., 2007). Those skills would not be acquired naturally. In addition to

relying on the dictionary, teachers also can teach students using context clues to predict unknown words, or they could incorporate definitional instruction into context clues. As Baumann, Kame'enui, and Ash (2003) suggested, instruction in using context clues is especially effective with the combination of definitional information.

The last implication attempts to draw educators' attention to the influence of motivational factors on reported strategy use. As found in this study, when L2 readers recognized the utility value of reported strategy use and had high self-efficacy, they were likely to put forth the effort to learn and use strategies. Prior research suggests explicit strategy instruction has a reciprocal relationship with students' motivation to read and to use strategies. Explicit strategy instruction can increase a sense of control over learning (Schunk & Zimmerman, 2007; Pressley, 2002). When teachers gradually release responsibility for students to use strategies and demonstrate the positive effect of strategy use on academic performance, students see their own progress, and thus they consider themselves more capable. The increasing feeling of control and the belief about the utility value of strategy use can help students see that the effort of learning and using strategies pays off. Therefore, teaching L2 students to become highly self-regulated, strategic readers can be a powerful way to promote effective L1 and L2 reading, which will, in turn, increase self-efficacy of L2 readers.

Conclusion

The purposes of this study were: (a) to examine how eighth-grade Taiwanese readers monitored, regulated, and monitored their thoughts and actions (i.e., strategies) to comprehend text in the L1 (Chinese) and the L2 (English), whose writing systems were sharply different; (b) to inspect the relationship between reading achievement and reported reading strategy use; (c) to investigate the transference of strategies and literacy concepts across languages; (d) to uncover students' views and attitudes toward the L1 and L2 reading activities and reading strategies; and (e) to study the relationships between the six personal variables to reported strategy use.

Major findings indicated that high-achieving Taiwanese readers tended to be highly self-regulated in their L1 and L2 reading processes. In other words, they demonstrated the higher awareness and better control of reading strategies across languages, compared to those with low-reading achievement. Further, the findings supported the possibility of cross-language transfer of reading strategies even when the writing systems of the L1 and L2 were very dissimilar. However, the transference could be influenced by L2 proficiency. The last important finding is that L2 readers who rated their reading achievement higher, valued reading strategies, and spent more time on reading were likely to report more strategies. The enjoyment of reading in the target language influenced reported strategy use particularly in L2 reading.

The findings suggest the gap between high-reading-achieving students (highly self-regulated readers) and low-reading-achieving students in their awareness of L1 and L2 strategic reading, and raise concerns about the extremely limited repertoire of strategies of low-achieving readers. The end of this chapter provided major implications

for future research and for instruction. Such implications for future research concerned methodological issues related to task-based reading strategy inventories, and the pedagogical implications included suggestions for planning and implementing strategy instruction.

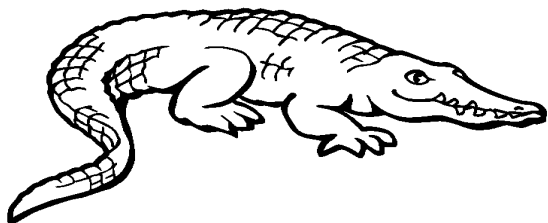
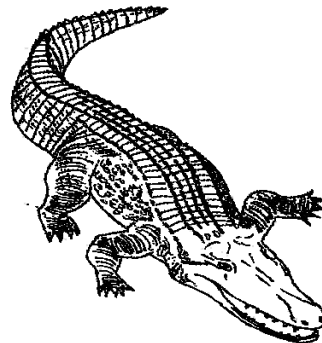
Appendix A

Reptile Relatives

Most people can't tell the difference between an alligator and a crocodile. That's not surprising. These large reptiles look a lot alike. Both have four short legs and a long, powerful tail. Their skin is greenish brown and covered with scales. Also, their eyes and nostrils are on top of their head.

There are many ways to tell the difference between the two reptiles. **An alligator** has a broader head and a rounder nose. **A crocodile** has a narrow head and a long, pointed snout. When an alligator's mouth is closed, its lower teeth are hidden. But when a crocodile's jaws are shut, a tooth sticks out on each side.

Both reptiles must live in warm waters to survive. Alligators like only fresh water. Crocodiles, however, sometimes swim out to sea for a short time. Alligators are found in only two places. They live in parts of China and in the southeastern United States. Crocodiles, however, live in many places. They are found in South America, Central America, Africa, Asia and Australia. A few are also found in southern Florida, with their alligator cousins.



Appendix B

廣告

現代廣告技術肇始於20世紀20年代。基於當時的心理學研究，產生了兩種推銷辦法。說理式廣告述諸理性，把產品的實用優點列舉出來。聯誼式廣告則設法左右顧客的情感。這些廣告理念，加上1939年在全美廣播公司最先播出的電視廣告，成為今天廣告業的基礎。

1954年，美國廣告公司經理李富思進一步發展說理式廣告，提出「獨特點推銷法」，把焦點集中到產品的獨特優點上，強調產品優於競爭對手的地方。他在1959年為M&M's巧克力做廣告，以這種巧克力獨一無二的糖衣為主題，口號是「只溶化在口裏，不溶化在手裏」。

1959年，伯恩巴克用同樣的方法為德國國民車公司的甲蟲車製作美國歷史上最成功的汽車廣告。他一改過去的宣傳方法，不再一味強調這種車高檔迷人，而把焦點集中到甲蟲車的高品質和省空間的設計，口號是「要多小有多小」。

英國也以美國為榜樣。1955年，該國首個電視商業廣告播出，推銷的產品是吉布士牙膏。

到20世紀60年代，由於電視普及，市場

PUT A TIGER IN YOUR TANK!



把老虎放進燃油箱 1951年，代表動力的老虎首次出現在埃索石油公司的廣告中亮相。

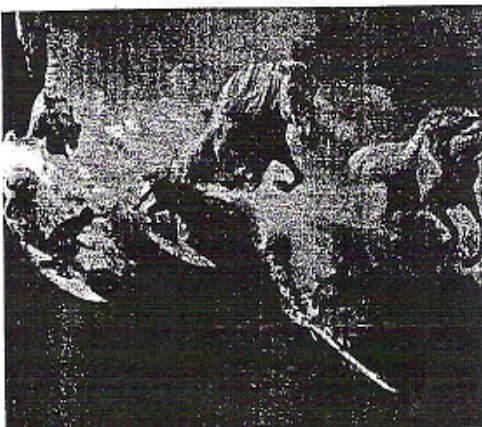
上商品繁多，廣告商為了表示產品與別不同，不得不另闢蹊徑。英國廣告公司老闆美格維放棄「獨特點推銷法」的理念，注重產品的「個性」或「品牌形象」，塑造企業偶像。美國玉泉汽水公司的總裁懷特赫成了「來自玉泉的人」，穿制服的司機變成皇家威士忌酒的象徵。

在80年代，社會大眾追求理想，廣告商把某些產品定為理想「生活方式」的必需品。

1987年，雀巢公司改變沿用了20年的宣傳策略，把金裝咖啡重新包裝成高品味夫婦的必備飲品，銷量因此大幅增長70%。廣告設計師更進一步，創作藝術感強烈的廣告，如堅尼斯啤酒的玻里尼西亞衝浪者廣告片（1999）。

精選廣告開支

國家	2001年的花費 (單位為億美元)
1. 美國	170.28
2. 德國	53.08
3. 日本	36.82
4. 英國	27.67
5. 法國	25.83
6. 義大利	12.90
7. 荷蘭	11.71
8. 印度 (包括報紙)	9.87
9. 西班牙	6.16
10. 澳洲、奧地利	5.88



衝浪者 1999年英國觀眾投票，選出堅尼士啤酒的廣告為有史以來最佳的電視廣告。畫面以衝浪者迎接巨浪的心情，比擬等候喝該啤酒時迫不及待的情緒。

全球的廣告支出

1999年在全世界範圍內廣告費支出最多的企業

企業名稱	所屬國家	廣告支出 (單位為億美元)
寶潔公司	美國	46.9
通用汽車公司	美國	41.0
聯合利華	英國 / 荷蘭	36.9
福特	美國	24.2
菲利普摩里斯	美國	21.2

參閱：

370-1 家具
402-3 電視
412-3 印刷術

Appendix C

Save the Florida Manatee!

The human population in Florida is growing, but the manatee population is dying out. People are taking over this sea mammal's home. • In fact, the gentle creature has no enemies, except for people.

The manatee looks like a huge potato with flippers and a tail. • Actually, this large creature is a cousin to the elephant. Manatees can reach 15 feet in length. • They can weigh up to 1,600 pounds.

Manatees live in warm, shallow waters and eat water plants. • The animals are too big to move quickly, so boats often hit them. Speeding boats kill more than 100 manatees every year. • Curious people also put the manatee in danger. Manatees are shy about being watched, so they'll swim out to deeper, colder waters, where it is harder to live. •

Many people are working hard to protect the Florida manatee. New laws lower the speed limits for boats in manatee habitats. • In at least 20 of these warm-water areas, no boats are allowed. You can help, too. • Write a letter to the governor of Florida stating your interest in saving the manatee. Act now, before the manatee disappears forever. •



Appendix D

宇宙學

古代哲學家觀察星球在天上的運動，提出了地球是宇宙的中心，而其他天體都圍繞地球運轉的假設。這個由希臘天文學家托勒密（約公元90-168年）所建立的學說，影響歐洲天文學界長達1500年之久，而一些更早的希臘哲學家——比較著名的有赫拉克利特（公元前4世紀）和阿里斯塔



具有劃時代意義的著作。哥白尼著作中的這兩頁，展示了行星圍繞太陽的運行軌道。

克斯（公元前3世紀）——則是堅持認為，行星是圍繞太陽，而不是圍繞地球旋轉的。

哥白尼（1473-1543年）是著名堅持這種觀點的歐洲天文學家。他堅信，地球沿軌道運行和自身旋轉，致使其他行星和星球看似圍繞地球旋轉。他的著作《天體運行論》在他逝世之年出版，其學說被羅馬天主教會壓制了100多年。

伽利略（1564-1642年）利用早期的

望遠鏡，觀察到太陽黑子、木星衛星及其他天文現象。他發現金星與月球一樣，會出現周期性盈虧現象，並進而證明其正如哥白尼所預言的那樣是繞太陽旋轉的。但是伽利略的《對話》一書（1632年）也同樣遭到教會的禁止，宗教裁判所強迫他放棄了這套學說。

其實在伽利略之前，德國天文學家開普勒（1571-1630年）就已研究出行星相對於太陽運行軌道的物理定律。作為哥白尼學說的信徒，開普勒首先認同行星按圓形軌道運行，但他後來作了修正，證明其軌道為橢圓形的。他認為在太陽與行星之間一定有一種力，將後者拉住在軌道上運動——這是對重力的一種早期描述。

牛頓（1642-1727年）在宇宙學方面貢獻良多。除了在光學上有許多發現，以及創立了微積分理論（參閱上頁），牛頓還提出關於運動和重力的定律。這些定律的權威性保持了230年之久。他在《基本原理》（1687年）一書中提出的運動三大定律顯示了力的特性，力、質量與加速度之間的關係，以及重力的本質。他的發現也最終解釋了行星及其他天體的運動原理，並奠定了「經典」物理學的基石。這些物理定律使人得以預見一切物體的運動，從銀河系一直到腳踏車。

牛頓定律直到1916年才被愛因斯坦（1879-1955年）發表的廣義相對論所取代。廣義相對論發展了狹義相對論（參閱上頁），對加速度，包括重力的影響，都作

了描述。愛因斯坦論述時間與空間在巨大物體周圍會發生扭曲，因而它們不能在所有情形下保持不變。愛因斯坦這個理論推翻了牛頓的物理學，儘管牛頓方程式與愛因斯坦方程式之間的差別很小，只是在極小（原子）或極大（宇宙）的尺度範圍，或者在接近光速的速度下才有所差異。

直到1925年美國天文學家哈勃（1889-1953年）發表了太陽系以外的銀河系，科學家才真正意識到宇宙到底有多大。透過測量光線在其光譜的顏色變化，哈勃發現所有星球都朝著遠離地球的方向運動，互相之間分得越來越開——離得越遠，其速度越快。他推斷宇宙正在膨脹，而且應該始於過去某個特定的時間點——這就是所謂「宇宙大爆炸」。這個發現形成了現代宇宙學的基礎。

在天文學領域，自愛因斯坦以來最偉大的貢獻，是由英國物理學家霍金（1942年-）作出的。霍金研究宇宙大爆炸的理論，並嘗試將量子學原理與相對論結合成 하나의理論，來解釋自然和宇宙的起源。

太空之困 隨著哈勃等

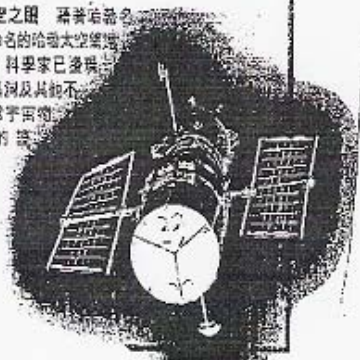
字命名的哈勃太空望遠

鏡，科學家已發現

了黑洞及其他不

尋常宇宙物體

的蹤跡。



Appendix E

Task-Based Reading Strategies Inventory (*Task-Based RSI*)

Your name: _____

Direction: Show how often you use the strategies when reading, by checking the appropriate box. 0 means “almost never” while 5 means “almost always.” It is important to answer in terms of how well each statement describes you, **not** in terms of what you think you should do, or what other people do. This is not a test. There are **no** right or wrong responses to these statements. The score you obtain will not affect your grades.

Before I read this English text,						
1.	I used the title or pictures to guess what I would read.					
	0	1	2	3	4	5
2.	I considered what type of text it was, such as a story, an informational text or a newspaper.					
	0	1	2	3	4	5
3.	I skimmed the text first to look for the main idea and later I read for details.					
	0	1	2	3	4	5
While I was reading this English text,						
4.	I focused on the tense of a verb, such as present tense and past tense.					
	0	1	2	3	4	5
5.	I read aloud or whispered the difficult parts of the text.					
	0	1	2	3	4	5
6.	I focused on every word in the text to understand its meaning.					
	0	1	2	3	4	5
7.	I paid attention to the beginning and the end of each paragraph.					
	0	1	2	3	4	5
8.	If I did not understand something, I guessed its meaning by using clues from the text.					
	0	1	2	3	4	5
9.	I checked what each pronoun referred to.					
	0	1	2	3	4	5
10.	When I couldn't understand a sentence, I skipped that sentence.					
	0	1	2	3	4	5
11.	I paid attention to sentence structure, such as subjects and objects.					
	0	1	2	3	4	5
12.	I used slashes to divide a sentence grammatically.					
	0	1	2	3	4	5
13.	I translated each sentence into Chinese.					
	0	1	2	3	4	5
14.	I continued reading even if I had difficulties.					
	0	1	2	3	4	5

15. I slowed down or speeded up depending on how difficult the text was.	0	1	2	3	4	5
16. I connected the content with what I already knew.	0	1	2	3	4	5
17. I marked or underlined important parts by using colored pens or drawing stars.	0	1	2	3	4	5
18. I divided unknown words into parts to figure out the meaning.	0	1	2	3	4	5
19. I tried to connect what I read in Chinese to help me understand a text written in English.	0	1	2	3	4	5
20. I reread difficult parts several times.	0	1	2	3	4	5
21. I did all I could to understand what I read without translating it word-for-word into Chinese.	0	1	2	3	4	5
22. I made a picture in my mind about what the text was saying.	0	1	2	3	4	5
23. I skipped unknown words.	0	1	2	3	4	5
24. I guessed what would come next.	0	1	2	3	4	5
25. I took notes or wrote down key words while reading.	0	1	2	3	4	5
26. I tried to understand the meaning without translating the text into Chinese.	0	1	2	3	4	5
27. I figured out the main idea of each paragraph.	0	1	2	3	4	5
28. I read the comprehension questions first and then read the text.	0	1	2	3	4	5
29. I had a purpose in mind when I read.	0	1	2	3	4	5
30. I thought only in English.	0	1	2	3	4	5
31. I read slowly but carefully to be sure that I understood what I was reading.	0	1	2	3	4	5
32. I did everything I could to get back on track when I lost concentration.	0	1	2	3	4	5
33. I decided what to read closely and what to ignore.	0	1	2	3	4	5
34. I used a dictionary to help me understand what I read.	0	1	2	3	4	5
35. I used pictures, tables and figures in the text to increase my understanding.	0	1	2	3	4	5
36. I stopped from time to time and thought about what I was reading.	0	1	2	3	4	5

37. I used context clues to help me better understand what I was reading.
0 1 2 3 4 5
38. I restated ideas in my own words to better understand what I read.
0 1 2 3 4 5
39. I used typographical aids like boldface and italics to find out key information.
0 1 2 3 4 5
40. I went back and forth in the text to find relationships, such as cause and effect or comparison, among ideas in the text.
0 1 2 3 4 5
41. I checked my understanding when I came across conflicting information.
0 1 2 3 4 5
42. I asked myself questions while reading the text.
0 1 2 3 4 5
After I read this English text,
43. I summarized it in my own words.
0 1 2 3 4 5
44. I thought about whether the content of the text fitted my reading purpose.
0 1 2 3 4 5
45. I analyzed and evaluated the information presented in the text.
0 1 2 3 4 5
46. I checked to see if my guess about the text was right or wrong.
0 1 2 3 4 5
47. I pictured or visualized information to help me remember what I read.
0 1 2 3 4 5

Note. The *Task-Based RSI* associated with the Chinese text does not include the four translation strategies: Item 13,

Item 21, Item 26, and Item 30.

Appendix F

Training Guidelines for Think-Aloud Tasks

Introduction

In this study, I am interested in what you do, what you feel and what you say to yourself while you are reading a text. In order to do this, I need you to talk aloud as you try to comprehend the text. In other words, I want you to say out loud *everything* that you are thinking and doing during the reading.

Before we start the real task, I will demonstrate the thinking-aloud, talking-aloud process. However, what I will demonstrate is how I read a text and the way I do does not mean it is correct or efficient. Everyone has their own ways that help them read and comprehend the text.

Steps

1. I demonstrate how I read a text, and at the same time I talk aloud about what I see, what I think and what I do.
2. The students practice reading a short text, and they practice talking aloud what they see, what they think and what they do.
3. I ask the students whether they have any questions and whether they want to have another practice.

Appendix G

Semi-Structured Interview Questions

Retrospective questions

1. Did you find the Chinese text and English text used in the think-aloud task difficult?
2. What parts seemed difficult for you in each language?
3. How did you solve any reading problems that arose?

General

4. Does being able to read in Chinese help when you read English? How?
5. Does being able to read in English help when you read Chinese? How?
6. In what ways is reading Chinese similar to reading in English?
7. In what ways is reading Chinese different from reading in English?

Appendix H

Background Questionnaire

1. Your name: _____
2. Your gender (please circle one): female male
3. Your age: _____
4. Your school: _____
5. How many years have you studied English? _____
6. Did you ever go to “Bu Shi Ban” or other places to learn English in addition to school? (please circle one)
 Yes No
7. Why are you learning English? (check all possible answers appropriate for you)
 - ☐ English is an interesting language.
 - ☐ I must study English to take tests.
 - ☐ I want to talk with native English speakers and make friends with them.
 - ☐ I am interested in something, such as a novel, a movie or a game written in English.
 - ☐ I want to use English on the job when I grow up.
 - ☐ Other reasons (please list): _____
8. How much do you enjoy learning English? (please circle one)
 1. I like it very much.
 2. I like it.
 3. I don't like it.
 4. I don't like it at all.
9. How much do you enjoy reading? (please circle one)
 1. I like it very much
 2. I like it.
 3. I don't like it.
 4. I don't like it at all.
10. How much do you enjoy reading English? (please circle one)
 1. I like it very much.
 2. I like it.
 3. I don't like it.
 4. I don't like it at all.

11. How much do you enjoy reading Chinese? (please circle one)

1. I like it very much.
2. I like it.
3. I don't like it.
4. I don't like it at all.

12. How long do you usually read a day in any language?

_____ hour(s) _____ minute(s)

13. When you are reading for pleasure, what language(s) do you usually read in? (please circle one)

Chinese English Both

14. How good a reader do you think you are in Chinese? (please circle one)

Poor Fair Good Very good

15. How good a reader do you think you are in English? (please circle one)

Poor Fair Good Very good

16. How useful do you think reading strategies are when comprehending a Chinese text?

Not useful Fairly useful Useful Very Useful

17. How useful do you think reading strategies are when comprehending an English text?

Not useful Fairly useful Useful Very Useful

Appendix I

Teachers' Guideline for Administrating the Task-Based Reading Strategy Inventory

Dear teacher,

Thank you and your students so much for participating in this study. This study is designed to investigate how eighth grade Taiwanese students comprehend the Chinese reading text and the English reading text. After participating in this study, students will get more knowledge of what a strategy is and have better understanding of how they themselves comprehend a text. Please inform the students that their information will be only read by me and their responses will not be graded. Also, please tell students that they are highly encouraged to participate in the study but they are not required to do it. I truly thank for your support and your students' involvement.

Procedure of Administrating the Inventory:

Day 1²⁸

1. Please distribute the Chinese reading text to the students and tell them that they have 10 minutes to comprehend the text.
2. After 10 minutes, please distribute the *Task-Based Reading Strategy Inventory* to students and inform them that they have 10 minutes to respond to the inventory.
3. Please read the directions for the *Task-Based Reading Strategy Inventory* aloud. Please tell the students that it is important to answer in terms of how well each statement describes them, **not** in terms of what they think they should do, or what other people do, and please inform them that there are **no** right or wrong responses to these statements.

(Note: Please administrate the second *Task-Based Reading Strategy Inventory* **two days** after the first one.)

Day 2

1. Please distribute the English reading text to the students and tell them that they have 10 minutes to comprehend the text.
2. After 10 minutes, please distribute the *Task-Based Reading Strategy Inventory* to students and inform them that they have 10 minutes to respond to the inventory.
3. Please read the directions for the *Task-Based Reading Strategy Inventory* aloud. Please tell the students that it is important to answer in terms of how well each statement describes them, **not** in terms of what they think they should do, or what other people do and inform them that there are **no** right or wrong responses to these statements.

²⁸ Half of the teachers had the guideline on which the English text and its associated *Task-Based RSI* were administrated on Day 1; the Chinese text and its associated *Task-Based RSI* were distributed on Day 2.

Appendix J

Coding Scheme for Think-Aloud Tasks: Descriptions and Examples of Strategies

Strategy Type	Descriptions & Examples
<u>Metacognitive Strategies</u>	
1. Predicting -based on pictures -based on titles	Using pictures or titles to predict what would be read. <i>"There are water plants and manatees in the picture. I guess the text might describe the life of manatees."</i>
2. Associating	Connecting prior knowledge <i>"I have learned the formula related to the Relativism, $E = (MC)^2$."</i>
3. Monitoring -make sense -not make sense	Thinking about what was read constantly. <i>"Hum...It is so strange. I don't understand."</i>
4. Skimming	Skimming through the text quickly and read for the details later
5. Self-Questioning	Asking questions to oneself during the reading <i>"So, is space itself expanding?"</i>
6. Verifying an inference or a self-raising question	Checking the correctness of a guess <i>"Yes, I am right. All planets are orbiting around the Sun."</i>
<u>Cognitive Strategies</u>	
7. Making inferences	Using context clues to make an inference between the lines or beyond the lines <i>"I think there must be someone who proposed a better theory."</i>
8. Rereading	Rereading difficult parts aloud or silently <i>"Too big to move quickly...too big to move quickly."</i>
9. Skipping	Skipping the parts that are difficult to understand <i>"Hum...I want to skip it now. Probably I will understand it later."</i>
10. Highlighting -important parts -unknown parts	Using markers or pens to underline or circle the parts that they think important or difficult

- | | |
|--------------------------------------|---|
| 11. Connecting between parts of text | Connecting the information presented in different paragraphs in a text
<i>"Why did the Roman Catholic Church keep suppressing their [Galileo's and Copernicus'] theories?"</i> |
| 12. Commenting | Providing personal judgments, opinions, and emotional responses to text
<i>"The manatees are poor."</i> |
-

Translation Strategies

- | | |
|---------------------------|--|
| 13. Translating words | Translating each word into their native language |
| 14. Translating sentences | Translating sentences to get the overall meaning
<i>"Because they are very shy, so [they] swim into deeper and colder water."</i> |
-

Vocabulary Strategies

- | | |
|--|--|
| 15. Brainstorming the L2 Vocabulary | Activating the prior L2 vocabulary knowledge to guess unknown words
<i>"Is habitat related to habit?"</i> |
| 16. Checking dictionaries
-traditional dictionary
-electronic dictionary | Using the dictionaries to look up the meanings of unknown words
<i>"I want to look up the word, population, in the dictionary."</i> |
| 17. Evaluating the appropriateness of a word definition | Making judgments on word definitions to see whether it is appropriate and relevant to the text.
<i>"This save does not mean deposit. It should have another meaning."</i> |
| 18. Using context clues | Searching for relevant information from surrounding sentences to guess the meaning of a unknown word
<i>"I don't know what flippers mean but I can guess that it might mean fin or something like that because I know tail means something on the rear part of its body."</i> |
-

Appendix K

Matrix of the Themes for the Semi-Structured Interview

Students (pseudonyms)	Theme 1: Reading Tasks			
	Chinese Reading		English Reading	
	Reading Difficulties	Theme 3: Often-Used Strategies	Reading Difficulties	Theme 3: Often-Used Strategies
Fu-Tin	Content Long article	Rereading Using context clues Asking others	Vocabulary Grammar Structure (footnote)	Using the dictionary Guessing from pictures or context Sounding it out
Ching-Wu	Content	Repeatedly reading Asking parents Using context clues Reading slowly	Vocabulary	Using the dictionary only for each unknown word Highlighting unknown words Using context clues Reading slowly Rereading
Yi-Chen	Content	Asking others Reading slowly and carefully Searching key words on Internet	Vocabulary	Using context clues Using the dictionary for important words Asking others Translating word by word only for difficult parts
Lin-Hung	Content	Asking other Searching key words on Internet	Vocabulary Content	Asking others Using the dictionary
Wei-Ming	Content	Asking others Searching key words on Internet	Vocabulary	Asking others Translating known words to guess the content Never using the dictionary (inability; reluctance)
Shen-Fang	Content	Asking others <i>"If I cannot understand the article, I just cannot get it by myself."</i>	Vocabulary	Asking others Rarely using the dictionary (inability)

Students (pseudonyms)	Theme 2: L1/L2 reading processes	Theme 3: Bilingual Strategies (Transferring and Translation)
Fu-Tin	L1/L2 reading process is similar. <u>Similarity</u> Trying to understand the meaning <u>Differences</u> <i>“For English, I need to look up vocabulary.”</i>	<u>Transferring:</u> Connecting to L1 prior knowledge when reading in the L2. Likely to connect to L2 prior knowledge when reading in the L1 but it happens rarely, <u>Translation:</u> <i>“If I can understand the sentence, I already know the meaning. Therefore, there is no need to translate consciously.”</i>
Ching-Wu	L1/L2 reading process is similar. <u>Similarity:</u> Skimming through the text and reading for details later. <u>Difference:</u> <i>“I do not need to look up vocabulary,”</i> for Chinese reading.	<u>Transferring:</u> Connecting to L1 prior knowledge when reading in the L2 and less connecting to L2 prior knowledge when reading in the L1 <u>Translation:</u> <i>“If I cannot understand most of parts of a sentence, I need to translate word by word. If I can understand it, I just can get it after I read it.”</i>
Yi-Chen	L1/L2 reading process is almost the same. <u>Similarity:</u> Using the similar strategies to overcome reading difficulties, such as rereading and using context clues to guess the meanings. <u>Difference:</u> Reading more slowly in English because of unknown vocabulary and phrases.	<u>Transferring:</u> Connecting to L1 prior knowledge when reading in the L2 and vice versa. <i>“Knowledge is mutual and the only difference is language.”</i> <u>Translation:</u> <i>“I only translate a sentence into Chinese when it is too difficult to understand.”</i>
Lin-Hung	L1/L2 reading process is different. (If language problems can be solved, reading process would be the same.)	<u>Transferring:</u> Connect to L1 prior knowledge when reading in the L2 but it rarely happens.

	<u>Difference:</u> <i>"For Chinese, I can understand without checking the meanings of unknown words. For English, I need to check each unknown word."</i> <i>"I need to more time on English reading."</i>	<u>Translation:</u> Trying to look up the Chinese translation of each word and combine the translations to guess the meaning of a sentence.
Wei-Ming	L1/L2 reading process is different. (If language problems can be solved, reading process would be the same.) <u>Difference:</u> <i>"I can understand Chinese reading but I cannot understand English reading."</i>	<u>Transferring:</u> Connect to L1 prior knowledge when reading in the L2 but it rarely happens. <u>Translation:</u> Translating known words into Chinese to guess the content of a text
Shen-Fang	L1/L2 reading process is different. <u>Difference:</u> <i>"When reading in Chinese, I can understand, but I totally cannot understand the English reading."</i>	<u>Transferring:</u> <i>"I think it is possible to connect to L1 prior knowledge when reading in the L2, but I cannot think of any examples right now."</i>

Appendix L

Rotated Factor Pattern Matrix for the 47-item *Task-Based RSI* Associated with English Reading: Principal Components Analysis with Oblique Rotation

Items in the <i>Task-Based RSI</i> Associated with English Reading	Factors						
	1	2	3	4	5	6	7
I connect what I read in Chinese to help me understand a text written in English.	0.64	-0.07	0.04	0.18	0.10	0.06	0.07
I check my understanding when I come across conflicting information.	0.64	0.05	0.04	0.01	0.07	0.07	-0.12
I critically analyze and evaluate the information presented in the text.	0.56	0.08	-0.13	0.22	0.03	0.10	-0.14
I check to see if my guess about the text is right or wrong.	0.56	0.07	-0.06	0.05	0.08	0.24	-0.04
I use tables, figures and pictures in a text to increase my understanding.	0.50	-0.11	0.20	-0.04	0.21	0.24	0.08
I connect the content with what I already know.	0.49	-0.04	0.10	0.11	0.14	0.30	0.03
I use typographical aids like boldface and italics to identify key information.	0.48	0.03	0.13	0.00	0.19	0.09	-0.13
I consider what type of text it is, such as a story, an informational text or a newspaper.	0.45	0.17	-0.03	0.20	-0.02	0.05	-0.16
I skim the text first to look for the main idea and later I read for details.	0.44	0.33	-0.04	0.03	-0.01	-0.02	-0.32
If I don't understand something, I guess its meaning using clues from the text.	0.43	0.19	0.06	-0.11	0.06	0.31	-0.15
I think about whether the content of the text fits my reading purpose.	0.43	-0.13	0.03	0.22	0.21	-0.13	-0.21
I use the title or pictures to guess what I would read.	0.42	0.03	0.18	0.06	0.04	0.30	0.17
I make a picture in my mind about what the text is saying.	0.42	0.15	0.03	0.02	0.29	0.08	0.19
I use context clues to help me better understand what I am reading.	0.41	0.12	0.03	-0.17	0.04	0.33	-0.34
I summarize it in my own words.	0.39	0.27	-0.03	0.01	0.17	0.02	0.04

I figure out the main idea of each paragraph.	0.38	0.37	-0.16	0.13	0.05	-0.17	-0.32
I go back and forth in the text to find relationships such as cause and effect or comparison among ideas in it.	0.36	0.15	0.06	-0.04	0.15	0.31	-0.10
I decide what to read closely and what to ignore.	0.35	0.05	0.06	0.46	-0.07	0.24	0.09
I pay attention to the beginning and the end of each paragraph.	0.30	0.42	0.03	0.08	0.03	-0.01	-0.11
I ask myself questions while reading the text.	0.30	0.17	0.05	0.33	0.01	0.05	-0.11
I translate each sentence into Chinese.	-0.30	-0.13	0.01	0.21	-0.10	-0.33	0.16
I pay attention to sentence structure, such as subjects and objects.	-0.13	0.83	0.03	0.02	0.12	-0.02	-0.01
I use slashes to divide a sentence grammatically.	-0.11	0.67	0.10	0.18	0.10	0.00	-0.13
I focus on the tense of a verb, such as present tense and past tense.	-0.11	0.61	-0.11	0.05	0.07	0.27	-0.14
I check what each pronoun refers to.	0.12	0.57	-0.04	-0.07	0.16	0.16	-0.04
I guess what will come next.	0.19	0.51	0.12	0.27	0.06	-0.10	0.17
I divide an unknown word into parts to figure out the meaning.	0.20	0.27	0.13	0.01	0.13	0.37	0.14
When I cannot understand a sentence, I skip that sentence.	-0.15	-0.05	0.89	0.04	-0.04	0.01	-0.08
I skip unknown words.	0.02	0.07	0.87	-0.06	0.00	-0.08	-0.02
I try to understand the meaning without translating the text into Chinese.	-0.01	0.01	0.03	0.70	0.09	0.01	-0.02
I think only in English.	-0.03	0.23	-0.13	0.56	0.06	-0.02	-0.18
I do all I can to understand what I read without translating it word- for-word into Chinese.	0.17	0.11	0.18	0.40	0.06	0.29	0.08
I mark or underline important parts by using colored pens or drawing stars.	-0.16	-0.05	0.02	0.16	0.82	0.09	-0.01
I take note or write down key words while reading.	-0.04	0.18	0.07	0.07	0.74	-0.22	-0.10

I picture or visualize information to help me remember what I read.	0.17	-0.02	0.02	-0.07	0.74	-0.10	-0.03
I use dictionaries to help me understand what I read.	-0.01	0.13	-0.09	-0.07	0.63	0.19	0.11
When I lose concentration, I do everything I can to get back on track.	0.07	-0.17	0.03	0.18	0.09	0.68	-0.18
I slow down or speed up depending on how difficult a text it is.	0.08	0.04	0.14	0.02	0.01	0.65	-0.14
I read aloud or whisper the difficult parts of a text.	-0.11	0.28	-0.05	0.21	0.11	0.58	0.12
I focus on every word in the text to understand its meaning.	0.20	0.20	-0.04	0.03	0.08	0.57	0.08
I continue reading even if I have difficulties.	0.33	0.21	0.06	0.05	-0.17	0.47	-0.15
I reread difficult parts several times.	0.25	0.20	0.08	-0.16	0.17	0.44	-0.09
I read slowly but carefully to be sure I understand what I am reading.	-0.07	-0.11	-0.15	0.30	0.21	0.42	-0.38
I restate ideas in my own words to better understand what I read.	0.21	0.01	0.14	0.01	0.22	0.41	-0.20
I stop from time to time and think about what I am reading.	0.23	0.07	0.02	-0.11	0.12	0.34	-0.42
I read the comprehension questions first and then read the text.	-0.08	0.10	0.25	0.10	0.02	0.02	-0.67
I have a purpose in mind when I read.	0.12	0.14	-0.07	0.13	0.26	0.03	-0.38

Appendix M

Rotated Factor Pattern Matrix for the 43-item *Task-Based RSI* Associated with Chinese Reading: Principal Components Analysis with Oblique Rotation

Items in the <i>Task-Based RSI</i> Associated with Chinese Reading	Factors						
	1	2	3	4	5	6	7
I check my understanding when I come across conflicting information.	0.83	-0.02	0.02	-0.01	-0.15	-0.11	-0.09
I connect the content with what I already knew.	0.80	-0.01	-0.09	-0.12	0.04	0.11	-0.04
I go back and forth in the text to find relationships such as cause and effect or comparison among ideas in it.	0.79	-0.12	-0.09	0.08	-0.14	-0.06	-0.10
I reread difficult parts several times.	0.77	0.06	0.06	-0.20	0.02	0.06	0.21
If I don't understand something, I guess its meaning using clues from the text.	0.75	0.10	-0.15	-0.14	0.05	0.08	0.00
I slow down or speed up depending on how difficulty of a text was	0.71	-0.10	0.16	-0.15	-0.05	0.14	0.10
I summarized it in my own words	0.64	0.04	-0.01	0.38	-0.01	-0.08	-0.11
I ask myself questions while reading the text	0.61	0.03	-0.04	0.36	-0.09	-0.05	0.04
I check to see if my guess about the text is right or wrong.	0.61	-0.15	0.09	0.03	0.17	-0.08	-0.19
I restate ideas in my own words to better understand what I read.	0.60	-0.16	-0.15	0.15	0.11	-0.21	0.30
I think about whether the content of the text fits my reading purpose.	0.59	-0.06	0.01	0.18	0.31	-0.01	-0.18
I use typographical aids like boldface and italics to identify key information.	0.52	-0.10	0.24	0.00	0.29	0.00	-0.05
I have a purpose in mind when I read.	0.50	0.25	-0.01	0.18	0.01	0.11	-0.03
I skim the text first to look for the main idea and later I read for details	0.48	-0.04	-0.05	0.14	0.10	0.14	0.40
I read aloud or whisper the difficult parts of a text	0.45	-0.08	0.05	-0.01	-0.18	0.41	0.10

I make a picture in my mind about what the text is saying.	0.44	-0.04	-0.25	-0.10	0.27	0.05	0.01
I consider what type of text it is, such as a story, an informational text or a newspaper	0.44	0.06	-0.10	0.42	0.03	0.00	-0.02
I mark or underline important parts by using colored pens or drawing starts.	0.00	0.99	-0.01	0.04	0.01	-0.01	-0.01
I take note or write down key words while reading.	0.00	0.99	-0.01	0.04	0.02	-0.01	-0.01
I tried to understand the meaning of an unknown word by dividing it into parts	-0.10	-0.02	0.83	-0.04	0.02	-0.01	-0.14
I read slowly but carefully to be sure I understand what I am reading.	-0.03	-0.01	0.78	0.06	-0.07	0.09	-0.04
I picture or visualize information to help me remember what I read.	0.34	-0.04	0.16	0.54	0.15	-0.10	-0.27
I figure out the main idea of each paragraph.	0.09	0.00	-0.05	-0.43	0.05	0.17	-0.32
I guess what will come next.	-0.02	0.02	-0.01	0.26	0.07	0.08	-0.03
I pay attention to sentence structure, such as subjects and objects.	-0.13	0.00	-0.13	0.20	-0.04	0.00	-0.14
When I lose concentration, I do everything I can to get back on track.	0.02	-0.01	0.01	0.16	-0.02	0.01	0.03
I use tables, figures and pictures in text to increase my understanding.	-0.38	-0.04	-0.04	0.15	0.66	0.02	-0.16
I pay attention to the beginning and the end of each paragraph.	0.34	-0.05	0.07	-0.01	0.49	0.13	0.08
When I cannot understand a sentence, I skip that sentence.	-0.02	0.01	-0.04	-0.35	0.47	-0.09	0.22
I decide what to read closely and what to ignore.	0.34	0.07	-0.16	-0.08	0.42	0.27	-0.07
I use the title or pictures to guess what I would read.	0.34	-0.01	0.06	-0.09	0.41	0.20	-0.34
I read the comprehension questions first and then read the text.	0.23	-0.02	-0.04	0.31	0.37	0.11	0.31
I use slashes to divide a sentence grammatically.	0.07	-0.09	-0.06	0.44	0.08	0.58	0.18
I focus on the tense of a verb, such as present tense and past tense.	0.28	-0.07	-0.02	0.20	0.03	0.52	-0.05
I stop from time to time and think about what I am reading.	0.16	-0.01	-0.02	0.10	-0.03	-0.46	-0.07

I use context clues to help me better understand what I am reading.	0.00	0.04	0.00	-0.07	0.00	0.41	-0.05
I skip unknown words.	-0.05	-0.02	0.01	0.10	0.02	0.24	0.02
I use dictionaries to help me understand what I read.	0.17	0.13	0.25	0.00	0.20	-0.15	0.40
I critically analyze and evaluate the information presented in the text.	-0.02	-0.03	-0.03	-0.02	0.01	0.02	0.28
I focus on every word in the text to understand its meaning.	-0.04	0.00	-0.07	-0.03	0.03	-0.06	0.27
I check what each pronoun refers to.	-0.04	-0.02	0.03	0.09	-0.05	0.08	0.26
I connect what I read in English to help me understand a text written in Chinese.	-0.03	-0.02	-0.01	0.05	0.06	-0.07	-0.18
I continue reading even if I have difficulties.	-0.07	0.00	0.05	0.08	0.11	-0.10	0.12

Note. Chinese factor analysis results: Only .30 loadings or above are reported. 44% of variance in Chinese RSI associated with the Chinese reading task.

Factor 1 (17 items): Problem-solving and active involvement in comprehension and monitoring (21% of variance explained).

Factor 2 (2 items): Visual action to understand key/important parts (5% of variance explained).

Factor 3 (2 items): Analytical reading on word level (4%).

Factor 4 (2 items): Visualize to remember (4%).

Factor 5(6 items): Analytical comprehension strategies using text features (4%).

Factor 6 (4 items): Interactive-process strategies (bottom-up, top-down) (3%).

Factor 7 (1 item): Using dictionaries for comprehension (3%).

Differences between this factor structure and the one for English reading strategies will be discussed in a future publication but are not included in this dissertation.

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