

A Cross-linguistic Within-subject Designed Study on the Relationship between  
Comprehension Strategies in First and Second Language Reading

by

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A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of the

DOCTOR OF PHILOSOPHY

in the Department of Communication and Social Foundations

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### ABSTRACT

This is a cross-linguistic within-subject designed exploratory study intended to investigate the relationships between comprehension strategies in first (L1) and second (L2) language reading. The research questions are as follows: 1. What specific comprehension strategies were used by these Chinese readers reading expository texts in Chinese (L1) and English (L2)? 2. To what extent did these Chinese readers use similar or different comprehension strategies when reading in Chinese (L1) and in English (L2)? Eight Chinese graduate students at the University of Victoria participated in this study. Think-aloud technique and comprehension strategy check-lists were used jointly to collect data on the participants' comprehension processes when they read expository texts in Chinese (L1) and English (L2). The participants' reading and think-aloud performances were audio-taped. The think-aloud tapes were transcribed afterwards to obtain real-time data on the participants' comprehension processes. The comprehension strategy check-list was used as a backup data source and an instrument to triangulate the data obtained from the think-aloud protocols. The results of data triangulation indicated that the two data collection instruments were valid and reliable for the collection of data of participants' comprehension processes. Seven findings were obtained from the study. The findings suggest that participants used the same types of strategies to process reading in the two languages. The script of the language did not change the pattern of participants' comprehension processes. However, the script of the language did change the frequency of occurrences of some type of strategies. That is, some participants did use some strategies more frequently in L1 than in L2 or vice versa. The findings of this study supported and were supported by Cummins's (1984, 1991) Common Underlying Proficiency Hypothesis and Goodman's (1970, 1971, 1973) Universal Hypothesis. The findings provide evidence to suggest that participants

tended to use the same types of strategies when reading in L1 and L2. Based on the findings, the researcher concludes that there is a strong relationship between comprehension strategies in L1 and L2 reading. The evidence suggests that there is not a single set of strategies that is more effective than others for all learners. What kinds of comprehension strategies that a reader used depend on the text clues available to the reader and on prior knowledge that a reader brought to the reading task. On the basis of the results of the study, the researcher contends that the most effective strategy training may consist of encouraging readers to become more aware of their existing comprehension strategies and aware of their strategy use. Limitations of the study were addressed. First, the number of research participants was relatively small in terms of generalization. It is not possible to make generalizations from a group of eight participants. A further limitation is that the participants in this study were reading aloud, which is certainly not their normal mode of reading. It is possible that the think-aloud performance itself may have affected the nature of data collected. The results shed light on the existing body of theoretical knowledge about comprehension processes through which researchers and L2 instructors may look anew at our students' performance and at the instructional methods and the techniques we have adopted.

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## ACKNOWLEDGMENTS

A special acknowledgment is reserved for my supervisor, Dr. Johnson. He was always available for consultation, guidance, creative suggestions and support, which were very important to me.

Appreciation will go to Dr. Anderson, Dr. Bryant, Dr. Evans, and Dr. Harker not only for their constructive suggestions, but also for the superlative training they have provided me with over the last three years. I am fortunate to have worked with such understanding and helpful people.

Sincere thanks will be extended to the University of Victoria for offering me the fellowship throughout the time I pursued my doctoral degree.

I am very grateful and in debt to sixteen Chinese graduate students who helped me and donated their time to participate in this study. Without their cooperation and support, I could not have finished my dissertation successfully.

I will express my thanks to my family and friends. They were always there to nourish me, never letting me consider for a moment that I would not successfully complete this manuscript.

Thanks will go to my husband, for being reliable source of encouragement and motivation. Special thanks will also go to my son for his understanding, patience and support.

## DEDICATION

This dissertation is dedicated to my parents. I will be eternally grateful for their love. It is through their love that I have developed the strength to continue to work for improvement in education.

## Chapter One: Introduction

### 1.1. Purpose of the Study

The purpose of this research is to study the relationships between reading comprehension strategies in first language and second language reading. Most first language (L1) readers achieve reading proficiency from many thousands of hours of practice over a lifetime of reading. It is amazing that many second language (L2) readers can achieve a similar level of reading proficiency in a second language from fewer hours of formal reading practice. Do L1 literacy experience and skills facilitate reading comprehension in a second language? Within the literature on L2 reading, there is relatively little research on the relationship between L1 and L2 reading, and less on the relationships between L1 literacy and L2 literacy skills within educated adult L2 readers.

Researchers in second language reading have recently, as Block (1992) claimed, "ceased debating whether reading is a bottom-up, language process or a top-down, knowledge-based process" (Block, P. 319). A number of significant factors influencing L2 reading, (e.g., effects of orthographic structure of the first language, rhetorical structure, cultural factors) have been investigated, and some insights have been obtained. Previous research has enabled us to understand more about the impact of cultural factors, content and rhetorical structure on the comprehension of L2 written texts (Carrel, 1984a; 1984b; Johnson, 1981). Research on schema theory has helped us to understand why L2 readers sometimes fail to comprehend an L2 passage (Johnson, 1981; Lee, 1986). However, this

kind of research has not explained L2 readers' reading comprehension processes. We still do not know what L2 readers do when they realize they have failed to comprehend written material or whether L2 readers use the comprehension strategies obtained in their L1 reading experience to solve their L2 reading problems. Nor do we know if they use different strategies in L1 and L2 to solve their comprehension problems, or whether L1 literacy affects L2 readers' comprehension strategies.

If second or foreign language instructors are to deal efficiently with readers of various linguistic backgrounds, they need to know more about the relationship between L1 literacy and L2 reading. More research is therefore needed on the relationship between reading comprehension strategies in L1 and L2 of particular individuals.

This study was designed to explore the relationship between comprehension strategies used in L1 and L2 reading, to find out whether Cummins' (1984, 1991) Common Underlying Proficiency model can be applied to educated adult L2 readers, and to determine whether reading comprehension is a cognitive universal process. In order to know more about academic L2 readers' comprehension processes and to better understand the Common Underlying Proficiency Hypothesis (Cummins, 1984, 1991), and the Universal Hypothesis (Goodman, 1970, 1971, 1973) the goal of the intended study is two-fold:

(1) to provide descriptive information on the reading comprehension strategies used by academic L2 readers who are Chinese native speakers and who are functioning successfully as readers of English as a second language at the University of Victoria;

(2) to ascertain to what extent these readers' comprehension strategies are similar or different when they read in their native language and in their second language.

## 1.2. Statement of the Problem and Need for the Study

In today's world, more and more people need to be literate not only in their native language, but also in a second language. However, little information on reading comprehension processes in a second language has been obtained. We are still uncertain if proficient readers of English as a second language (ESL) use similar comprehension strategies when reading in their native language and in the second language. Moreover, we have little knowledge about the actual comprehension processes of ESL readers who do obtain acceptable scores on proficiency tests (e.g., TOEFL) and function quite well in an academic environment. Considering our lack of knowledge about this type of second language reader, investigation is needed to determine how these already-literate readers read in a second language, what the relationship is between their L1 reading comprehension strategies and their L2 reading performance, and whether these reading comprehension strategies are universal and interdependent across languages, or whether there are generic processing strategies that accommodate both first and second languages (Bernhardt, 1991). Analyses of the relationship of the comprehension strategies between L1 and L2 reading may lend insight into the Common Underlying Proficiency Hypothesis (Cummins, 1984, 1991), and the Universal Hypothesis (Goodman, 1970, 1971, 1973).

### 1.3. Theoretical Framework and Research Assumptions

This study was based primarily on the following existing theories and research assumptions which are related to L2 reading:

#### 1.3.1. Existing L2 Reading Theories

1. Psychological perspective. Esling and Downing (1986) suggested the possibility of literacy transfer across languages and, based on this assumption, put forward their transfer hypothesis. According to this hypothesis, the skill of literacy, like the skill of oracy, is learned only once in an individual's lifetime, though he or she may transfer those skills to other languages.

2. Cognitive perspective. There is a cognitive/academic proficiency that is common for all languages (Cummins, 1984). Although the surface orthographic structures of languages may be different, an underlying proficiency is presupposed which is common across languages.

3. Psycholinguistic perspective. The primary goal of reading is comprehension. The comprehension process is thought to be universal since no matter in which language, the ultimate purpose of reading is the same. Goodman (1971) suggests that the reading process cannot vary to any extent from one language to another since the key question is how much background knowledge the reader brings to the specific reading task.

#### 1.3.2. Research Assumptions

This study was based on the following research assumptions indicated in the literature, and attempted to meet the needs of L2 reading research.

1. Second language reading research has not sufficiently emphasized that first language literacy is a significant component in second language reading (Bernhardt 1991).

2. The major problem of previous studies of L2 reading is that they provide insufficient information about the relationship of reading comprehension strategies between L1 and L2 reading in the same individuals (Alderson, 1984).

3. Insights into the relationship between L1 and L2 reading comprehension processes can only come from empirical studies using a cross-linguistic within-subject design. Such studies compare the performance of the same individuals in various L1 reading tasks to their performance in similar L2 reading tasks (Hulstijn, 1991).

4. The methodological assumption is that utilizing a think-aloud technique during reading performance and a comprehension strategy check list immediately after the reading task will provide realistic descriptions of readers' comprehension processes.

#### 1.4. Research Questions

For the purpose of the research, and based on the theoretical framework and research assumptions, the research questions are addressed as follows:

1. What specific comprehension strategies were used by these Chinese readers reading expository texts in Chinese (L1) and English (L2)?

2. To what extent did these Chinese readers use similar or different comprehension strategies when reading in Chinese (L1) and in English (L2)?

### 1.5. Significance of the Study

A crucial question concerning the nature of the effect of L1 reading comprehension strategies on L2 reading remains unanswered. This question appears to be of great importance in two aspects. First, we stand to gain in our theoretical understanding of the notions of L2 proficiency in general and L2 reading proficiency in particular if they could be linked with existing L2 reading theories such as the Common Underlying Proficiency Hypothesis (Cummins, 1984; 1991), and the Reading Universals (Goodman, 1970; 1971; 1973). Second, such research may hold important consequences for L2 instruction. This kind of research may enable us to understand L2 reading comprehension processes better, and provide L2 researchers and L2 instructors with insights into L2 readers' reading comprehension processes. Consequently, such research may also change our view of L2 reading instruction.

Even though L2 reading research has begun to attend to comprehension processes (Block, 1986; 1992), information on these comprehension processes is still limited. In addition, most previous researchers draw assumptions about readers' comprehension strategies by examining readers' comprehension scores, that is, how many correct answers the students provide for a cloze test or a multiple choice test (Carrell, 1989, Carson et al., 1990). Strictly speaking, since these kinds of instruments test the end-product of comprehension rather than the processes of task performance, we still do not know what L2 readers are actually doing when they process the text toward comprehension. It is essential that we learn more about the strategies which readers use to make sense of expository texts in both their L1 and their L2. This study attempts to address that need.

This research is an exploratory study intended to examine the relationship between L1 and L2 reading comprehension strategies with academic L2 readers. Theorizing about reading comprehension strategies in both L1 and L2 reading activities requires an experimental design which directs research attention to ongoing process. Ericsson and Simon (1984) suggest that process-tracing methods provide a conscientious analysis and synthesis of the strategies readers use. This study portrays readers' verbalizations of comprehension processes by using the think-aloud technique as a data collection procedure, and a reading comprehension strategy check list to collect additional data so as to compensate for some weaknesses of the think-aloud protocols (which will be discussed in Chapter 3) and to triangulate the data obtained through the think-aloud protocols. By collecting the concurrent data of the same individual readers reading in Chinese (L1) and English (L2), the researcher obtained more insights into how these L2 readers processed the texts in the two languages concerned, what specific strategies they used, and to what extent these strategies were similar or different in L1 and L2 reading. Thereby, this study helps us understand better the Common Underlying Proficiency Hypothesis and the Universal Hypothesis.

## 1.6. Definition of Terms

### **L1 and L2 Readers**

L1 refers to the first or native language of a person. L1 readers are readers who read in their native language. In the case of this study, L1 refers to Chinese.

## **L2 and L2 Readers**

L2 refers to a second language, or a language besides the native language, that a person is learning or dealing with. L2 readers are persons who can read in a language other than their native language. In this study "L2 readers" refers to readers who are not only proficient readers in their native language, but also have mastered the fundamental knowledge of the target language, so that reading in an L2 has become part of their life. In the case of this study, L2 refers to English.

## **Academic L2 Readers**

In this study, "academic L2 reader" refers to graduate students who are undertaking graduate studies and research in various subject fields at the University of Victoria.

## **English as a Second Language (ESL)**

English is taught and learned in a situation where the language has social status in the community as an official language, as the medium of instruction in some sector of public education. In the ESL situation, learners can not only learn the language in a formal classroom, but also acquire the language in their daily lives. As for reading, ESL learners can read more extensively outside of class, e.g., reading advertisements, notices, newspapers, and books according to their own interests.

## **Reading Comprehension Strategies**

Reading comprehension strategies are cognitive moves selected during reading to solve problems or to achieve particular goals. Reading comprehension strategies (i.e., predicting, summarizing, etc.) are the mental operations involved when readers

purposefully approach a text to make sense of what they read. These may be either conscious techniques controlled by the reader or unconscious processes applied automatically (Barnett, 1989; van Dijk & Kintsch, 1983).

### **Authentic Material**

Authentic material refers to an article or a passage chosen from a publication without any editing or change in language or organizational style. In other words, the material retains its original form.

### **Cross-linguistic Within-subject Design**

Cross-linguistic within-subject design refers to a study in which the same individuals are examined on both their L1 and L2 reading performances in similar reading tasks. Such a study compares the performance of the same individuals in similar reading tasks in L1 and L2 so as to find commonalities or differences between individuals' reading comprehension strategies when they deal with different languages.

#### **1.7. Limitations of the Study**

1. The study is an exploratory investigation into the relationship of reading comprehension strategies between L1 and L2 reading among Chinese graduate students. Because of the characteristics of the subjects in the study, the results obtained may not be generalized to L2 readers of different educational or linguistic backgrounds.

2. The study does not assess the subjects' L1 reading ability since the participants in the study are assumed to be proficient L1 readers on account of their educational background. If this study is to be replicated with other language groups, or with subjects

of different educational backgrounds, and if a standard reading test is available, L1 reading ability should be more fully assessed.

3. The results obtained in this study are specific to the unique combination of text, task, context, and reader background knowledge. The results do not reflect the entire Chinese graduate student population since the study was undertaken with particular people reading particular texts under particular circumstances.

4. Further research is needed to understand more about the relationship between readers' L1 and L2 reading comprehension strategies. Further research can be conducted with subjects of different linguistic backgrounds, or with larger groups, using reading materials of different discourse types, such as narrative, fiction/nonfiction.

5. Use of think-aloud techniques is a time-consuming task. Considering the limitations on the time of the participants and the researcher, the research was done with a small group of participants. The generalizability of a limited scale study is always open to question.

6. The instruments of data collection, namely, the think-aloud task itself and the texts, may have affected the participants' comprehension strategies.

In the following chapter, literature relevant to the present study will be reviewed. Chapter Three will present the methodology review; Chapter Four will address the design of the present study; Chapter Five will present the result of the study from both group and individual perspectives; Chapter Six will discuss the findings of the study in the theoretical frame presented in Chapter Two. The study concludes with Chapter Seven, in which

findings are summarized, conclusions are developed, and implications for future research and instructional pedagogy are presented.

## Chapter Two: Literature Review

The relationship of reading comprehension strategies between L1 and L2 is, of necessity, a complex and multi-dimensional topic. To grasp its fundamental structure, a vast body of literature must be surveyed. In this chapter, I include current research from three points of view relevant to the study: 1) existing L2 reading theories which underlie the relationship between L1 and L2 literacy skills; 2) reading comprehension strategies and strategy use; and 3) the relationship between L1 and L2 reading. Some contrary viewpoints are analyzed and discussed as well.

### 2.1. Theories Underlying the Relationship between L1 Literacy skills and L2 Literacy

#### Development

In this section, three existing L2 reading theories which analyze the relationship between L1 and L2 literacy are included: Esling and Downing's (1986) Transfer Hypothesis, Cummin's (1983, 1991) Interdependence Hypothesis, and Goodman's (1970; 1971; 1973) universal hypothesis.

#### 2.1.1. The Transfer Hypothesis of Reading

Esling and Downing (1986), working from a psychological perspective, suggested the possibility that literacy transfer could happen across languages. Transfer here, from the current researcher's understanding, is being used in a general

psychological sense, and not in the limited sense that it has in language acquisition studies, in which it refers to the transfer of specific linguistic structures. Salomon and Perkins (1988; 1987) offer a framework for explaining the conditions under which transfer will occur more reliably. They distinguish two different kinds of transfer, the "low road" and the "high road" (Perkins, et al. 1990, p.295). According to the above researchers, low road transfer occurs spontaneously, when patterns of cognitive processing automatized in one context are triggered in another by a similarity of stimulus conditions. As explained by Perkins' example, sitting behind the wheel of a truck will trigger one's car-driving skills, which fortunately suit the truck context fairly well. High road transfer happens by mindful decontextualization of principles from one context and application to another. For instance, a chess player, getting involved in politics, might abstract the principle "control the center" from chess and apply it to the political arena (Perkins, et al., 1990).

Reading comprehension in an L2 might involve both low road and high road transfer. For example, an L2 reader, facing a text in the target language, may find that his or her experience of decoding, deriving or constructing meaning from the context will fit the L2 reading context, an instance of low road transfer. As for the high road transfer, L2 readers might use their awareness of knowledge held in long-term memory to facilitate their reading comprehension.

Based on research on skill acquisition in general, Esling and Downing apply the findings to reading in particular. They argue that reading is a skill that can be developed in any language. They assume that there exists a universal pattern of skill

development. Any skill, such as reading, is developed through the universal pattern which consists of three overlapping stages: cognitive, mastering, and automaticity. At the first stage, learners try to figure out what they should attempt to do in performing the skill. At the second stage, the learners work to perfect the performance of the skill. Then they practice until they obtain automaticity. "Once automaticity has been achieved, a skill like reading does not atrophy" (Esling & Downing, 1986, p. 56). Based on this assumption, Esling and Downing have proposed the transfer hypothesis as follows:

The skill of literacy like the skill of oracy is learned only once in an individual's lifetime though he or she may transfer those skills to other specific languages. (p.60)

The transfer hypothesis assumes that reading, as a skill, can be transferred because reading is also considered to be developed through the three typical stages till it reaches its automaticity. Once automaticity is obtained, a reader is expected to apply his reading skills developed in one language to any other languages, despite differences in the written systems of the languages concerned. However, research on L2 acquisition in general and L2 reading in particular has not yet provided sufficient evidence to support Esling and Downing's transfer hypothesis. What is notable in research on transfer is that the great majority of studies focuses on such manifestations as the transfer of specific linguistic structures that lead to errors (i.e., negative transfer) and on transfer in language production (Ringbom, 1992). In other words, this kind of research focuses on cross-linguistic similarity or difference rather than on language comprehension processes, that is, the involvement of higher-level cognitive

processes such as using previous knowledge in long-term memory to facilitate language comprehension.

Esling and Downing's hypothesis suggested a transfer beyond formal or linguistic similarity and dissimilarity. What they suggested is that once a person acquires reading skill in any language, he or she can apply the skill to any other language. This hypothesis implies that reading skill includes "knowing how" (Esling & Downing, 1989, p. 57). In other words, the focus of the transfer hypothesis of reading is on cognition. The "knowing how" is also called "procedural knowledge" (O'Malley & Chamot, 1990), or operational knowledge (Bernhardt, 1991). The so-called procedural knowledge includes knowing when-what, that is, when you need to do what to help achieve the goal. This kind of knowledge can only be developed and acquired gradually through plenty of practice. Once the procedural knowledge is obtained, it can possibly be applied to other similar situations. In accord with Esling and Downing, Bernhardt also suggests that once a person has learned how to read, no matter in which language, he or she does not need to learn to play this game again.

Nonetheless, L2 reading research has not yet provided any persuasive evidence for the transfer hypothesis. Liu et al. (1992) compare sentence-processing strategies by observing the listening comprehension processes of bilingual speakers of English and Chinese. The findings of their study indicate that transfer of sentence-processing strategies occurs among the subjects. However, the study focuses on linguistic-specific structure, namely, word-order in the two languages concerned. It indicates language transfer rather than cognitive strategy transfer. Therefore, we still do not know if or

how this transfer happens, or under what circumstances the transfer happens. Still, research studies in L2 reading indicate that readers perform reading tasks similarly in L1 and L2 (Clarke, 1979, 1980; Benedetto, 1984, among others). Can the transfer hypothesis of reading explain the phenomena that L2 readers performed similarly in L1 and L2? Is it possible to test whether a strategy used by a reader was developed in L1 reading experience or was acquired in L2 reading practice? The transfer hypothesis of reading might be adequate in theory, but not testable in research. We need further research to explore the nature of transfer if it happens in L2 reading. Cummins' (1983, 1991) work with bilingual children provides a consistent point of view concerning the possibility of transfer across languages, and addresses a theoretical position on the issue of transfer of literacy skills.

#### 2.1.2. Common Underlying Proficiency Theory (The Interdependence Hypothesis)

Cummins (1981, 1983) makes a strong case for the transfer of literacy skills across languages. He states that an underlying cognitive/academic proficiency exists which is common to all written languages. This theory of a common underlying proficiency is also called the interdependence hypothesis, and suggests, from a cognitive point of view, that there is a cognitive/academic proficiency that is common for all languages. Cummins (1983, 1984) explains that there is only so much space or capacity available in our brains for language or literacy. He compares the space of language or literacy to a balloon. If we divide the space between two languages, blowing into the L1 balloon will succeed in inflating L1 but not L2. If that is the case,

literacy in neither language will develop properly. For the purpose of bilingual education, Cummins argues that we can better inflate the L2 balloon by blowing into the L1 balloon because the space for literacy development is not, and should not be separated. L2 learners can thus benefit from proficiency either in L1 or in L2, or from both, since literacy skills can be seen as common or interdependent across languages. This common underlying proficiency is believed to facilitate the transfer of cognitive/academic skills from one language to another. As such, a theoretical foundation for the interdependence hypothesis is given. Research in bilingual education has provided evidence for Cummins' Common Underlying Proficiency model from different aspects, such as studies relating age on arrival and immigrant students' L2 acquisition (Cummins, 1980, 1981); results of bilingual students' L2 acquisition (Cummins, 1984); and studies of the relationship between L1 and L2 proficiency (Cummins & Mulcahy, 1978).

The Common Underlying Proficiency theory expresses the point that experience with either language can promote development of the proficiency underlying performance in both languages. It also indicates that L2 learners, particularly educated adult L2 readers, have two channels by which to inflate their capacity for literacy development. Cummins (1981) further contends that surface aspects, such as oral fluency, develop separately in L1 and L2, but that an underlying cognitive competence required for the development of literacy skills is common to L1 and L2. This suggestion implies that the level of L2 reading proficiency is largely predicted by L1 literacy competence. It should be pointed out that Cummins' theory is

contrary to Esling and Downing's in its view of oracy development. However, oracy skills are not the focus of the present study, and will not be discussed further.

With respect to Cummins' theory, the common underlying cognitive/academic proficiency has different L1 and L2 surface manifestations. Although the surface orthographic structures of languages are different, an underlying proficiency is presupposed which is common across languages. In reading, the surface features of L1 and L2 are the objects of lower-level cognitive processing, having become relatively automatized or less cognitively demanding, whereas the underlying proficiency is one that involves higher-level cognitive processes in reading comprehension.

This model, from a cognitive point of view, lends support to the possibility of transfer of literacy skills across languages, since literacy-related skills involve cognitive processes. Cummins believes that the common underlying proficiency would predict that reading instruction in one language not only leads to literacy skills in that language, but also to a deeper conceptual and linguistic proficiency which is strongly related to literacy and other general academic skills in the other language. Cummins (1991) presumes that the unidirectional literacy skill transfer occurs from L1 to L2. Previous research (e.g., Lambert & Tucker, 1972; among others) on bilingual education of children provides evidence for this interdependence hypothesis.

Providing a transfer occurs in reading across languages, transfer should also occur in adult L2 readers' reading processes and should not be only unidirectional as Cummins (1991) proposed. The common underlying proficiency model suggests that educated adult L2 readers who are already literate in their L1 may have two channels

available to them as they develop literacy skills in their L2. They can draw on their literacy skills and knowledge of literacy practices from their L1, and they can also draw on input from the second language. Therefore, research on educated adult L2 readers might indicate a two-way transfer, that is, from L1 to L2 and vice versa, since adult educated L2 readers have something to transfer both ways. Liu et al.'s study on listening comprehension processing mentioned earlier provides evidence of "backward transfer" (Liu, et al., 1992, p. 472), that is, transfer of listening comprehension skills from L2 to L1. However, there has been no research done to test the Common Underlying Proficiency Hypothesis with educated adult L2 readers.

The reason that we lack research on two-way transfer among educated adult L2 readers might be that a transfer phenomenon is difficult to test among these readers, or that this phenomenon is neglected or overlapped by other factors such as the reading universals proposed by Goodman (1970; 1971; 1973).

### 2.1.3. The Reading Universal Hypothesis

Cummins' Common Underlying Proficiency Theory assumes that the same basic literacy skills underlie the processing of meaning in L1 and in L2. In accordance with Cummins, but from a psycholinguistic point of view, Goodman, (1970, 1971, 1973), put forward the Reading Universal Hypothesis. This hypothesis suggests that the primary goal of reading is comprehension. Comprehension can only be obtained by making use of both sensory and nonsensory sources (Rumelhart, 1977), or seen and unseen information (Bernhardt, 1991) to reconstruct the meaning of a given passage.

During reading, readers predict the meaning of a text by relating it to their background knowledge; they use other strategies available along with the incoming sensory data. Then the readers may refine, confirm, or even reject the initial prediction.

In accord with Goodman's suggestion, Miller (1988) analyzes the reading comprehension process and contends that reading comprehension includes visual decoding processes, cognitive processes that integrate the information in a text with general knowledge. Of these, only decoding is specific to a certain language. The other two processes may be universal to any language. Hence, reading is thought to be universal in any language since no matter in which language, the ultimate purpose of reading is the same. Goodman (1973) suggests that the reading process cannot vary to any extent from one language to another, since the key question is how much background knowledge (e.g., linguistic knowledge, content knowledge, strategy knowledge) the reader brings to the specific reading task. He goes further and postulates the reading universal hypothesis. The reading universal hypothesis argues that the reading process will be much the same for all languages, with minor variations to accommodate the specific characteristics of the writing systems and the grammatical structures of each.

Research on orthographic differences in L1 and L2 reading (Koda, 1989; 1990, among others) indicates some difference in word recognition processes in different languages. However, word recognition is just one of the primary steps of reading comprehension. Recognizing words is a lower-level and mechanical process compared with the other processes such as relating to previous relevant knowledge stored in the

long-term memory. In being consistent with Goodman's hypothesis, Rosenblatt (1985) strongly suggests that we need not pause here to deal with the primary level of recognition of the printed signs. As soon as we turn to the matter of their lexical or semantic interpretation as symbols, we find ourselves involved in consideration of "what the reader brings to the text -- a fund of past linguistic, literacy, and life experiences".

Based on the universal hypothesis, Goodman claims that learning to read a second language should be easier for someone already literate in another language, and good L1 readers are more likely to be good L2 readers, regardless of how similar or dissimilar the orthography is, since the essential characteristics of the reading comprehension process are universal. Some research on L2 reading (Clarke, 1979; 1980; Benedetto, 1984), lends support, to some extent, to Goodman's universal theory and his claims.

Goodman calls for researchers "to test and challenge the hypotheses in terms of languages and orthographies other than English" (Goodman, 1970, p. 103.). Unfortunately, no research has been done in L2 reading to test this hypothesis. However, previous studies with adult second language readers (Hauptman, 1979; Benedetto, 1984; Block, 1986; 1992), no matter what the initial intentions of the studies were, have revealed some similarities in reading comprehension processes across the languages concerned. What is the underlying cause of the similarities? Could we interpret the similarities as being caused by reading universals? Or is there a universal pattern that proficient readers follow when they read in any language?

Instead of saying reading comprehension is universal, other researchers, such as Lee and Musumeci (1988) and Block (1986, 1992), present some empirical evidence suggesting that the reading comprehension process is a "stable phenomenon". Block (1986) investigated the reading comprehension strategies of L2 readers who were native speakers of Chinese and Spanish compared with those of L1 readers whose native language was English. Her findings indicate that the subjects with different L1 backgrounds performed similarly when reading in English (L2), and that they also performed similarly to the native speakers of English. Based on this result, she claims that strategy use in reading is a stable phenomenon which is not tied to specific language features.

Block's findings imply that reading comprehension is a universal process. Previous research also suggests that reading is not merely a linguistic process, beyond the primary stage of reading, say, the stage of decoding or word recognition, but also a cognitive process. Reading comprehension in any language requires cognitive and metacognitive skills. It is these cognitive and metacognitive skills that enable a reader to make use of his background knowledge, to sample and predict the printed information, to evaluate former predictions, to monitor understanding, and to repair comprehension when necessary. It is assumed that these cognitive and metacognitive strategies are universal. Once these kinds of skills have been developed, no matter in which language, readers should be able to apply them to reading in any language providing they have attained a sufficient mastery of the language in question.

#### 2.1.4. Summary

The foregoing theories from three different theoretical standpoints, namely, the cognitive, psychological, and psycholinguistic perspectives, claim that reading is a skill transferable, interdependent, and universal across languages. These three existing theories share some commonalities, and their core features overlap. According to the present researcher's understanding, all these theories emphasize cognitive commonalities in reading comprehension processes across languages. All these theories indicate that there is a relationship between L1 literacy and L2 literacy development. What we need is empirical research to explore the nature of the relationship between L1 and L2 reading. It should be pointed out that previous studies (Block, 1986; 1992) compare L1 readers' comprehension processes with those of L2 readers. To better understand the relationship between L1 and L2 reading comprehension processes, we need information about how the same readers cope with reading tasks in their L1 and L2. We should probe how these readers gather and use information available to them to construct their understandings. Evidence can only be obtained from empirical experiments on comprehension processes in L1 and L2 with the same individual readers.

## 2.2. Research on Comprehension Strategies and Strategy Use in L2 Reading

### 2.2.1. Comprehension Strategies

Language comprehension is viewed in cognitive theory as an active, constructive process that applies equally to listening or to reading. According to

O'Malley and Chamot (1990), the comprehension process progresses through stages of perceptual analysis, parsing, and utilization of the meaning uncovered in oral or written text. Similar to O'Malley and Chamot's notion, other researchers, such as Ulijn (1976) and Schank (1972; 1975) contend that comprehension includes parsing and inferring. Parsing, which is largely controlled by conceptual information, represents the meaning of each individual sentence of the text. A process of inference, on the other hand, helps to construct the meaning of a text since a text usually leaves many concepts unexpressed, so that the reader has to infer them from his conceptual knowledge. A reader has some alternatives to generate conceptual knowledge, or background knowledge to form hypotheses and expectations about the text. These alternatives can be called reading comprehension strategies. Cognitive theory holds that the comprehension process is a process in which the reader uses various kinds of knowledge (e.g., linguistics, content, strategy, etc.) selectively and interactively to reconstruct meaning of a written text. At each of the stages, complex processing and strategic analysis take place to assist readers in detecting or inferring meanings and in relating the information to their existing knowledge.

The notion of comprehension strategy was first introduced in 1970 by Bever in the context of sentence processing. Since then, several other researchers (Kintsch & van Dijk, 1983, among others) have employed the notion, and extended the notion from the sentence level to the discourse level. These researchers suggest that understanding a written text involves not only the processing and interpretation of printed data, but also the activation and use of internal, cognitive information. Thus

the reader has three kinds of data, namely, information from the text, information from the situation or context, and information from the cognitive presuppositions (van Dijk & Kintsch, 1983).

Researchers also claim that comprehension strategies are part of our knowledge (van Dijk and Kintsch, 1983; Block, 1986, 1992; Barnett, 1988). Reading comprehension is considered to be a complex activity involving various strategies that readers use to construct meaning of a written text. Among them, some strategies may be called linguistic strategies, since they are language-specific. Some are considered to be lower level aspects of reading, such as feature analysis of the print and word identification, with the parsing of phrases and sentences and the assembly of idea units. Also some are considered to be the higher level aspects of reading comprehension, including drawing upon prior knowledge and integrating the information in the text with prior knowledge (Perfetti, 1985; Stanovich, 1991). The high-level aspects of reading comprehension strategies are more cognitive and involve the use of world knowledge, personal experience, prior related information, and other cognitive information, such as opinions, beliefs, attitudes, interests, plans, and goals. What strategies readers use, however demonstrate the knowledge they have about understanding a text, the ways in which they process the text, and certain kinds of schemata that they activate to facilitate their comprehension.

So far the effective use of reader schema is the only comprehension strategy to have occasioned extensive L2 research (Barnett, 1988). Cassanave (1988) contends that the area of schema has been more appealing because the test designs are less

complicated. As well, the concept of schema is more concrete and easier to gain insights into than other cognitive processes. Research on schema theory provides information about why L2 readers fail to understand a given type of text, and how to provide L2 readers with appropriate information they lack before reading. Nonetheless, no information indicates what readers actually do with schemata or how readers overcome their comprehension obstacles to reach their comprehension of a given text. Research on schema theory provides evidence that world knowledge or linguistic knowledge will be used to aid in interpreting the meaning of a text. Research studies indicate that L2 readers fail to understand a written text in the target language either because they lack appropriate schemata (of content, cultural, or rhetorical), or because they fail to activate them. Research also shows both that activating appropriate schemata or providing necessary background helps L2 readers comprehend more, and that familiarity and unfamiliarity of the content area of texts will affect L2 readers' use of comprehension strategies (Carrell, 1984, 1989; Bernhardt, 1986; Johnson, 1982; Lee, 1986 among others).

To better understand the comprehension process, we should not only know why L2 readers fail to understand a written text, but also know how they process a written text, how they understand it, and what strategies they use to solve their comprehension problems and to fix their comprehension failures. In this sense, research on strategy use is, at least, as important as learning why L2 readers fail to understand a written text. However, researchers have different notions of strategies. Some researchers believe that strategies are tactics that readers use on purpose and

consciously (Paris et al., 1983). These researchers try to distinguish skills from strategies. They define skills as actions that readers take unconsciously, whereas strategies are conscious moves that readers take in order to solve comprehension problems. Another notion holds that "comprehension strategies are generally unconscious. Strategic behaviour is neither necessarily unconscious nor necessarily automatic" (van Dijk & Kintsch, 1983, p. 31). For the purpose of this study, the current researcher considers all readers' alternative moves, operations or procedures to achieve the goal of comprehension, both conscious and unconscious, to be strategies.

These researchers also suggest that one of the fundamental properties of strategies is that they are not independent. Thus, readers can use strategies jointly and selectively to reach their comprehension goals. However, what strategies are to be used, how to process the text, and what kinds of knowledge structures are needed are decisions that can only be made by a certain reader in a certain context, and for a certain reading purpose. van Dijk and Kintsch (1983) propose that:

The strategies applied are like effective working hypotheses about the correct structure and meaning of a text fragment, and these may be disconfirmed by further processing. Also, strategic analysis depends not only on textual characteristics, but also on characteristics of the language user, such as his or her goals or world knowledge. This may mean that a reader of a text will try to reconstruct not only the intended meaning of the text -- as signaled by the writer in various ways in the text or context -- but also a meaning that is most relevant to his or her own interest and goals. (p.11)

Another important characteristic of strategies is that they are difficult to study because they happen in readers' brains. Some kinds of problem solving and decision

making can be applied very quickly and in a highly automatized way in language understanding. Furthermore, only certain kinds of strategies are open to empirical assessment via protocol analysis (van Dijk & Kintsch, 1983).

### 2.2.2. Strategy Use

Most research on comprehension strategies used in L2 reading has focused on specific comparisons and contrasts between of L1 and L2 readers, particularly on comparing native readers' reading performances with those of L2 readers when they process a given language (Bernhardt, 1987; Block, 1986; 1992). These studies use those native readers' reading comprehension processes as a yardstick by which to measure L2 readers' performance. In essence, what they have found is that L2 readers read much more slowly than native readers (Cziko, 1979, Oller & Tullius, 1973); L2 readers tend to be more attentive to visual details in text than native readers (Hatch et al, 1974; Cziko, 1980); L2 readers spend more time for each eye fixation than L1 readers (Oller & Tullius, 1973; Bernhardt, 1983); L2 readers' oral mistakes in miscue analysis are less semantically related to the original words; they have difficulty profiting from semantic and discourse constraints within a text (Chihara et al. 1977; Cziko, 1978; Clarke, 1979); and L2 readers have difficulty in generating appropriate background knowledge to facilitate comprehension (Carrell, 1983; 1984, Lee, 1986; Johnson, 1981). As we have seen, L2 readers lag behind L1 readers in terms of the efficiency with which lower level processing is carried out. In other words, the great difference between native readers and L2 readers is a local difference (Brown, 1985).

Admittedly, these findings are in some sense a truism. It is apparent that without the appropriate functioning of these local systems, comprehension suffers. From a second language perspective, it is equally true that L2 users rarely reach native-like control over these systems. Hence, in second language research, researchers always look to all facets of the linguistic system when making generalizations about reading (Bernhardt, 1992). That is why we always explain that L2 readers' comprehension failure is due to their L2 proficiency level. However, previous research also indicates that the linguistic system provides a necessary but insufficient understanding of the second language reading process. We cannot ignore that some L2 readers with well-developed linguistic knowledge of the target language fail to comprehend or that some L2 readers with meager linguistic knowledge succeed in comprehension. The explanation for these phenomena must obviously include, but go beyond, the linguistic base (Bernhardt, 1991).

What are the other factors which affect L2 readers' comprehension process when processing an L2 text? Literacy variables and world variables, according to Bernhardt (1991), are the other important factors. Literacy variables consist of operational knowledge (Bernhardt, 1991) or procedural knowledge (O'Malley & Chamot, 1990), which refers to knowing how to approach a text, why a reader approaches it, and what to do with a text when it is approached. The relationship between L2 and L1 reading proficiency clearly operates in this dimension of literacy knowledge as well as in the dimension of world knowledge, more so than in the dimension of linguistic knowledge of the target language. In this sense, research into

the relationship between L1 and L2 reading comprehension strategies of the same individuals is crucial. By examining the patterns of comprehension strategies of the same individuals in both languages, we may uncover aspects of reading comprehension processes that are difficult to detect and describe when studied in the context of a single language. Investigation of the same individuals' comprehension strategies in reading two languages may reveal how readers process a text in their native language and in a second language, and whether they process texts similarly or differently in different languages. Thereby, evidence of whether there is a universal pattern of comprehension strategies in reading can be indicated.

However, research on comprehension strategy use in second language reading is still in its infancy. Previous research focusing directly on L2 reading strategy use is slight (Barnett, 1988). Most suggestions about strategy use have been obtained from studies which treated the question as incidental to that of how reading comprehension related to general language proficiency. These studies focus on the questions of "reading problem or language problem" (Alderson 1984), "reading ability or language proficiency" (Carrell 1991), and "a language problem, a reading problem, or a knowledge problem" (Bernhardt, 1991). Other L2 studies focus on comparing the reading processes between L1 and L2 with native readers versus non-native readers. These studies infer readers' reading processes from their comprehension rate or from their correct answers to cloze tests or multiple-choice comprehension questions or from miscues (Clarke, 1979, Cziko, 1978, Carrell, 1989). Only a few studies attempt to explore L2 reading strategy use (Block, 1986, 1992). None of them focus on the

relationship of comprehension strategies between L1 and L2 reading of the same individuals.

### 2.2.3. Summary

Reading comprehension processes involve linguistic, cognitive and metacognitive strategies, and world and literacy knowledge as well. During reading process, L2 readers solve their comprehension problems by using their linguistic knowledge, by consciously or unconsciously using their cognitive or metacognitive strategies, and by applying their world or literacy knowledge. However, what knowledge sources L2 readers resort to and what kind of strategies they use are determined by their particular reading purposes, by particular text features, and by particular circumstances under which they are processing the text. To investigate L2 readers' comprehension strategies, we should not merely focus on L2 readers' language proficiency, but rather go beyond that to explore their cognitive moves when they read in their L1 and L2. By doing this, we can hope to explore the nature of the relationship between L1 and L2 reading comprehension strategies.

## 2.3. The Relationship between Comprehension Strategies in L1 and L2 Reading

### 2.3.1. Main Arguments in L2 Reading Research

When dealing with reading in a second language, researchers have been debating such issues as: "psycho or linguistic?" (Clarke 1979), "language competence or reading strategies?" (Cziko 1980), "a reading problem or language problem?"

(Alderson 1984), "reading ability or language proficiency?" (Carrell 1991), and "a language problem, a reading problem, or a knowledge problem?" (Bernhardt, 1991).

These arguments lead to the following question: Is L2 reading related more to the level of L2 language proficiency, or to the level of L1 reading ability?

In general, research on L2 readers' reading ability and strategy use falls into two groups. Some researchers (Clarke, 1980, 1979, 1978; Hauptman, 1979; McLaughlin, 1987) compared the L1 and L2 reading processes of second or foreign language learners. They found that those who used successful strategies in L2 reading adopted similar strategies in their L1 reading. However, their limited L2 proficiency did not allow the subjects to read as successfully as they did in their L1. Therefore, Clarke (1979) posited his well-known "short-circuit hypothesis", and Alderson (1984) coined the term "language threshold" for second language reading abilities. Both the short-circuit hypothesis and the threshold hypothesis argue that below a language proficiency threshold, the comprehension processes used in students' L1 reading are not used as effectively in second language reading. Therefore, Alderson (1984) believed L2 reading to be more a language problem than a reading problem. Language was seen to play a critical role in second language reading abilities. These researchers argue that an L2 proficiency level is a main element which affects L2 readers' reading processes.

In contrast, other groups of researchers (Benedetto, 1984, Block, 1986, 1992, Carrell, 1991, Hudson, 1982) found that L2 readers processed reading materials similarly in their L1 and L2. As well, proficient L2 readers performed similarly to

proficient L1 readers, and less proficient L2 readers performed similarly to less proficient L1 readers. It must be noticed that these researchers compare and contrast L1 readers' comprehension processes with those of L2 readers. Researchers of this group maintain that L2 reading depends on the reading ability in a reader's L1 literacy level rather than on the reader's proficiency level in the target language.

The foregoing arguments found in the literature reveal that relationships exist in L1 and L2 reading. But the arguments do not answer several questions: How does L1 reading ability relate to L2 reading? Which has more impact on L2 readers' comprehension processes, L1 literacy ability or L2 proficiency? For adult educated L2 readers, does L1 literacy ability have more influence on their L2 reading comprehension processes than L2 proficiency? Answers to these questions can only come from empirical studies using cross-linguistic within-subject designs (Hulstijn, 1991). In other words, such studies should compare the reading comprehension processes of the same individuals in L1 reading tasks and in similar L2 reading tasks.

### 2.3.2. How do L1 Reading and L2 Reading Relate?

Bernhardt (1991) posits that we have not sufficiently emphasized that first language literacy is a significant component in second language reading. How do L1 reading and L2 reading relate? Before we can begin to answer such questions, we need to gain knowledge of the relationships, or interdependence, between L2 and L1 reading comprehension processes.

Many studies have been undertaken in comparing L1 readers' and L2 readers' reading processes. However, only a few studies have investigated the reading comprehension processes of the same individuals when they read the two languages concerned. Even less research has been focused on adult L2 readers' reading comprehension processes, compared to comprehension product. Even though these researchers initiated their research on the differences in L1 and L2 reading performance, we can still benefit from their findings. These findings, to varying extents, tend to reveal that reading in a second language is similar to reading in a first language. Perhaps there is more we can learn about the similarities. It might be these similarities in reading comprehension processes across languages which will enable us to look into the nature of second language reading performance and the relationship between L1 and L2 reading comprehension processes.

Hauptman (1979) compared university students' first and second language reading strategies. This study was conducted with three groups of French learners using the cloze procedure. It attempted to investigate whether there were any differences or similarities in the use of syntactic cues between English (L1) and French (L2) reading. The subjects in one of the groups were asked to read one English and one French text. The findings indicated that those who made use of unsuccessful strategies in their L2 reading adopted similar strategies in their L1 reading. Those who left blanks in an L2 cloze test, for example, also left blanks in L1; and there was a high correlation between their lack of attention to global cues in L1 and L2 texts.

Clarke (1979, 1980) did a study with low level ESL (English as a second language) learners who were native Spanish speakers. By looking into the data obtained from subjects' cloze and oral reading performances in both languages, Clarke reported that good L1 readers performed relatively better in L1 and L2 reading tasks than poor L1 readers in both reading tasks. However, the difficulty of the L2 reading text reduced the advantages of good L1 readers over poor L1 readers in L2 reading performance. As Clarke did not describe the reading ability level of the texts, we do not know to what extent the difficulty of the L2 reading material prevented the subjects from applying their successful reading skills in L1 to the L2 reading task.

Another often-cited case study involving native speakers of Spanish was conducted by Benedetto (1984). The five subjects, college ESL students, had advanced language ability levels in L1 and L2. Data were collected through students' cloze, recall, and interview procedures. Benedetto reported that the students who lacked an efficient approach to written texts in L1 exhibited less sensitivity to discourse constraints when reading in L2 in spite of acquired L2 ability. He suggested that even though L2 readers might acquire a second language ability which permitted them to rely less on their first language reading ability, they seemed to continue to rely, when reading in L2, on whatever strategies had been developed for use in L1. Their L2 reading ability did not improve as a function of increased skills in L2 reading. In his study, he reported that only those students who were strategic readers in their native language were able to employ bottom-up/top-down approach to L2 reading once they

had overcome the limitation of the language threshold. This finding implies that L1 reading proficiency has a strong influence on the subjects' L2 reading performance.

Carson and his colleagues (1990) initiated research to investigate reading-writing relationships in first and second languages with 105 undergraduate and graduate students selected from five universities in the United States. One group of subjects contained 45 native speakers of Chinese, the other group, 57 native speakers of Japanese. One of the purposes of the research was to explore the relationship between L1 and L2 reading. Both groups read one passage in their L1 (Chinese or Japanese) and one in L2 (English), then performed cloze procedures in both languages concerned. The findings indicated that there were strong relationships between reading in L1 and in L2. The researchers suggested that reading ability transferred from L1 to L2. On the other hand, they also suggested that L1 literacy transferred at lower L2 proficiency levels, whereas at higher proficiency levels, L2 input may be the more significant source for developing L2 literacy skills. However, the researchers provided no evidence to support their suggestion that reading ability transfers at the low level.

Bossers (1989, cited by Bossers, 1991) conducted a study to investigate the relation between L1 reading, L2 reading, and L2 knowledge. The subjects in this experiment were 50 native speakers of Turkish learning Dutch as a second language, and enrolled in Dutch-as-a-second-language courses or participating in tertiary education. The subjects read two passages in Turkish (L1) and two passages in Dutch (L2). Comprehension was tested by means of 16 multiple-choice questions per text. The subjects' L2 knowledge (i.e., grammar knowledge and vocabulary knowledge)

was also tested. The findings indicated that a) L2 knowledge is a more powerful predictor than L1 reading; b) differences between the least skilled L2 readers are predicted only by differences in L2 knowledge; and c) L1 reading comes into play as a significant predictor variable only at a relatively high level of L2 reading. The findings suggest that knowledge of the target language plays a dominant role initially, and that L1 reading ability becomes a prominent factor at a more advanced level. In other words, direct transfer of L1 reading skills occurs only when a certain amount of L2 knowledge has been acquired.

A more recent study in which the relation between L1 reading and L2 reading was explicitly addressed was carried out by Carrell (1991). She hypothesized that both L1 reading ability and L2 proficiency would play a significant role in L2 reading ability. The hypothesis was subsequently tested by using two groups of subjects. The first group consisted of 45 college ESL students who were native Spanish speakers. Their ESL proficiency level varied from intermediate to advanced. The second group, native English speakers, consisted of 75 learners of Spanish as a foreign language (SFL). They were selected from first year, second year, and third year Spanish classes.

The subjects in both groups read L2 and L1 reading passages and answered 10 multiple-choice questions. The findings of this study indicated a difference between the two groups. Relatively speaking, L1 reading ability was a stronger predictor than L2 proficiency for the group of native Spanish speakers (group 1), while L2 proficiency accounted for a greater portion than L1 reading ability for the group of native English speakers (group 2). Carrell accounted for this difference by the different target

language environments: group 1 was in a second language setting, while group 2 was in a foreign language environment. The alternative explanation offered was that the groups may have had a different L2 proficiency level. However, the level of L2 proficiency was not measured, but estimated on the basis of instructional level. The different results between the two groups may stem from either differential effects on target language environment or from different L2 proficiency levels, or from both the language environment and L2 proficiency level.

### 2.3.3. Summary

The aforementioned studies with adult educated L2 readers, most of them are L2 learners except the subjects in Carson et al's study, suggest that: a) L2 proficiency level does have influence on L2 readers' reading performance (Bossers, 1989; Clarke, 1979, 1980); b) L2 readers' reading ability in L1 does relate to their L2 reading performance (Hauptman, 1979; Benedetto, 1984; Bossers, 1989; Carson et al, 1990; Carrell, 1991); c) L1 reading performance is similar to L2 reading performance (Clarke, 1979, Carson et al, 1990); and d) L1 reading skills do transfer to L2 reading (Clarke, 1979; Carson et al, 1990; Bossers, 1989).

Such contradictory research results leave us with the following question: which skill or skills are transferable? The above researchers claimed that transfer occurred from L1 to L2 reading, but they did not provide evidence to support their claim. Furthermore, does transfer only occur from L1 to L2? Can the transfer occur from L2 to L1, considering that advanced L2 readers read more like experienced native readers

than do beginning L2 readers? These research results leave us with questions surrounding literacy skill transfer. These researchers also assumed that advanced L2 readers will normally read more like experienced native readers than do beginning readers. Will this assumption imply that some lower level processing strategies, such as skills of word recognition, or skills of recognizing discourse markers, are specific to a specific language? Does it also imply that the higher level strategies, namely relating to prior knowledge, activating appropriate schemata, and selective use of strategies are common to comprehension in any language? In addition, the assumptions and conclusions of the relationship between L1 and L2 reading of these studies are based on the subject's correct answers to cloze tests or to multiple-choice questions. That is, the results are obtained from research on comprehension products rather than on comprehension processes. Focus on comprehension processes may be informative in order to explore the relationship between L1 and L2 reading comprehension strategies.

It should also be noticed that in those studies most subjects were second language learners, except for the subjects of Carson's study. Varying L2 proficiency levels may cause performance differences in L1 and L2 reading tasks. Further research may be needed to investigate real or academic L2 readers like the subjects of Carson's study, for whom reading in a second language had become part of their life.

#### 2.4. Summary and Theoretical Questions

A survey of the previous research in L2 reading reveals, as Bernhardt contends, that the majority of L2 reading studies are product-oriented. They generally

focus on outcome measures or on results. They rarely probe how L2 readers utilize information presented in a text, prior knowledge, world knowledge or literacy knowledge in order to construct their comprehension. Furthermore, L2 reading researchers and research studies tend to infer the strategies that readers used rather than probe them. As Bernhardt (1991) points out:

They infer from data gathered across different subject groups of different proficiency levels on different text types, rather than tracing it along with the development of general language proficiency within stable passage topic domain. (Bernhardt, p. 68)

It is apparent from the review that the reading comprehension process is a strategic enterprise. What is not clear is to what extent L1 reading comprehension strategies relate to L2 comprehension processes; whether these comprehension strategies are universal to reading in any language; and whether some readers utilize similar or different patterns of comprehension strategies when performing similar reading tasks in both L1 and L2. Only by knowing how a reader processes similar reading tasks in both L1 and L2 can we better understand the relationship of L1 and L2 reading.

This research was designed to explore these questions by investigating:

1. What specific comprehension strategies were used by these Chinese readers reading expository texts in Chinese (L1) and English (L2)?
2. To what extent did these Chinese readers use similar or different comprehension strategies when reading in Chinese (L1) and in English (L2)?

### Chapter Three: Methodology Review

The review of literature indicated that the method chosen for collecting data could allow one to address the issue of strategy use. This chapter addresses the rationale for the choice of data collection approaches for this study by surveying and analyzing data collection techniques often used in L2 reading research.

#### 3.1. Data Collection Approaches Often Used in L2 Reading Research

In previous studies, L2 reading researchers gained multiple insights by using techniques such as cloze passage, multiple-choice questions, miscue analysis, eye-movement studies, recall protocols, and introspective and retrospective verbal reports. Some researchers (Hulstijn, 1991; Block, 1992) argue that research on the differences between L1 and L2 reading has failed to provide a coherent framework for conceptualizing the reading comprehension processes and for establishing systematic contrasts between L1 and L2 reading activities. Cloze testing, for example, is used frequently by researchers (Cziko, 1978; Clarke, 1979, 1980; Benedetto, 1984, among others), and involves the ability of readers to fill in blanks with correct semantic and syntactic forms. This method tends to measure L2 readers' grammatical competence rather than the process by which they construct the meaning of the text. Subjects may not necessarily understand the meaning of a passage; instead, they can use their grammar knowledge to fill in the missing parts.

Miscue analysis, on the other hand, focuses on errors made in oral reading, and tends to reflect the ways in which readers interact with text. Nonetheless, some studies indicate that miscues show no direct relationship to comprehension processes (Connor, 1981; Mott 1981), but rather impede the comprehension process (Bernhardt, 1983). Moreover, in the case of L2 readers, it is sometimes difficult to tell the difference between miscue and mispronunciation, since many L2 readers start reading in the target language before they obtain oral proficiency in that language. As a result, the procedure of miscue analysis is somewhat unreliable in its application to the study of L2 reading.

Eye movements, or eye-tracing techniques, measure reading processes by following the stages in processing through fixation duration and reading speed in the sequences of fixations and regressions (Oller & Tullius, 1973; Bernhardt, 1978, among others). This technique can tell us how long an L2 reader spends on certain kinds of words, function words or content words, and how many regressions he makes. Based on this data, researchers infer that subjects use strategies such as anticipatory strategies while reading (Bernhardt, 1987). However, this technique can hardly tell us what happens inside the readers' mind. We still do not know how L2 readers process the information in the text, and what strategies, if any, they utilize to solve their comprehension problems when necessary.

Recall protocols and multiple-choice comprehension questions are also often used by L2 researchers (Bernhardt, 1990, 1991, Carrell, 1989, 1990, among others). These methods focus on how much readers remember from the text, what kind of information, details or main ideas they remember, how many correct answers the readers present, and

what kind of questions they answer correctly. Based on this kind of data, researchers infer the kinds of processing strategies readers use when reading the text. However, data of this kind still cannot provide valid information on readers' comprehension processes, such as which knowledge resources they resort to, or what or how they activate certain kinds of prior knowledge to facilitate their comprehension.

To sum up, it is not that one approach is better than another but that each is valuable for a different research purpose. Moreover, each method also has its own limitations. Theorizing about reading comprehension strategies requires an experimental design which directs research attention to concurrent processes. To better understand L2 readers' concurrent processes, we need techniques which can probe into readers' minds and which can provide a conscientious analysis and synthesis of the strategies that readers use.

### 3.2. Verbal Reporting as a Data Collection Approach

In the last decade, L2 reading research has moved from predominantly quantitative research to more qualitative studies. An interest has increased in more observational rather than experimental studies. In such studies the comprehension strategies employed by individual L2 readers can be observed and explored in some detail. Verbal reporting as a data collection approach has been widely used in first language literacy acquisition, and particularly in first language reading research. Recently, the use of verbal reporting as a data collection approach in second language acquisition has increased with the growing

emphasis on collecting data about cognitive aspects involved in processing a second language (Seliger, 1987; Block, 1986, 1992).

Introspective verbal reporting refers to a set of data collection procedures in which research subjects report to the researcher on the processes in which they are engaged while performing a cognitive or linguistic task (Cohen & Hosenfeld, 1981, Mann, 1983). In an introspective verbal report, subjects are required to report what goes on in their minds while they are involved in a particular task; a retrospective report, in contrast, requires subjects to infer their own mental processes or strategies from their awareness and their memory of the particular mental event under observation. Both introspective and retrospective data collection techniques are reported to yield rich data for first language reading comprehension processes (Bereiter, 1985; Cox, 1981; Ericsson & Simmon, 1984, 1980; Block, 1986, 1992; Padron & Waxman, 1988). However, they have a relatively short history as a research method in the study of second language reading.

### 3.2.1. Think-aloud as an Introspective Data Collection Method

One of the introspective data collection methods, think-aloud, was developed by Newell and Simon (1972) to study cognitive problem-solving strategies. Adapted from cognitive psychology, this method has been referred to as a "stream-of-consciousness disclosure of thought processes while information is being attended to" (Cohen, 1983, cited by Rankin, 1988, p. 119). Think-aloud technique is based on the assumption that it elicits information contained in short-term memory and is thereby directly accessible for further processing and verbalizing. Think-aloud technique requires subjects to report

whatever occurs to them when reading a text. Data is produced when a subject verbalizes his or her thought processes while performing a given task. The subject's verbalizations are tape-recorded and transcribed. The transcriptions are called "protocols". The protocols reveal what the subject understands and what he has in mind during reading, not direct strategies. The researcher has to infer from the think-aloud protocols what strategies the subject utilized.

Reading is considered to be a kind of problem-solving activity (Thorndike, 1917).

He noted :

It consists in selecting the right elements of the situation and putting them together in the right relations, and also with the right amount of weight or influence or force for each. The mind is assailed as it were by every word in the paragraph. It must select, repress, soften, emphasize, correct and organize, all under the influence of the right mental set of purpose or demand. (P. 431)

However, as this activity takes place in the reader's mind, it is difficult to obtain direct information about what is going on in the minds of readers as they attempt to construct meaning from text or about the knowledge resources to which they resort and what kind of strategies they employ to solve comprehension problems. Since reading is considered a problem-solving process involving cognitive activities, think-aloud has been adapted for reading research and is widely used in studies of reading in a first language, particularly in the area of comprehension processes and comprehension monitoring strategies (Bereiter & Bird, 1985; Nist & Kirby, 1986; Randal, Fairbanks & Kennedy, 1986; Steinberg, Bohning, & Chowning, 1991). Nonetheless, little research has been done using think-aloud to

examine the reading comprehension strategies of second language readers in L2 (Block, 1986, 1992).

To find out the processes by which learners in a second language read and to help them acquire new reading strategies, Hosenfeld (1977) broke ground with studies of forty native English speakers thinking aloud in English (L1) while reading in another language. Hosenfeld also conducted research with a single second language reader for the purpose of documenting both reading behaviour and the student's ability to acquire new reading strategies. The subjects responded to pauses or breakdowns in processing with open-ended promoting (e.g., does that word remind you of another word you have seen in this passage?). To a great degree, then, Hosenfeld's findings were the result of the interviewer's guidance (Swaffar, 1988) because the data was obtained and shaped by questions that the researcher asked.

Following Hosenfeld, other researchers such as Block (1986, 1992), Anderson (1991) and Sarig (1987) used think-aloud protocols to look into the minds of L2 readers. In these studies, the think-aloud technique provided additional information about the strategies L2 readers use to process a text, and provided the researcher with information not available through traditional comprehension checks. By using think-aloud technique, these studies enable us to see whether L1 and L2 readers use similar or different processes and resources for overcoming the comprehension difficulties they perceive (Block, 1986). Successful use of think-aloud in second language reading research indicates that think-aloud is a useful tool for investigating reading comprehension processes and that it is

applicable to L2 reading research. With training, second language readers can perform the think-aloud task and reading activity simultaneously.

The above research also suggests that data will be more informative about the reading comprehension processes when readers have problems understanding what they are reading. Olson and his colleagues (1984) suggest that think-aloud technique is a useful means to elicit the higher level processes involved in comprehension. According to Cohen and Hosenfeld (1981), "think-aloud data are, by their nature, unanalyzed and without abstraction" (p. 286). Think-aloud differs from other forms of introspective report because readers report their thoughts and their comprehension processes without theorizing about them (Block, 1986). In this way, think-aloud technique provides a direct picture of a reader's mental activity which is usually hidden when dealing with a printed text. Correspondingly, think-aloud offers a promise of breaking into the reading comprehension processes to reveal concurrent strategies (Olson et al., 1984).

Recall that in previous research, think-aloud protocols were mostly conducted in the subjects' first language. The subjects read in the target language but spoke about their thoughts and understanding in their native languages (Hosenfeld, 1977, Donin & Silva, 1993). Performing the think-aloud task in L1 while reading in an L2 involves a language switch and translation from L2 to L1 and vice versa. Translating, because it involves surface mapping between languages, generally fails to activate a reader's conceptual processes (Swaffar, 1988). On the other hand, when research subjects reported in their L1, the researcher had to translate the subjects' verbal report. The process of translation may confound the reliability and validity of the data obtained, since not all expressions are

translatable across languages. As well, translation depends heavily on the researcher's proficiency in both languages concerned.

Moreover, in the foregoing research studies, the think-aloud procedures were conducted differently. Some asked subjects to verbalize their thinking at a pause or at the end of each sentence (Block, 1986, 1992; Hosenfeld, 1977); others asked research subjects to report their strategies after completing an entire passage of 643-1057 words (Anderson, 1991). The length of the passage could be a crucial factor which affects the quantity and quality of the subjects' verbal report data, given that think-aloud protocols elicit information in short-term memory. If the text is too long, the subjects may not remember their comprehension processes. On the other hand, think-aloud protocols, as suggested by many researchers (Olson, et al., 1984; Rankin, 1988; Block, 1986), do not require subjects to theorize about their strategies. What the subjects need to do in performing a think-aloud task is to verbalize whatever is on their minds. It is not the subjects' task, but the researcher's task, to analyze the strategies used by the subjects.

As with the other data collection approaches, think-aloud technique also has its drawbacks and limitations. Rankin (1988) and Garner (1987) note that subjects' reports on their mental processes are not complete because of limitations in their second language proficiency, or because some subjects are not accustomed to carrying out think-aloud tasks and find it difficult to perform two tasks simultaneously, thus failing to verbalize important information. Again, there are also social and psychological factors which result from the interaction from the researcher and the subject, the subject's willingness to cooperate (Seliger, 1987), and the subject's ability to express his true mental states.

Another weakness of think-aloud is that it unnaturally slows down the reading process, although it does not appear to break up its continuity, as does requiring subjects to stop and comment at designated points (Olshavsky, 1975; 1977). In addition, think-aloud protocols may reveal only certain strategies (Bereiter & Bird, 1985). Those processes which are already automatic or are not easily verbalized may not readily be studied (Block, 1986). Because strategies that have become proceduralized may be operating automatically through connection in long-term memory, the process does not enter short-term memory (Ericsson & Simon, 1987) and may be inaccessible for introspective report (O'Malley & Chamot, 1990).

Even though the think-aloud method has its drawbacks, it has continued to gain respect as a data collection method in reading research. It is especially well-suited to the task of providing perhaps the most direct access we have to the mental processes engaged while reading is going on (Rankin, 1988). It is likely the most objective and fruitful data base for L2 reading research if undertaken properly. By investigating what strategies second language readers actually use when reading in L1 and L2 as opposed to what we think they do, we enlarge our knowledge of reading comprehension processes across languages thereby providing our second language learners with efficient reading instruction. Researchers such as Anderson (1991) and Cohen (1983) call for more research that uses think-aloud as a method of tapping the mental processes that L2 learners use.

### 3.2.2. Questionnaire as a Retrospective Data Collection Approach

A questionnaire or a self-check instrument is an often-used data collection approach in second language acquisition. It asks research subjects to report their behaviour in a written form and is considered to be a retrospective data collection approach since it is usually conducted after a cognitive task. A questionnaire or self-report instrument enables a researcher to obtain information that is not directly observed. Therefore, questionnaires are used mostly to collect data on phenomena which are not easily observed, such as attitudes, motivation, self-concepts, data on the processes involved in using language, and to obtain background information about the research subjects, such as previous background in language learning, number of languages spoken, and years of studying the language (e.g., Liu, et al., 1992, among others).

Questionnaires on comprehension assessment, self-awareness of prior knowledge (Cox & Weber, 1989), and awareness of strategic reading processes (Schmitt, 1990) are also used in reading research. Recently, questionnaires or self-report instruments have been used in second language reading research (Padron & Waxman, 1988; 1990; Syananondh & Vattanapath 1991; Barnett, 1988). Padron and Waxman (1988; 1990) conducted studies to investigate cognitive strategies in the reading achievement of Hispanic elementary ESL students. The Reading Strategy Questionnaire was used as a data collection method and was administered immediately after the subjects finished a reading test. The subjects were required to report the extent to which they used the described strategy by responding either (a) Always, (b) Sometimes, or (c) Never. Besides the findings and their contribution to the understanding of reading comprehension

processes, this research suggests that the results support the use of self-report measures to assess students' cognitive strategy use in reading. These researchers suggest that self-report instruments have tremendous advantages over other verbal report approaches such as think-aloud and interview because they are easy and convenient to administer (Padron & Waxman, 1988).

Syananondh and Vattanapath (1991) undertook a similar study with Thai university students who were learning English as a foreign language (EFL). The Reading Strategy Questionnaire was adapted from Padron and Waxman (1988) to investigate the high and low achieving EFL students' reading comprehension strategies, and the data was compared to determine whether there were significant differences between the two types of students. Instead of conducting the survey immediately after a reading test, it was administered one week after the reading test. The scale was modified slightly by changing three rating scales into five ratings: (a) Always; (b) Often; (c) Sometimes; (d) Rarely; and (e) Never. A version in the subjects' native language (Thai) was used in order to minimize language problems concerning the ability to understand the questionnaire. In accordance with Padron and Waxman's findings, this study also reports that the questionnaire is a useful means to obtain information on students' reading comprehension processes.

Barnett (1988) investigated how real and perceived strategy use affects L2 comprehension. Two hundred seventy eight French students were involved in the study. A reading comprehension strategy questionnaire was used to obtain information on the subjects' perceived strategy use in general. Data obtained from the questionnaire were compared with the scores of the multiple-choice comprehension questions to see the

relationship between the subjects' correct answers to the comprehension questions and their perceived strategy use. Besides the finding that teaching strategy does have a positive influence on the students' strategy use and comprehension, the study also indicates that the questionnaire is a useful data collection technique. By using this technique, researchers can look into the readers' reading comprehension processes.

These studies in second language reading indicate that questionnaires or self-report instruments have the advantage of enabling researchers to reach a data source which is inside the reader. This approach enables researchers to uncover strategies that are automatically used and not directly or easily observed by other data collection methods. Questionnaires can be conducted in either the subjects' native language or in the target language, which makes it easier for the subjects to respond to the questions. In addition, this approach can easily be conducted with large numbers of subjects, and the data obtained from a questionnaire are usually in numerical form, which is far more manageable and easier for a researcher to analyze.

As a retrospective approach, questionnaires are conducted after a reading task, either immediately after the reading task or weeks later. However, if the text is long, a delay in data collection may lead to invalidity of the data obtained, since the subjects may not remember what they actually did when processing the text. Alternatively, they may report what they perceive, or have been taught, to be good strategies, even if they did not actually use them when processing the text. One of the compensatory ways to obtain valid and reliable data from the questionnaire is to conduct a survey immediately after the reading task and to ask the subjects to give examples of reported strategies. Examples will

confirm the strategies used, and also offer information about the circumstances under which the readers used these strategies. Alternatively, introspective and retrospective data collection approaches can be used jointly to compensate for each other's drawbacks.

### 3.3. Summary

From the cognitive perspective, the reading comprehension process is an intrapersonal problem-solving task that takes place within the brain's knowledge structures. The activities taking place within the brain are the focus of research, and evidence of the reading comprehension processes can only be found by probing readers (Bernhardt, 1991). Despite their disadvantages and weaknesses, both introspective and retrospective verbal reporting techniques can serve this purpose.

Introspective methods can provide a more active observation of the comprehension processes. Think-aloud, as one of the useful introspective methods, is considered to be appropriate for providing a direct view of readers' mental activity, "a kind of window into those processes which are usually hidden" (Block, 1986, p.464). The main weakness of think-aloud technique is that it may not present accurate data about comprehension processes because of the readers' automatic strategy use or because of their language limitations. Hare (1981) suggests that retrospective techniques have the advantage of keeping the process intact. Readers do not need to interrupt their reading by verbalizing their thinking. However, the weakness of the retrospective method is that the information obtained may not be accurate because it tells us neither why readers fail to

understand nor how they are processing the text (Johnston, 1983; Winograd & Johnston, 1982).

Considering the advantages and disadvantages of the two types of data collection instruments, researchers can collect secondary data to corroborate the primary data obtained from either introspective or retrospective approaches, and to obtain some indications of either intra- or inter-rater reliability. These two kinds of data collection instruments can be used jointly to obtain reliable information on the strategies that the participants actually use when they process a written text. It is presumed that the retrospective method used to triangulate as a check of reliability will also compensate for some disadvantages of the introspective data collection instruments and vice versa.

With respect to the purpose of this study, both introspective and retrospective data collection techniques are particularly valuable for research into reading comprehension processes. Think-aloud protocols are likely to present a reliable record of participants' thoughts and comprehending processes. Retrospective instrument such as questionnaires, on the other hand, will elicit insights into the participants' reflections on their own cognitive processing, reflections which could not be revealed in the think-aloud protocols. A compensatory combination of these recommended instruments is implemented in the present study. The research study emphasizes think-aloud protocols in an attempt to discover comprehension processes, and utilizes a retrospective instrument as a compensatory data source and an instrument for data triangulation. Thus the data obtained by using both recommended data collection

**instruments should provide a rich source of data information on reading comprehension processes.**

## Chapter Four: Research Design

The research design for this study was chosen in order to demonstrate relationships between comprehension strategies in reading L1 (Chinese) and L2 (English).

The study investigated the following research questions:

1. What specific comprehension strategies were used by these Chinese readers reading expository texts in Chinese (L1) and English (L2)?
2. To what extent did these Chinese readers use similar or different comprehension strategies when reading in Chinese (L1) and in English (L2)?

Pilot studies had been conducted before the final research design was decided upon. This chapter presents a brief report on the pilot study, and addresses the following issues: criteria for selecting research participants, reading materials, data collection instruments and procedures, triangulation of data, training of participants, data analysis, reliability estimate, and the role of the researcher in the study.

### 4.1. Pilot Studies

The purpose in conducting the pilot studies was to test the design of the study; that is, whether the introspective and the retrospective techniques, think-aloud protocols and the reading comprehension strategy check list, were effective instruments for collecting data for the purpose of this particular research study.

Eleven native Chinese speakers took part in three pilot studies in summer 1993 and 1994. The pilot studies were conducted in the office of the researcher prior to her deciding upon the final design for the main study. Five passages, three in Chinese and two in English, were drawn from publications intended for first language readers. Explanation and discussion of the purpose and procedures of the study, and training in think-aloud procedures were provided at this stage so as to let the participants understand what they should do. Each participant was asked to think aloud about his or her understanding of the materials, as well as anything that came to mind while reading the passages. Verbal probes in response to the participants' talk were provided to encourage continuous verbalizations. Taped records of verbalizations were transcribed immediately after each participant finished the data collection procedures. Comprehension strategy check lists were used to collect additional data and to triangulate the data obtained from the think-aloud protocols. Preliminary analyses of the data obtained from the two sources, think-aloud protocols and the comprehension strategy check lists, were undertaken prior to deciding on the approach to be taken in the main study.

An initial analysis of data obtained from both the think-aloud protocols and the comprehension strategy check lists revealed a consistency between the data from the two sources, which further suggested that think-aloud protocols and the reading comprehension strategy check lists would be effective instruments for the collection of data in the intended study. Data obtained from these two instruments indicated that check lists served not only to triangulate data obtained from the think-aloud protocols, but also compensated for the potential weakness of think-aloud protocols by drawing from

respondents additional data that might otherwise have been overlooked. Collecting data from both think-aloud protocols and comprehension strategy check-lists enabled the researcher to obtain a realistic picture of the participants' comprehension processes when reading in the two languages concerned. It was decided, therefore, to use think-aloud protocols and comprehension strategy check lists as data collection instruments in the main study.

#### 4.2. Research Participants

Participants were drawn from the Chinese Student and Scholar Association at the University of Victoria. All participants were native Chinese speakers, born, raised and had a Bachelor Degree in Mainland China, currently studying in graduate school. The participant selection criteria and rationales are presented in Table 1. **Table 1**

**Table of Criteria and Rationale for Selection of Participants**

Criterion	Rationale
<p>1. They have obtained their certificate or degree in a higher educational institution in China.</p>	<p>The academic certificate or degree obtained in their home country indicates that they are proficient readers in their native language since university education requires extensive and demanding reading.</p>
<p>2. Their score on the Test of English as a Foreign Language (TOEFL) was at least 550.</p>	<p>Foreign students who receive this score are considered to be proficient in English and are admitted as graduate students at the University of Victoria.</p>
<p>3. They have successfully completed at least one year of graduate courses at the University of Victoria.</p>	<p>This serves as a double check on the second criterion in establishing that an individual is able to cope with reading in a graduate course.</p>
<p>4. They learned English primarily for academic purposes.</p>	<p>This study focuses on Chinese graduate students who are reading in English as a second language.</p>
<p>5. They are willing to volunteer time to the study.</p>	<p>No funds are available to pay the participants.</p>

The participants were selected according to these criteria and the underlying rationale. They shared some similarities, such as educational background and EFL learning experience, which may also be characteristics of Chinese graduate students at the University of Victoria in general.

Before starting the study, the researcher made contact with all Chinese graduate students at the University of Victoria by e-mail, by telephone, and in person, informing them of the research focus, and asking whether they were interested and willing to participate in the research. Sixteen participants were selected from those who were willing to participate and were qualified according to the criteria described above. Eight participants' responses were retained for the final analyses for the purposes of the study. The reason that sixteen participants were chosen was to allow for those who might drop out. Moreover, it was anticipated that some participants might not provide useful data; experience from the pilot study, for example, had shown that some participants were not able to perform think-aloud and reading simultaneously. The reason that eight participants' responses were retained for the final analyses was that the pilot studies indicated that data from less than four participants did not show any clear pattern of strategy use; whereas data from more than eight participants did not change the pattern. Based on the results of the pilot studies, the researcher therefore decided that eight participants would be a moderate and manageable number.

The sixteen Chinese graduate students involved in the data collection stage of this study were from different disciplines. Some of them dropped out of the study for various reasons: one participant went to Hongkong to join her husband before the second session;

another participant was preparing for his candidacy examination and could not afford time to attend the second session; still another got a job interview and was out of town during the second session. Of the remaining thirteen participants' think-aloud protocols and comprehension strategy check-lists in both languages, only eight were selected for analysis. The other five were not included because comparatively these participants provided many broken utterances either in Chinese or in English. They did not present complete thinking or responses to the text. If these data had been included, the researcher would have had to fill in all the gaps in their statements or utterances to complete their meaning. In this case, the data would no longer have been authentic, which would have caused problems with the validity of the data. Therefore, the researcher decided not to include these five participants in the final analysis. The eight participants (Table 2 ) retained for data analysis fully met the criteria of subject selection and all of them provided information of their comprehension processes for the purpose of this study. The following table presents the relevant demographic information about these participants.

**Table 2****Table of Background Information on the Participants**

PARTICIPANT	GENDER	AGE	FINAL DEGREE OBTAINED IN HOME COUNTRY	TOEFL SCORE	YEARS OF ENGLISH LEARNING	YEARS OF STAY IN ENGLISH SPEAKING COUNTRIES	MAJOR FIELD	EXPECTED DEGREE
P1	FEMALE	26-30	B.A.	600	15	4	ECONOMICS	M.A.
P2	MALE	31-35	M.A.	583	10	4.5	PUBLIC HEALTH	Ph.D
P3	MALE	31-35	DIPLOMA	570	5	4.5	BUSINESS	M.A.
P4	MALE	31-35	B.A.	617	17	2.5	ADMINISTRATION	M.A.
P5	MALE	26-30	M.A.	567	10	4.5	PHYSICS	Ph.D.
P6	FEMALE	31-35	B.A.	603	15	2	PSYCHOLOGY	M.A.
P7	MALE	36-40	M.A.	600	10	5	LINGUISTICS	Ph.D.
P8	FEMALE	26-30	B.Sc.	620	14	2.5	BIOCHEMISTRY	M.Sc.

### 4.3. Criteria for Selecting Reading Materials

This study examined the reading comprehension strategies that the participants used in their L1 and L2 reading tasks. Since a within-subject comparison requires that different texts be used in the first and second language, two pieces of authentic material were used, one in the participants' native language (Chinese), the other in L2 (English). An attempt was made to obtain passages on different topics that were sufficiently similar in structure and length to ensure that the participants were performing similar reading tasks in both languages. Both passages were expository in nature. The rationale for choosing expository texts was that very few studies investigating L2 readers' reading comprehension strategies had been done using expository texts (Malik, 1989). Nonetheless, the area where academic L2 readers are likely to encounter more difficulties is in the reading of expository texts. Reading expository texts is a kind of reading that graduate students have to do as part of their academic life. Therefore, we need to know more about the comprehension processes of L2 readers when they read expository texts.

The rhetorical structures of expository text include, as Meyer and Freedle (1984) have suggested, collections of descriptions, sequence, causation, problem and solution, and comparison and contrast. According to current L2 reading theories, texts with different rhetorical organization structures and of different content may involve the use of different reading comprehension strategies. Researchers such as Meyer (1975), Meyer and Freedle (1984), and Carrell (1989) have emphasized the importance of rhetorical organization, length, and content of texts. Previous research

also suggests that the rhetorical nature of connected discourse of the expository type is more discipline bound than it is language or culture bound (Benedotto, 1984). Seliger (1971) argued that the shared rhetorical conventions functioned as “discourse organizer concepts” which are non-linguistic in nature. According to the above theoretical positions, expository texts in Chinese and English are considered to share a similar rhetorical organization structure.

Regarding the length of the passage, Rankin (1988) suggests that a passage should be long enough to allow the subjects to become involved in reading, but not so long that they become fatigued by the demands of thinking aloud for extended periods. For L2 readers, according to Rankin, a length between 300 and 1000 words seems to be appropriate under most conditions. Based on this suggestion, the length of the reading material of this study was 624-626 Chinese characters or English words.

With respect to the content of the text, researchers such as Rankin (1988) and Carrell (1989) suggest that the passage being used should be universal enough to be understood by the participants of the study. Taking all the above theoretical issues in to consideration, the researcher arrived at the following criteria for choosing materials:

1. Rhetorical structure: The overall rhetorical organizational structure of both English and Chinese passages shared the rhetorical structure of an expository text;
2. Length: Each passage contained 500 to 700 words or characters;
3. Content: No participants in this study had any detailed background or specialized knowledge about the content, and no detailed background knowledge was needed to understand the passages.

The researcher chose 20 passages, 10 in each language, based on Meyer's (1975, 1979) rhetorical structure pattern of expository texts. Then four other independent raters of native and bilingual readers were trained to get familiar with Meyer's rhetorical structure pattern of expository texts by reading some samples and analyzing their organization structures. After training, the raters read the 20 passages to determine the rhetorical structures. Then 10 passages, five in each language were reread by the raters and the researcher to decide the difficulty level of the selected passages. After each rater completed reading and made his or her judgment, their judgments were compared with those of the researcher to determine which two passages, one in English and the other in Chinese, were matched in rhetorical structure, length, and difficulty level. Then the one English and one Chinese passages which had obtained 100% agreement were used as texts for the study.

The two passages, one in English and one in Chinese, chosen to be used in the study obtained high agreement on these three criteria. The passages were approximately equal in length and were similar both in rhetorical structure and in difficulty level according to the researcher and the four raters' judgement. Table 3 displays the characteristics of the reading materials.

**Table 3****Table of Criteria for Reading Materials**

Criteria	Chinese	English
Structure	Collection of descriptions	Collection of descriptions
Difficult level	Difficult/Moderate	Moderate/Difficult
Paragraphs	3	4
Sentences	16	15
Words	624	626

After the researcher chose these two passages, the raters read them again. The independent raters reported that they felt the Chinese passage was relatively more difficult than the English one. Then the researcher consulted her supervisor and a bilingual member of her supervisory committee. All of them believed that a relatively more difficult passage in L1 could better enable the participants to demonstrate their comprehension processes, and considered that the chosen Chinese passage was acceptable.

Since the purpose of this research was to investigate the relationships between comprehension strategies used by the same individuals in reading passages in Chinese and English, one authentic passage from each of the two languages was used as text. The researcher tried various ways of matching the texts for this study. However, the only purpose for matching the passages of the two languages in rhetorical structure, difficulty level, and length was to assure that the subjects were performing similar reading tasks in the two languages concerned. The strict equivalency of the two passages involved was not the concern of this research study, the more so since, as Favreau and Segalowitz (1982)

have argued, the equivalency of texts across languages is “very difficult to achieve in any event” (p.333). This study did not directly address the issue of text structure and made no attempt to assess the subjects' comprehension product of the passages. Therefore, comprehensive procedures for analyzing text, such as a propositional analysis (Kintsch & van Dijk , 1978; van Dijk & Kintsch, 1983 ), or a measure of relevant idea units (Taylor, 1985; Meyer, 1975) were deemed unnecessary, since the number of propositional units or idea units recalled was neither the focus of the study, nor even an element in it.

The two expository passages shared the structure of a collection of descriptions. According to Meyer and Freedle (1984) and Carrel (1984) the type of collection of descriptions represents a group of concepts or ideas by association in which one element of the association is subordinate to another, namely to the topic. By presenting particular attributes, specifications or settings, the description gives more information about the topic. The two passages were excerpted from articles from an academic journal and a book published for first language academic readers. The texts originated as authentic texts in the academic publications Higher Education published in English, and Jiaoyu Xinlixue (Educational Psychology) published in Chinese. Both passages were on general topics concerning education. The English passage was about student selection in higher education; the Chinese passage was about communication and learning. The English passage begins by discussing the importance of effective selection of students in higher education systems. As it goes on, more reasons and problems are presented to support this main issue of effective selection of students in higher educational institutions. The Chinese passage begins by discussing the importance of communication for human beings in the

development of the society. It continues by presenting descriptions of the procedures by which a human being develops the ability to communicate, of language as a medium of communication, and of learning in human development. Although the passages were each written on a different topic, they were chosen from relatively obscure sources to be of interest to graduate student readers. All participants indicated in their think-aloud protocols that both passages were of interest and had never been read or seen before by them.

The texts were photocopied, and presented as they appeared in the original book or journal. Using Olshavky's (1976-1977) method of inserting red dots, which was used recently by Block (1986, 1992), the researcher put a red dot after each sentence to remind the participants to talk about their thinking at least at the end of each sentence. The experience of the pilot studies revealed that without red dots at the end of each sentence, some subjects forgot to talk. The insertion of red dots at the end of each sentence was found to be adequate for this particular type of readers. In addition, a line number was added to the end of every fifth line of the passages. For instance, at the end of the fifth line, there was a number 5, and at the end of the tenth line, there was a number 10, and so on. These line numbers were used to make it easier for the participants to refer to a certain sentence when they reported their reading comprehension strategies in the check list.

#### 4.4. Data Collection Instruments

##### 4.4.1 Instruments

Think-aloud and retrospective data collection techniques were used jointly in this study. Think-aloud was used to collect concurrent data during the reading comprehension processes. When reading a passage, each participant was asked to say aloud everything she or he thought or understood, everything that occurred to him or her, no matter how trivial it might seem. The think-aloud procedure involved externalizing the content of the mind while engaged in the reading task, without inferring mental processes. In other words, the participants did not need and were not asked to name the strategies that they used. All the procedures of reading and think-aloud were tape-recorded.

In contrast to previous research, this study required the participants to perform the think-aloud task in both of the languages concerned, namely, verbalizing their thinking in L1 when they read in L1, and performing think-aloud in the second language when they read in L2. The participants in the study were considered to be able to report their thinking in English because they were graduate students, who were engaged in various kinds of research and attended class presentations, seminars, and even conferences in various disciplines conducted in English. Therefore, they did not lack opportunities to talk in their second language -- English. Their performing think-aloud in both of the languages enabled the researcher to obtain first-hand data, since the researcher shares the same first and the second languages with the participants. However, verbalizing in the second language might cause other problems, for example,

the participants might not have appropriate words available to express their thoughts if their L2 was not as fluent as their L1. As a result, the researcher might not obtain accurate information about what the subjects were actually thinking when they read in L2 and about what kind of strategies they were using to solve their reading problems. In order to avoid the risk of this kind of invalidity, the participants were allowed to insert a few words in another language to express their thoughts. For example, a participant in this study could not find a word to express the meaning of "syllabus" in English. Instead, she used a Chinese phrase to express it. In this way, the verbalization continued, and the researcher was able to obtain information about the participants' thinking and comprehension processes.

Furthermore, some reading comprehension strategies (e.g., mental-translation, rereading silently, or decreasing reading speed) may not be observable; therefore the strategies might not be demonstrated in the participants' think-aloud protocols. In addition, given that the participants were fluent L1 readers and relatively good L2 readers as well, they might use some strategies automatically because of their wealth of reading experience. In this case, they might not verbalize these automatic strategies since they did not allocate attention to these automatic processes. To avoid this kind of invalidity and to obtain valid data of the participants' reading comprehension processes, a reading comprehension strategy check-list was used to collect additional data.

As reported in previous research (Padron & Waxman, 1988; Syananondh, 1991), retrospective techniques, such as questionnaires or self-check lists, can be used

to collect data on phenomena which are not easily observed. Although retrospective data and think-aloud data are different, having the former in reserve to back up the latter makes good research sense (Rankin, 1988). Some of the strategies that the participants failed to verbalize for whatever reasons might be reported on the check-list. Retrospection also provided interesting sorts of data in itself, especially if the participants had trouble verbalizing their thoughts. To increase the validity of the reports on the check-list, the participants were required to present examples when they reported use of a given strategy by reporting the line numbers. That is, the participants wrote down the number of line of text in which the participants were aware of using a given strategy. Since all of the participants provided examples when reporting a certain strategy, the additional data obtained from the check-lists was considered reliable and was a useful data instrument to back up the think-aloud protocols. The data obtained from the think-aloud protocols and the additional data from the check-list were added to give the sum of strategies used by the participants when performing the reading tasks.

There were two sets of reading comprehension strategy check-lists. One was the L1 reading comprehension strategy check-list, the other was the L2 reading comprehension strategy check-list. The two sets of check lists varied slightly. Each set consisted of 20 or 23 items. Since the participants were second language readers, there might be some specific comprehension processes (e.g., mental-translating) used only in an English reading task, and such strategies were included in the L2 check-list. The check-lists were designed based on extensive reading of related literature (Waxman &

Padron, 1987; Hahn, 1984; Chou Hare & Smith, 1983; Paris & Myers, 1981, among others), and on the strategies derived from the pilot studies conducted prior to deciding on the final design for the study. The strategies in the literature served the purposes of the studies in which they were employed. However, not all the strategies in the literature match the purpose of this study. For example, a strategy such as taking notes was considered a study strategy rather than a reading comprehension strategy, and it could not be used in this study. In addition, there were strategies, such as “revising comprehension or hypotheses”, “evaluating the structure of the text”, “evaluating the content of the text”, reported by the participants or observed in the pilot studies which were not referred to in the literature. The researcher therefore designed check lists of selected reading comprehension strategies for this study. The check lists were revised after being used in the pilot studies. The comprehension strategy check-list enabled the researcher to collect additional data, such as adjusting reading speed, about the participants’ reading comprehension processes. A comparison of the data obtained from both instruments indicated that the participants provided some additional data, which enabled the researcher to better portray the comprehension processes of these readers.

However, the comprehension strategy check-list did not and could not possibly exhaust the strategies used by the participants. It was not a surprise that there were some discrepancies between the strategies reported on the check-lists and in the think-aloud protocols. Therefore, the check-list also asked the participants to add any strategies that they thought they had used, providing examples.

#### 4.4.2. Triangulation of Data

The data obtained from the think-aloud protocols and from the comprehension strategy check-lists were triangulated by comparing the data obtained from both data sources to see whether the think-aloud could be measured against the check-list and vice versa. This was done in order to triangulate the data. The result was reported in Table 4 as a percentage of the agreement of the data on the check-lists and the think-aloud protocols.

**Table 4**

**Table of Data Triangulation**

Passage Language	Group Total Strategy		Percentage
	Think-aloud	Check-list	
Chinese	110	92	84%
English	104	96	92%

N=8

The “group total strategy” refers to the sum of strategies used by each participant when reading either in L1 or in L2. The results indicated that there is an agreement of 84% between the strategies obtained from the comprehension strategy check-lists and from the think-aloud protocols in Chinese reading, while for the English reading the agreement is 92% between the strategies found in the think-aloud protocols and the comprehension strategy check-lists. The percentages indicate that the agreement between the two instruments used in this study was high. The result of data triangulation indicated that the same sorts of strategies were found in both the think-aloud protocols and on the check-lists, and hence results provided evidence to suggest that both data collection instruments were reliable for this kind of study.

#### 4.5. Training in the Think-aloud Performance

Olson et al. (1984) strongly suggest training research subjects. According to these researchers, training may be a way of ensuring the quality of data. They contend that the exact content of what subjects say has to be up to them, but that the amount and level of talking may be subject to training. In order to obtain reliable and valid data, participants were trained to perform the think-aloud task. The training followed the three-part series of explanation, modeling and supervised practice suggested by Church and Bereiter (1983). At the explaining stage, the think-aloud approach was introduced by a written instruction as well as oral explanations. At the modelling stage, two expository passages, one in Chinese and the other in English, were used to train the participants. Each passage consisted three paragraphs. At this stage, the researcher performed the think-aloud task with the first paragraph to show the participants how to read and talk about their thinking and understanding simultaneously. At the third stage, the participants were asked to try out the think-aloud task and practise on the subsequent paragraphs, which allowed the participants to familiarize themselves with the process. To elicit undirected and inhibited introspection on strategies that each participant was using to comprehend the passages, the participants were repeatedly told to "read the passage as you usually do, and talk about your thinking, whatever occurs to you when you are reading. Don't try to analyze your thoughts".

Some participants practised with one paragraph, and some practised with two paragraphs till they felt comfortable doing it. The participants asked questions during the training and practice sessions. The training sessions varied from 15 to 25 minutes in

Chinese, and from 10 to 15 minutes in English. Since the participants had witnessed the first data collection session, think-aloud in Chinese, they spent less time practising in English to refresh their memory.

The participants were also informed that the study was not a test; therefore there were no right or wrong answers. The researcher was more concerned that they spoke than about what they might say. No matter how trivial the participants' talk might seem, everything said was of great value to the research.

#### 4.6. Data Collection Procedures

The researcher first asked the participants to read and sign a Letter of Consent before starting to collect data. The letter explained the purpose, procedures, and the participants' tasks in the study. Then dictionaries, including a Chinese dictionary, an English-Chinese dictionary, and an English dictionary, were provided in case the participants felt a need to consult them. Each participant spent approximately one and a half to two hours participating in the data collection procedures. The data collection procedure consisted of two sessions. One was reading and thinking aloud in Chinese, then responding to the Reading Comprehension Strategy Check-list in L1 immediately after reading the L1 passage. In the second session, the participants were asked to perform the same tasks in L2.

To minimize the influence of the first data collection session on the participants' comprehension processes in the second session, an interval between the two sessions was considered necessary. Calero-Breckheimer and Goetz (1993)

conducted two sessions in two languages one week apart to guard against this possibility. In the pilot studies prior to this research, the interval between the two sessions was 10 days. The results indicated that the participants' reading comprehension processes were not affected by the experience of participating in the first data collection session. For the current research, the interval between the two data collection sessions was approximately one month.

#### 4.7. Data Analysis

##### 4.7.1. Transcribing

Audio-tapes of the think-aloud were transcribed by the researcher immediately after each participant completed a session. Transcribing a subject's verbalization immediately better refreshed the researcher's memory, and reminded the researcher of some elements of the participants' observable behaviour during reading, such as pointing at the lines, or their facial expressions. To ensure the transcriptions were representations of the participants' verbalizations, the transcriptions included some broken utterances, pauses, and filling-in utterances such as "em, m ..." and the like. In order to make the transcriptions consistent among the participants, the same symbols were used to represent filling-in utterances, pauses, and broken utterances. A note on symbols used in the transcriptions was presented to independent raters. Field-notes taken by the researcher were consulted when a verbalization was being transcribed.

#### 4.7.2. Coding

The transcriptions were coded immediately after transcribing. Reading and rereading the protocols several times and jotting down notes as reading progressed enabled the researcher to know the data better. The notes were later developed into a primitive outline which was used to search for the strategies frequently employed by participants, to code and to categorize the data. The coding system was set up to allow for the display of any other strategies might develop from participants' responses.

At the next step, the researcher made an effort to compare and contrast the participants' utterances to discover which statements or utterances were like each other and which could not go together. Properties of a category were discovered by listing how all utterances were alike and how they differed. Based on constant comparison, the researcher coded all relevant data that could be thought to bear on a point, and then systematically assembled, assessed and analyzed these data in a fashion that could constitute proof for a given category. The properties of categories were generated from evidence in the think-aloud protocols, then the evidence from which the category emerged was used to illustrate the category. Linkages were established by simple comparing and contrasting, by sorting data into like and unlike groups, and by identifying underlying associations between or among groups. For example, guessing or skipping an unknown word was classified as a strategy that a reader used to understand specific text components. All the verbalizations of this kind were considered to be text-based strategies and organized under the umbrella of text-based strategies.

Posner (1989) suggests: "The particular words used provide powerful clues about subjects' representations of the task and about their processing" (p. 23). Therefore, some coding was constructed from the actual vocabulary used by the participants, and by defining equivalencies between words used nearly synonymously.

In deciding the size of the unit to code, the researcher faced the "context-versus-reliability trade off" (Simon & Kaplan, 1989). As Weber (1985) stated, "Larger portions of text such as paragraphs and whole texts are usually more difficult to code as a unit than smaller portions such as words and phrases, because larger units typically contain more information and a greater diversity of topics". On the other hand, Simon and Kaplan (1989) argued: "single words or phrases often do not include enough context to disambiguate meanings. In analyzing protocols, sentences or complete ideas are often considered as segments" (p. 28). Since the participants in this study were accomplished readers, most of them processed an entire sentence at a time when reading the texts. The think-aloud protocols indicated that they read a whole sentence first, then verbalized their understanding or thinking. After listening to the tapes of think-aloud several times, the researcher discussed this issue with her supervisor and decided to code the protocols according to original text sentence. A strategy that occurred in one original text sentence was counted once.

The reason for this decision was two-fold. First, that some strategies were frequently used in one text sentence was the artifact of the think-aloud task. For example, in the case of "rereading", some participants reread a portion of the text to indicate to the researcher that they were dealing with this certain portion of the text.

The purpose of rereading was evidently to focus on the text. Second, if each occurrence of a strategy was accounted, the data as a whole would be skewed by one single participant, or one single strategy. For instance, one participant used the strategy of "representing the meaning of sentence" very frequently. What she actually did was paraphrasing a same sentence several times without adding any new information or making any change to the former paraphrasing. Actually, she frequently repeated her paraphrasing. If every single repetition of paraphrasing like this had been counted as an instance, the data obtained from these participants as a group would have been skewed by the single participant. As a result, the data of this study would not present a real and complete picture of these Chinese readers' comprehension processes.

#### 4.7.3. Frequency of Occurrences

Pased on the above decision, all occurrences of a single strategy in one text sentence were counted as one instance no matter how many times a participant moved off and resumed. The frequency of a certain strategy used by a participant in this study refers to the occurrences of the strategy in the whole passage. The frequency of occurrence for each of these 24 sub-categories of responses and strategies observed in the study was counted within individual participants' think-aloud protocols and their comprehension strategy check-lists for each of two passages: Chinese and English. Thereby, an individual frequency and a group frequency were obtained.

Under some circumstances, the participants used more than one strategy to construct the meaning of a text sentence; thereby responses to one sentence might

contain several strategies. For instance, a participant verbalized: "I don't quite understand what the 'student places' is. Well, I don't need to worry about it". This response revealed that the participant used at least three strategies: monitoring comprehension, evaluating the uncertain part, and reading on.

#### 4.8. Inter-rater Reliability and Intra-rater Reliability

Think-aloud technique includes the transcription of the protocols and the categorization of data. Some of the participants' responses were overt and directly demonstrated their strategies. Others were covert and had to be inferred by the researcher, a process which depends heavily on the researcher's subjective interpretation of the subjects' verbalizations (Seliger, 1987). Researchers (Seliger, 1987; Bogdan & Biklen, 1992) suggest estimating inter-rater reliability of data collection procedures. In order to obtain information about how reliable these two data collection instruments were, both inter-rater and intra-rater reliability were estimated.

##### 4.8.1. Inter-rater Reliability

The researcher initially coded the think-aloud protocols and established categorizations of responses and strategies according to the research purpose. The coding system consists of a total of 24 strategies grouped into four categories, as presented in the following chapter. To obtain evidence of inter-rater reliability, 38% of the transcriptions of the think-aloud protocols were randomly selected by rolling dies,

and sent to be coded independently by two raters who were ESL teachers with Master's degrees, and who were able to speak and read in both Chinese and English.

A coding manual, consisting of a set of criteria, definitions and examples of strategies that had emerged from the study, was prepared as a guideline for the researcher and independent raters to work out the inter-rater reliability of the data. Most examples were chosen from the pilot studies, some from other participants whose think-aloud protocols were not used to test inter-rater reliability. The definitions, criteria and examples helped to train the raters and enable them to focus on the particular purpose of this study.

After careful explanation of the coding procedure, the independent raters read and memorized the definitions and criteria. Then they practiced with some protocols from the pilot studies to become familiar with the definition and criteria. Since the raters had difficulty distinguishing the operations of "paraphrasing sentences", "explaining", and "restating", the researcher, after discussion, decided to combine the three into one single strategy. It was named "representing the original meaning of text sentences". After these training procedures, the raters worked on their own to code the 38% of protocols of the study separately. Raters had the freedom to incorporate new strategies into the list as necessary. After each rater completed coding the data of the selected think-aloud protocols, their codings were compared with those of the researcher. The inter-rater reliability was determined by comparing the coding of the researcher with the coding of each of the independent raters. Although no statistical analysis was possible given the small number of research participants involved, the

percentage of the inter-rater agreement was calculated. The percentages present the degree of agreement between the coding of each rater and that of the researcher. The high degree of similarity in inter-rater categorizations was construed as an indication of acceptable reliability. Table 5 presented the proportion and mean of inter-rater reliability.

**Table 5**

**Table of Inter-rater Reliability**

Rater	Chinese Passage	English Passage	Mean
Rater 1	88%	94%	91%
Rater 2	93%	4%	93.5%

The inter-rater reliability, that is, the degree of agreement between the researcher and Rater 1, was 91%, and was 93.5% between the researcher and Rater 2. This results indicate that the coding of the category of responses and strategies was reliable. The percentages would be substantially higher if reliability had been calculated based on the four categories of responses and strategies instead of on the 24 specific strategies which were coded.

The comparison of the inter-raters' coding also revealed that some explicit strategies such as "relating to background knowledge", "representing the original meaning of the text sentence", and "evaluating the content of the text" were easy to code by the raters. As a result, the degree of agreement of these strategies between the researcher and the raters was very high. Nonetheless, some covert strategies which needed to be

interpreted, such as “monitoring one’s own comprehension”, and “revising or confirming comprehension or hypotheses” were not directly demonstrated. Therefore, the degree of the agreement of these strategies was relatively low. However, the manual of coding did help the independent raters to focus on the purpose of this study, and to code the covert strategies.

#### 4.8.2. Intra-rater Reliability

The intra-rater reliability was also of concern. The researcher re-listened to the tapes and reread all of the transcriptions, re-coded and re-categorized the data twice, a month apart, to establish intra-rater reliability. The intra-rater reliability was obtained by comparing the primary coding with the second and the third codings made by the researcher. The percentages indicated the degree of agreement between the primary coding and the second and the third coding. Table 6 displays proportion and mean of intra-rater reliability.

**Table 6**

**Table of Intra-rater Reliability**

Passage Language	Re-coding 1	Re-coding 2	Mean
Chinese	94%	92%	93%
English	95%	93%	94%

As Table 6 indicates, intra-rater reliability, namely, the degree of agreement between the primary coding and the second and third codings made by the researcher, had a mean of 93.5%, which indicated that the intra-rater reliability was high.

It was then decided to use the researcher's coding as the criteria for determining the frequency of use for each strategy, as it was considered that the researcher had the advantage of observing the participants during their performance, listening to the tapes repeatedly, and knowing the participants. Above all, she knew very clearly the purpose of this study and what she was looking for in the protocols. All these advantages lent the researcher credibility in the categorization.

#### 4.9. The Role of the Researcher

The role of the researcher during the two individual data collection sessions varied according to the needs of the individual participants and to the particular task being performed. At the beginning of the each session, the researcher welcomed the research participant and expressed her gratitude for his or her valuable time and appreciation of his or her participation in the study. The researcher then reiterated the purpose of the study and outlined the tasks to be performed by the participant, and emphasized that the reading and think-aloud task in Session One was in Chinese, and that those taking place in Session Two would be in English. During the training period, participants were encouraged to ask questions concerning the procedures and tasks if they felt the need for further clarification.

During the reading and performing think-aloud period of each session, the researcher sat on the left side of the researcher participant, so as to minimize the participant's feelings of being observed. However, when the participant remained silent for a few seconds, the researcher encouraged him or her to keep going by saying "you

are doing fine, keep going, keep reading". Most time the researcher sat nodding her head, or verbalized: "uh-huh, umm" or the like to indicate that she was listening. The researcher made notes describing the participants' nonverbal reactions to the task exhibited by the participants during this period, such as gestures, facial expressions, and actions related to writing, marking, underlining, and so forth. These observations served later as an aid to the interpretation of the recorded verbal data. When the reading and think-aloud task was completed, as indicated by the participant, the researcher recorded the elapsed time.

Then the researcher handed the participant a pre-printed self check-list of reading comprehension strategies, and explained to the participant the task to be performed. During this period, the researcher resumed her previous position and took notes on the behaviour demonstrated while participants were answering of the comprehension strategy check-list.

#### 4. 10. Definition of terms

In this section, some specific terms used in this study are defined. In the following chapters, these terms are used to present and discuss the results of the study.

##### **Total strategies**

"Total strategies" refers to the sum of strategies that the researcher observed from the participants' think-aloud protocols and the strategies reported by the participants on the comprehension strategy check-lists.

**Group total strategies**

“Group total strategies” refers to the total number of strategies used by the eight participants as a group when reading the Chinese passage or the English passage.

**Individual total strategies**

“Individual total strategies” refers to the total strategies used by each participant when she or he read the Chinese or the English passage.

**Frequency**

“Frequency” refers to the number of instances that a particular strategy occurred in Chinese or English reading task.

**Group frequency**

“Group frequency” refers to a sum of frequency of instances of all strategies used by all the participants as a group.

**Individual frequency**

“Individual frequency” refers to the frequency of instances of all strategies used by each participant as an individual reader.

**Text sentences or original text sentences**

“Text sentences” or “original text sentences” refer to the sentences in the reading materials which the participants of this study were processing either in Chinese or in English.

## Chapter Five: Results

The major focus of this investigation was to study the comprehension processes of the participants' reading in Chinese (L1) and English (L2). The two research questions were posed: 1) What specific comprehension strategies were used by these readers reading expository texts in L1 and L2? 2) To what extent did these participants use similar or different comprehension strategies? These questions were first investigated by examining the comprehension processes of the participants as a group, and second by examining some participants as individual readers. An investigation of each individual reader's comprehension processes in L1 and L2 attempts to provide detailed information about individuals' comprehension processes and to describe what specific strategies an individual readers used in L1 and L2 reading performances. That is, besides the differences among participants, to what extent did each individual reader process the texts similarly or differently in Chinese and English. In this chapter, findings to the research questions are presented in three sections. The first section presents the findings to question one from a group perspective. The second section presents findings to question two from a group perspective. The third section presents the findings to both research questions from the perspective of individual readers.

In order to give a global and a detailed picture of the participants' comprehension processes. Findings are presented in the following order: 1) comprehension strategies identified in the study, 2) the frequency of specific strategies used by the participants when reading the Chinese and the English passages; 3) total strategies and frequencies of

strategy used by the participants as a group, 4) the number and percentage of strategies used in the participants' comprehension processes in both Chinese and English, 5) strategy categories used by the participants; 6) individual readers' strategy use in Chinese and English tasks; and 7) frequencies of strategies used by each individual reader.

### 5.1. Findings to Question 1: What Specific Comprehension Strategies were Used by These Readers Reading Expository Texts in L1 and L2?

#### 5.1.1. Finding 1 to Question 1: Strategies Identified in the Participants' Comprehension Processes while Reading Chinese and English Expository Texts

As explained in Chapter Four, think-aloud protocols were examined and analyzed in three stages. In the first stage, the content of the responses was interpreted, and comprehension strategies were located. Second, a comparison of the participants' responses in the think-aloud protocols led to a grouping of these responses into categories of responses and strategies. Third, careful and repeated reading and coding of the think-aloud protocols several times enabled the researcher to understand the content meaning of the responses and the underlying purposes of these specific strategies and to define 24 sub-categories - strategies found in this study and grouped into four categories reflecting their functions and strategy sources: 1) text-based strategies, 2) text structure-based strategies, 3) text and prior knowledge combined strategies, and 4) self-corrective strategies.

Next, the responses on the comprehension strategy check-list were categorized accordingly. For example, the strategy of "guessing unfamiliar words" on the check-lists

was collapsed into the category of “focusing on vocabulary” according to the responses in the think-aloud protocols. The categorizations of responses and strategies are presented here with examples from participants’ think-aloud protocols. The examples were chosen from both the Chinese and the English protocols, and from all of the eight research participants’ think-aloud protocols. In order to present a full picture of the participants’ comprehension processes, unfinished utterances, silence, and pauses such as “em”, “en”, “um” and “well”, were included. In the transcribed protocols, (...) refers to three seconds of pause, /// refers to unfinished utterances, (“---”) refers to rereading, “...” indicates that this portion was restated, and three dots means that the quotation is omitted.

#### Text-based strategies:

The category of text-based strategies in this study refers to the way in which participants operated to construct meaning of the text by focusing on selected components of the original text, such as words, phrases, clauses or sentences in the text. Responses of this kind indicate that the participants were attempting to find meaning in the text. Under this category, there are six strategies: focusing on vocabulary, relating to prior sentences, summarizing or making conclusions, using sentence or grammatical structure, reading on, and questioning and looking for answers in the text.

##### 1. Focusing on vocabulary

“Focusing on vocabulary” refers to the operations in which participants identified and figured out the meaning of single words or phrases. Responses of this kind included guessing or reasoning around a particular word or phrase in the text. This strategy was thought of as a unique strategy by which a participant

focused his or her attention on the meaning of a single word or phrase. The goal was to solve the vocabulary problem in order to obtain understanding of a certain part of the text. The meaning identified by the participants might be the dictionary definition of the vocabulary item, not necessarily an accurate meaning in the given context. Examples:

- Response to sentence #3 of the Chinese passage: What does “artificial things” mean here, it means that it was made through human beings’ hard work, man-made things? (P 4).
- Response to sentence # 3 of the English text: "capacity", usually I think about "capacity" as the ability, em, or the room to do something, the room to achieve something. (P 1)

## 2. Relating to prior sentences in the text

“Relating to prior sentences of the text” was an operation in which the participants attempted to associate the information they obtained from the previous text with the information in subsequent text. The participants referred back to previous sentences when processing subsequent text in order to figure out the relation between text statements.

Block (1986) defined this kind of operation as "connecting new information with previously stated content" and named the action as one of attempts to "integrate information".

“Relating to prior sentences” in this study was used in three cases. First, when the participants failed to understand a certain part of the passage, they referred to the statements or information provided in the previous parts. Example:

- Response to sentence #10 of the Chinese text: I don't know what it talks about (...) I think it is still talking about the importance of interaction in learning /// em. (P5)

Second, when they read the subsequent text, some information reminded them of the prior sentences; then "relating to prior sentences" helped them to integrate text information and construct the meaning of the subsequent text. Example:

- Response to sentence #6 of the Chinese text: OK, I think this relation refers to what was talked about in the previous sentence-- the relation to the material world. This sentence should be understood so in the context. This (...) OK, I think it talks about the same thing as in the previous sentence, ... (P 1)

Third, the subsequent text helped them improve or revise their comprehension of prior sentences. They also talked about their understanding of the prior sentences and their understanding of the current sentence. This strategy was observed being used together with "revising comprehension". By associating to information in the previous sentences, they figured out the meaning of the given part. In this way, their comprehension of a paragraph or the text was achieved. Example:

- Response to sentence #10 of the Chinese text: It said earlier that children draw adults' attention by their behaviour and actions and associate with the outside world. (P 6)

### 3. Summarizing or making conclusions

Summarizing or making conclusions was defined as a text-based strategy by which the participants used very brief statements to abstract the significant meaning of a certain

sentence, paragraph, or even the whole passage in order to check their comprehension.

The purpose of summarizing was to test if the reader himself or herself could pinpoint and retain the important information. This strategy allowed a reader to check whether comprehension was progressing smoothly. Examples:

- Response to the second paragraph of the Chinese passage: I think the second paragraph talks about language and thinking. But it also talks about the relation between language and communication. (P 8)
- Response to the first paragraph of the English passage: So this paragraph is talking about the selection of students, selection standard, (...) to select students who can do best. (P 5)

#### 4. Using sentence or grammatical structure

The reader used his or her grammatical knowledge to figure out the structure of a sentence so as to facilitate his or her comprehension of it. This was a unique strategy frequently used by one participant when she read the English passage. Examples:

- Response to sentence #11 of the English passage: Um, from "not only" I expect a continuing sentence is going to carry double meanings, not only this, but also that. So in this case I would look forward for "but also", the right consequences... (P 1)
- Response to sentence #1 of the English text: ...Then it starts from "because", it gives some reason. ... OK, the word "because", en, I can relate to the first part of the sentence, because of the quality of students, the quality and efficiency of the educational programs ///. I

use the sentence structure, because the quality of the facts; after that I have to look for words that can fit in meaning. So in this case, it is the fact of quality, of the fact of the efficiency also /// So other words, em, em, I just use modifiers ... (P1)

### 5. Reading on

"Reading on" was defined as a text-based comprehension strategy in this study. Reading on involves looking for information in subsequent text that might throw light on a particular problem or limitation in understanding. Responses of this kind revealed that the participants specially read ahead so as to obtain clues to confirm their hypothesis or to comprehend the formal chunk of text. Kletzien (1991) identified it as "reading subsequent text". Under three circumstances, the participants used the strategy of "reading on". One was when the participants were not quite sure whether they correctly understood a sentence or part of sentence. Examples:

- Response to sentence #1 of the Chinese passage: em, (...) I will put this sentence aside, and see the next. (P6)
- Response to sentence #9 of the English passage: ...well, I don't understand how this related to the previous sentence, let me see, maybe later it will explain. (P8).

The examples provide evidence to suggest that the uncertainty leads these readers to read on to gather more information rather than attempt to puzzle out the meaning by spending more time in processing the present sentence.

A second was when they that realized some information was missing or they needed more information from the text and expected the following portion of the text to supply it. They decided to keep on reading and moved to the next sentence in order to find clues in the following text. Examples:

- Response to sentence #4 of the English passage: Okay, let me see what is the next paragraph for more examples. (P 6)
- Response to sentence #3 of the Chinese passage: Why?... probably I will get it if I keep reading. (P3)

The third circumstance was when they formulated a hypothesis about a portion of the text; they would read on so as to search for clarification or to test against their hypothesis. This strategy was often observed being used with "forming hypotheses" or "skipping unknown words or phrases". Example:

- Response to sentence #12 of the English text: Well, it will affect ///, it will affect (...)social equity, ... how people look at their decision... Let me see what the next sentence says. (P8)

#### 6. Raising questions and looking for answers in the text

"Raising questions and looking for answers in the text" was defined as a text-based strategy because the participants not only raised questions about the content, but also attempted to find answers to their questions in the text. As reading was in process, the participants asked questions in order to clarify their understanding. A direct question of the text or author indicated a problem-solving strategy. It demonstrated that the reader was attempting to clarify what was being read. This strategy permitted the reader to bring

into play general problem solving procedures that are not normally activated during reading (Bereiter & Bird, 1985). Vorhaus (1984) defined this kind of operation as "asking question about the parts you do not understand". Block (1986) defined this kind of operation as two strategies: "questioning meaning of a clause or sentence" and "questioning meaning of a word".

The participants in this study did, however, operate differently from those in Block's. On the one hand, they not only questioned what they did not understand, but also formed questions about what they understood. By giving answers to their own questions, they clarified their comprehension. On the other hand, the participants in this study asked questions mostly about the content. When participants were not quite sure what the text was about, they could not grasp the author's point, or they understood a portion of the text but wanted to know more, they questioned themselves about the content, and attempted to find answers to their questions. They were posing "understanding" questions (Anderson, 1980) for themselves in order to verify comprehension. By doing so, they focused their attention on finding reasonable answers to their questions. Once an answer was found, the problem was solved, and comprehension was achieved. Therefore, "raising questions" was thought of as a comprehension strategy by which the participants solved their problems and reached comprehension. Examples:

- Response to sentence #2 of the Chinese passage: It says that there are some results of research... What are these results? (1, 3)
- Response to sentence #10 of the English passage: This is a very difficult choice, the government and higher education institution,

maybe, both of them have to make a difficult choice. Why, why is it difficult, what is the difficulty? Oh, I see ... (P 8)

- Response to sentence #6 of the English passage: Why? because those were controlled by the government.... (P 3)

### Text structure-based strategy

Responses which reflected attempts by the participants to use their knowledge of text organization to facilitate their comprehension were grouped under the category of text structure-based strategies. Five strategies were grouped under this category: looking for key words relevant to the content, looking for main ideas or topic sentences, recognizing the structure of the text, checking the consistency and coherence of text information, and evaluating text organization.

#### 7. Looking for key words

“Looking for key words” was a comprehension strategy by which the participants located important words which they thought could give them significant clues about the content of the text in a sentence or even the whole text. As they verbalized, by looking for key words, the participants either formed their hypothesis about the content, or grasped the meaning of a sentence. This strategy was observed being used with the strategy of “forming hypotheses”. Examples:

- Response to sentence #16 of the Chinese passage: Here “the specific manner and style” are key words of the sentence, and ... (P3)

- Response to sentence #1 of the Chinese passage: “Communication” is the key word of the passage. The following text, I think, will talk about communication. (P3)
- Response to sentence #1 of the English passage: In the second part, the main word is “effective co-ordination”. (P1)

#### 8. Looking for main ideas

“Looking for main ideas” was defined as a comprehension strategy in this study. By identifying one main idea per paragraph, readers sought to construct a picture of the pattern of text organization. As they were reading, the participants attempted to grasp the topic of the text or the main idea of a paragraph. The main idea of the paragraph was likely to be an important component of the paragraph summary in most cases. Therefore, this strategy was also used along with “summarizing” when they attempted to obtain a whole picture of the text. What the participants actually did was to combine the main ideas of each paragraph to obtain a global understanding of the text. Examples:

- Response to sentence #10 of the Chinese passage: The relation of language and communication is the topic of this passage. (P 3)
- Response to sentence #1 of the English passage: The main idea is that selecting right students is important. (P 5)

#### 9. Recognizing the text structure

“Recognizing text structure” was defined as a comprehension strategy by Block (1986) and Kletzien (1991). These researchers suggested that recognizing the structure of a text representation was central to effective comprehension. This strategy was used by all

of the participants in this study. The participants pinpointed the purpose of information, and the way that the author organized the text information. It also occurred that when they noticed some issues were discussed by the author in the previous part of the text, they would simply mention that it was talked about earlier, or that it was a repetition of a certain part of the text. Examples:

- Response to sentence #13 of the Chinese passage: Em, this is conclusion, this is the conclusion to this paragraph. (P 7)
- Response to sentence #1 of the English passage: There is a quotation. I think the writer is trying to use some previous study to show how important it is to select university students. (P 3)

#### 10. Evaluating the structure of the text

“Evaluating the structure of the text” was considered as a unique comprehension strategy by which the participants changed their role from that of reader to that of writer. They used their knowledge of text organization to comment to the author’s way of organizing and presenting information in the text. The change of role enabled them to see the text from another aspect, and gave them a chance to act as critics of the author.

Responses of this kind reflected the participants’ making some comments on the organization of the text. Examples:

- Response to sentence #9 of the Chinese passage: I think this paragraph is well organized; it is logical and coherent. (P 4)

- Response to sentence #16 of the English passage: The text is too crowded, it makes me tired of reading this kind of text. The author should number the issues rather than use dash. (P 3)

#### 11. Checking the coherence and consistency of text information

"Checking the coherence and consistency of text information" refers to the way that readers checked whether the ideas presented in a text were logically consistent or coherent with one another. This strategy might require integration of ideas from separate sections of the text. Responses of this category reflected readers sometimes using a logical method of analysis, something like if  $1+1=2$ , so  $2-1$  should be 1, to help them check the consistency of the text input, or confirm their understanding of a certain sentence.

Examples:

- Response to sentence #15 of the Chinese passage: If the former sentence is correct, this one should be right. (P 2)
- Response to sentence #16 of the English passage: Well, I believe so even though I don't have any evidence to prove. It is logically reasonable from the context. (P 2)

#### Text and prior knowledge combined strategy

Responses indicated that the participants used both information from the text and their prior knowledge about the content, language, and their world experience. The characteristic of this kind of operation was that the text functioned as a trigger. The information in the text triggered some prior knowledge in the participants' long-term memory. The prior knowledge, in turn, facilitated their comprehension of a given part of

the text. The use of this kind of strategy also indicated that sometimes the participants were talking away from the text. However, the purpose of this kind of utterance was to comprehend the text. There were four strategies under this category: relating to prior knowledge, evaluating the content of the text, representing the meaning of sentences, and forming hypotheses about the content of the text.

## 12. Relating to prior experience or knowledge

“Relating to prior experience or knowledge” was a strategy by which the participants activated their prior knowledge to help them comprehend the content of the material. Activating relevant prior knowledge has come to be recognized as crucial to reading comprehension (Anderson, 1978). Kletzien (1991) defined it as “using prior knowledge”. Bereiter and Bird (1985) termed it “recall of related information”. Block (1986) and Olson et al. (1984) identified this strategy as using general knowledge and associations. Other researchers like Steinberg et al (1991) defined this strategy as “associating” at the discourse level. They went even further and subcategorized it into a) experience; and b) textbook knowledge. However, it was very difficult for the present researcher to distinguish the sources that the participants resorted to when processing the texts because of the nature of the content of the texts. Therefore, this distinction was not made. Responses indicating that the participants were integrating their prior knowledge into the reading task were placed in a single category, and called “relating to prior knowledge or experience”. In this study, “relating to prior experience or knowledge” includes any kind of experience, whether personal experience, world knowledge, or knowledge obtained from school.

When the participants read a sentence they related it to their own experience or their prior knowledge to explain, reiterate, and clarify information in the text. Sometimes they just said: "This reminds me ..."; other times they talked about something from their experience or prior knowledge. The latter kind of responses seemed to go astray from the text content. However, the appropriate reference frame enabled them to understand the text. Examples:

- Response to sentence #11 of the Chinese passage: This reminds me of definitions of language in linguistics... (P 7)
- Response to sentence #13 of the English passage: Especially in Chinese family, the parents all want their children to go to university. It reminds me of my own experience... (P 3)

### 13. Evaluating the content of the text

"Evaluating the content of the text" was identified as a unique comprehension strategy by which the participants checked the information in the text against what they already knew, or believed to see whether it was true or plausible. This was categorized as a text and background knowledge combined strategy because the text information triggered the participants' curiosity or interest to test it against their background knowledge, experience, and beliefs. Responses of this kind included the participants' agreements or arguments with the author, and even their own opinions about certain information in the text. When reading, the participants verbalized whether they agreed or disagreed with the statements in the text by simply responding: "Yes," or "Yeah, I think so", "I agree with the author", or "Really? I don't think so". Sometimes they argued

against the author and presented their own opinions. Their responses might focus on their opinions and lead away from the content of the text. However, this kind of argument helped them to clear up their doubts or realize their lack of some background knowledge. By this kind of interaction with the author, their comprehension of a certain part was facilitated. Examples:

- Response to sentence #5 of the Chinese passage: I think this point of view is basically right, but ... (P 4)
- Response to sentence #4 and #15 of the English passage: That is for sure, but I am not quite sure if quality has that much to do with (...) with funding (...) because within a certain amount of funding the quality still can be improved (P 7)

#### 14. Representing the meaning of the text sentences

The strategy of “representing meaning of the text sentences” refers to the way in which the participants used their own words to maintain or represent the meaning of the original text sentences. The meaning of text sentences were represented by the participants in three ways: “paraphrasing sentences”, “explaining”, and “restating”.

Paraphrasing was using other characters or words to present the initial meaning of the original sentences, by which the participants simplified the information in the text and clarified their comprehension. Examples:

- Response to sentence #6 of the Chinese text: It says children do something through a medium, namely, with help of adults, adults help children to do what they want... (P 2)

- Response to sentence #2 of the English text : This sentence says that universities cannot take as many students as they can handle. They cannot take students who do not have ability to fulfill further study. (P 5)

The second way of “representing the meaning of the text sentences” was “explaining”. “Explaining” was based either on their current understanding of the text or on their background knowledge. When processing the text, the participants used their own frames of reference suggested by, but not entirely directly related to, text. The participant’s background knowledge was activated and virtually led the participant into a new frame of reference. This kind of response was indicated when the participants used their own words, added extra information, provided examples, or cited references to elaborate or facilitate their comprehension of the text. Examples:

- Response to sentence #7 of the Chinese passage: It means, it implies that when a child cannot speak, he cannot express himself, he draws adults’ attention by other things or actions. For example, he cannot speak, but he points to something, or throws something so as to try to tell adults what he wants. (P 3)
- Response to sentence #10 of the English passage: The basis and criteria for selection is also difficult to make because they have to set up the right basis and criteria to select students. If they make a wrong one then the good students may not come to universities. (P 8)

The other kind of “representing the meaning of text sentence” was “restating”, by which the participants repeated the original phrases or even statements of the text. When the participants were paraphrasing or explaining a sentence of the text, for convenience, they simply borrowed or used the author’s words. Examples:

- Response to sentence #14 of the Chinese passage: It says that learning or study always happens with “other people’s participation”, with some people’s involvement. (P 1)
- Response to sentence #7 of the English text: This is the case they have to accept “more students than they can handle”...(P 6)

(The portion placed between quotation marks and underlined was borrowed from the text)

#### 15. Forming hypotheses

“Forming hypotheses” was defined as a comprehension strategy by which the participants predicted or anticipated the content of following sentences or paragraphs. It provided the readers with the opportunity to activate background knowledge or frames of reference, and to set a purpose for reading, namely, checking the accuracy of the hypothesis. A hypothesis demonstrated that the reader had formed some idea about what was being read. Pitts (1983) identified this kind of behavior as “forming a tentative hypothesis”. Block (1986) defined it as “anticipating content”. “Forming hypotheses” occurred in this study when the participants started a new paragraph; they formed their hypotheses at the same time they were skimming or scanning the text. So this strategy was observed being used with “skimming and scanning”. Sometimes hypotheses were

organized around a hint or clue explicitly mentioned in the original texts. Other times the hypotheses indicated that the participants were applying background knowledge and relying less on suggestions presented in the text. Examples:

- Response to sentence #1 of the Chinese passage: I guess it is about social activities such as having parties, making friends, getting to know people. I think it will talk about why we need this kind of social activities, (P 1)
- Response to sentence #5 of the English passage: It is going to talk about student selection in developing countries. (P 7)

Self-corrective strategies:

Self-corrective strategies reflected more declarative, procedural, or conditional knowledge, and that the participants had procedural knowledge for planning, monitoring, and evaluating their own comprehension. These kinds of strategies indicated that the participants focused on understanding, and presented evidence of self-efficacy. This category consists of nine strategies. There were two characteristics of these strategies. One was that the participants used these strategies very flexibly, and the other was that the participants were aware of their purpose for reading.

16. Adjusting reading speed

The participants obviously adjusted their reading speed; they either slowed down or read faster when they realized that some portion of the text was easy or not easy to understand, or did not meet their predictions. Pitts (1983) identified this reading behavior as "changing the rate of reading"; Goetz (1993) defined it as "change in reading speed".

Slowing the rate of reading allows greater processing time, quickening the rate of reading, on the other hand, allows the reader to save time for other portion of text. However, this strategy was not evident in the think-aloud protocols because the procedure of talking about understanding slowed down the reading speed. As a result of using the comprehension strategy check-list, the participants reported it with examples in the comprehension strategy check-list, which compensated for the weakness of the think-aloud protocols.

#### 17. Skipping unknown words or terms

“Skipping unknown words or terms” was defined as a self-corrective strategy in the study. When the participants encountered an unfamiliar word, they would ignore it if they thought the word was not important, or would not affect their comprehension. This was a combination of “monitoring comprehension” and “reading on”. Responses revealed that when the participants decided to skip a given word and continued reading, they were monitoring their comprehension processes. They were aware of what they were doing, and they also evaluated the significance of the words they skipped in the text. Examples:

- Response to sentence #8 of the English passage: I still don't understand “tertiary”. But it is not going to matter too much for me to understand the whole sentence. (P1)
- Response to sentence #11 of the English passage: I don't understand it (social coherence), let me skip it. (P 8)

### 18. Borrowing words from another language or switching language

“Borrowing words from another language or switching language” was a way in which the reader used a word or words in another language to express his or her understanding of the text. This strategy often occurred when some expressions in either Chinese or English were not available in the participant's short-term memory. Then the reader would insert words or borrow expressions from another language to maintain his or her comprehending process instead of interrupting reading to search for the needed expression in long-term memory. This was a unique strategy of bilingual readers in this study. It enabled the participants to keep reading and construct meaning of the passage.

When participant 7 evaluated the structure of the Chinese text, and said in Chinese: “It needs an example here”. Instead of using the word “example” in Chinese, he borrowed the word “example” in English. In an other case, the same participant evaluated the content of the text by saying: “That’s true” in English when he was reading the Chinese passage. Another participant (P 6) tried several times to search for the English word “syllabus”, but she could not get it in that moment. For convenience, she inserted a Chinese word “syllabus” to express her explanation of the sentence #7 of the English passage.

### 19. Skimming or scanning

This strategy was defined as a self-corrective strategy because the responses indicated that the participant knew his or her reading purpose and planned his or her reading comprehension processes. This kind of operation often occurred at the very beginning or by the end of the participants' reading performance. At the beginning, they

went through the text very quickly in order to grasp the topic of the passage immediately. Some participants also skimmed or scanned when they finished reading the whole passage in order to summarize the passage, to check their comprehension, or to make sure they “grasped the main idea of the passage” (P 3). Examples:

- Response at the very beginning of the Chinese passage: I will scan through the article to see if there is a title there. (P 3)
- By the end of the Chinese passage: I will go through back quickly to see whether I got the important points. (P 3)
- Response at the beginning of the English passage: I will read the first sentence of each paragraph to find the topic of the article. (P 3)

#### 20. Revising or confirming hypotheses or comprehension of a former part

“Revising or confirming a hypothesis or comprehension of a former part” was defined as a self-corrective strategy in this study. As the participants formed their hypotheses about the content of the passage, they read along. At the same time, they tested their hypotheses against new information and adjusted or confirmed their former hypotheses. When they noticed that their former hypotheses or comprehension were not correct, that, for example, their paraphrasing was inaccurate, they made some changes. Block (1986) defined the similar reading behavior of his subjects as “correcting behavior”. However, the participants in this study not only revised and adjusted their hypotheses and understanding, but also most of the time they confirmed some of their hypotheses and understanding of the former portion of the text. This strategy was observed being used with a combination of “relating to prior sentences” and “monitoring comprehension”. It

was evident that the participants connected the new information with the prior information and evaluated their understanding. Examples:

- Response to sentence #7 of the Chinese passage: Just now I understood that children are passive. Now I can see that actually children are also active when they want communicate with adults,...  
Yes, sometimes children are active, they initiate some communication with adults. (P 6)
- Response to sentence #9 of the English passage: This is the same as what I understood from the second paragraph. (P 2)

#### 21. Monitoring comprehension

Previous research indicated no strategies of any type could be comprehension promoting without effective monitoring. "Monitoring comprehension" was defined in Block's study (1986) as "the reader assesses his or her degree of understanding of the text" (p. 473). "Monitoring comprehension" in this study was identified as a strategy which indicated that the participants evaluated their rate of understanding, and or they were aware of lack of reference to facilitate comprehension. Responses of this kind also revealed that the participant attempted to find out why she or he could not understand a certain portion of the text. Examples:

- Response to sentence #15 of the Chinese passage: Actually, I am not quite sure what this sentence talks about... (P 5)

- Response to sentence # 4 of the Chinese passage: ... well, [laughing] I misread "key" as "spoon" (Chinese words), so I lost my understanding. (P 7)
- Response to sentence #16 of the English passage: I have no idea about this. It's beyond me. ( P 4)

## 22. Rereading

"Rereading" is a strategy identified in many studies. Bereiter and Bird (1985) defined this strategy as a) rereading from the beginning of confusing segments occurring as a result of comprehension failure; and b) rereading previously comprehended parts as a result of loss of connection. Block (1986) suggested rereading should be a local strategy. "Rereading" was included in the category of self-corrective strategies in this study because the underlying nature of "rereading" was that the participants were aware that their confusion and misunderstanding had occurred. The operation of "rereading" was a *corrective attempt to figure out whether the confusion or misunderstanding was the result of misreading or an inappropriate reference frame*. For this reason they decided to read a given portion of the text again. "Rereading" in this study included any kind of rereading, e.g., rereading a word or character; and rereading a phrase or a clause, or a sentence; either rereading aloud or silently. Most often rereading led to comprehension when combined with other strategies.

However, it should be pointed out that "rereading" in some circumstances may have been an artifact of the think-aloud procedure itself, which slowed down reading and sometimes introduced digressions (Bereiter & Bird, 1984). The participants in this study

sometimes might reread a portion in order to indicate which part of the text she or he was talking about.

### 23. Marking or underlining a certain part of the text

The participants underlined or circled words or certain portion of the text when they had difficulty understanding or grasping the meaning immediately, or when they were trying to locate key words. Vaohaus (1984) identified this kind of reading behavior as "underline important parts". It was evident in this study that the portion underlined was a difficult part, or key words. For example, participant 3 marked some key words in the Chinese passage such as "media of communication", "language transfer" etc. Participant 4 marked the portion that he had difficulty understanding.

### 24. Monitoring own reading comprehension strategies

"Monitoring own comprehension strategy" seemed to arise distinctly out of the reader's own processing. This kind of operation indicated that the reader adjusted his or her strategy to understand a given part of the text. Block (1986) defined it as "comment on behavior or process". The characteristic of this strategy was that the reader verbalized his or her plan or strategy use even though not asked to do so. This kind of verbalizations reflected the participants' self-awareness of their plan. Examples:

- Response to the Chinese passage at the very beginning: I think I should scan it to grasp the general meaning, then I will read it through. (P 6)

- Response to sentence #14 of the Chinese passage: What, oh, I will put the word "study" in the place of "it", to see if it makes sense. (P 3)
- Response to sentence #11 of the English passage: Well, let me read it again. I'll try again. (P 7)

It was evident that each of these verbalizations represents a category involving reference to the reader's own progression through the text.

Twenty-four strategies were observed in the participants' comprehension processes in L1 and L2 reading tasks. The examples provide evidence to indicate that these readers were able to evaluate quickly the usefulness of a particular strategy and shift to another if necessary. They also tended to use strategies in combinations rather than in isolations.

#### 5.1.2. Finding 2 to Question 1: The Frequency of Strategy Use in L1 and L2 Reading Tasks

Finding 1 demonstrated what strategies occurred in the participants' comprehension processes when these readers processed L1 and L2 expository texts. Participants used all the identified strategies in their reading of the two passages. Which specific strategies, then, were more frequently used in these two reading performances? What was the ranking of strategies frequently used by the readers? Table 7 presents more detailed information about group frequency and percentages of frequency of frequently-used strategies in the two reading tasks.

Table 7

**Table of Frequently-used Strategies in L1 and L2 Reading Tasks**

Strategy	Chinese Group <i>F</i>	English Strategy	Group <i>F</i>
<b>Rank 1 Most frequently-used Strategies (by 8 participants)</b>			
Representing the text	88	Representing the text	92
Rereading	56	Relating to prior knowledge	46
Evaluating the content of the text	40	Rereading	45
Relating to prior knowledge	20	Recognizing the text structure	31
Monitoring comprehension	20	Summarizing & making conclusion	29
Summarizing & making conclusion	18	Questioning	25
		Looking for main ideas	10
<b>Subtotal / Percentage:</b>	<b>242 / 56.5%</b>	<b>Subtotal / Percentage</b>	<b>278 / 56%</b>
<b>Rank 2 Very frequently-used Strategies (by 7 participants)</b>			
Recognizing the text structure	24	Forming hypotheses about the content	14
Relating to prior sentences	21	Evaluating the content of the text	63
Forming hypotheses about the content	18		
<b>Sub-total / Percentage:</b>	<b>63 / 14.7%</b>	<b>Subtotal/Percentage</b>	<b>77 / 15.5%</b>
<b>Rank 3 Frequently-used Strategies (by 5 or 6 participants)</b>			
Questioning	29	Monitoring comprehension	27
Adjusting reading speed	12	Focusing on vocabulary	21
Evaluating the text structure	11	Reading on	12
Reading on	10	Monitoring comprehension strategies	11
Revising or confirm comprehension	9	Adjusting reading speed	11
Looking for main ideas	5	Revising or confirm comprehension	10
		Skimming or scanning	8
		Relating to prior sentences	8
<b>Sub-total / Percentage:</b>	<b>76 / 17.8%</b>	<b>Sub-total / Percentage:</b>	<b>108 / 21.8%</b>
<b>Total / Percentage:</b>	<b>381 / 88.8%</b>	<b>Total / Percentage:</b>	<b>463 / 93.3%</b>

Note. Group *F* = Group Frequency

In Table 7, strategies were ranked according to the number of participants who used the strategies. A strategy used by all the eight participants was placed in Rank 1, a strategy used by seven out of eight participants was in Rank 2, and a strategy used by five or six participants was in Rank 3. Table 7 shows that some strategies were used by all the

eight participants, which can be thought of the most-frequently used strategies. In Chinese reading, six strategies in Rank 1 were used with a group frequency of 241, making up 56.3% of the group frequencies of 428, while in English reading, seven strategies in Rank 1 were used with a group frequency of 278, making up 55.4% of the group frequencies of 496.

Strategies in Rank 2 were used by seven out of eight participants and considered to be very frequently-used strategies. In Chinese reading, three very frequently-used strategies made up another 14.7% of the group frequency. Two very frequently-used strategies made up 15.5% of the group frequency of strategy use in English reading.

Strategies used by five or six participants were grouped in Rank 3 and considered as frequently-used strategies. In Chinese reading, six strategies were used with a group frequency of 76, which made up 17.8% of the group frequency. Eight strategies were identified in Rank 3 with a group frequency of 108 in English reading, which made up 21.8% of the group frequency.

This finding suggests that 15 out of the 24 strategies were most frequently, very frequently or frequently used by the participants when they read the Chinese passage, totaling 88.8% of the group frequency of strategy use. There were 17 strategies out of 24 that were most frequently, very frequently, or frequently used by the participants when reading the English passage, which totaled 93.3% of the group frequency of strategy use. This finding provides evidence to indicate that some strategies were frequently used in both Chinese and English reading tasks. Although these strategies were used with various

frequencies in the two reading tasks, they were used in both reading tasks, which indicates that the participants processed the two reading tasks in the two languages similarly.

This finding also implies that some strategies were infrequently used when the participants read the Chinese and the English passages. What, then, were these infrequently-used strategies? The investigation of these participants' comprehension processes also enabled the researcher to find out some infrequently-used either in reading of the Chinese passage or the English passage, or both passages. Table 8 presents group frequency and percentages of infrequently-used strategies derived from the participants' comprehension processes when they read the Chinese passage and the English passage.

**Table 8**

**Table of Infrequently-used strategies in L1 and L2 reading tasks**

<b>Rank 4 Infrequently-used strategies (used by four or fewer participants)</b>			
<b>Chinese</b>		<b>English</b>	
<b>Strategy</b>	<b>Group <i>F</i></b>	<b>Strategy</b>	<b>Group <i>F</i></b>
Focusing on vocabulary	12	Using grammatical structure	11
Marking or underlining	9	Evaluating text structure	8
Borrowing words from another language	7	Skipping unknown words	6
Skimming or scanning	5	Looking for key words	3
Looking for key words	4	Marking or underlining	2
Monitoring comprehension strategy	4	Borrowing words from another language	2
Checking consistency	3	Checking consistency	1
Skipping unknown words	2		
Using grammatical structure	1		
<b>Total / Percentage:</b>	<b>47 / 11 %</b>	<b>Total / Percentage:</b>	<b>33 / 6.6%</b>

N=8

Note. Group *F* = Group frequency

The strategies used by four or fewer participants were grouped in Rank 4 and considered to be infrequently-used strategies. Table 8 shows that nine infrequently-used strategies covered only 11% of the group frequency in Chinese reading. Seven infrequently-used strategies in English reading covered only 6.6% of group frequency. The table also indicates that six strategies were infrequently used in both reading tasks. However, the frequency of some of these infrequently-used strategies was relative high. This phenomenon suggests that some participants used these strategies more frequently than others. Their contribution to the use of a certain strategy skewed the group data. This phenomenon will be explained in the section of describing individual comprehension processes.

## 5.2. Findings to Question 2: To What Extent did the Participants Use Similar or Different Comprehension Strategies When Reading Chinese and English Expository Texts?

### 5.2.1 Finding 3: Total Strategies and Frequencies of Strategies Used by the Group in L1 and L2 Reading Performances

To answer this research question, the total strategies and frequencies of strategies used by the participants as a group when reading the L1 and L2 expository texts were examined. The frequencies of strategies used in the two reading tasks were not exactly the same. Therefore, the group total strategies and group frequency of strategies used by all of the eight participants as a group are presented separately and comparatively. The mean and standard deviation for total strategies and total frequencies of strategy use for the Chinese and English passages by the participants are reported in Table 9.

**Table 9****Table of Group Total Strategies/Frequencies: Mean, SD, and Passage Language**

<b>Passage Language</b>	<b>Group Total Strategy</b>			<b>Group Total Frequency</b>		
	<b>Total</b>	<b>Mean</b>	<b>SD</b>	<b>Total</b>	<b>Mean</b>	<b>SD</b>
Chinese	121	15.1	3.1	428	53.5	15.7
English	129	16.1	3.0	496	61.5	18.4

N=8

Group total strategy refers to the total number of strategies used by the eight participants as a group when reading the Chinese passage or the English passage. Table 9 demonstrates that the participants as a group used similar numbers of strategies in Chinese and English reading, eight strategies more in English reading. The frequencies of strategies used in the two languages were also close; a difference of 56 occurrences existed. This finding suggests that the participants processed the texts similarly in the two languages.

#### 5.2.2. Finding 4 to Question 2: Strategies Used in Both L1 and L2 Reading Performances

To better answer research question two, data obtained from both reading performances were compared. A comparison of the strategies used in Chinese reading and those used in English reading revealed that over 80% of the strategies were used in both. Table 10 presents the number and percentages of the common strategies used by the participants when reading the two passages.

**Table 10****Table of Strategies Used in Both L1 and L2 Reading Performances**

<u>Group Total Strategy</u>		<u>Strategy in Both</u>	<u>Percentage</u>	
<u>Chinese</u>	<u>English</u>		<u>Chinese</u>	<u>English</u>
121	129	106	87.6%	83%

N=8

The sum of common strategies used in the two reading tasks provides further evidence to suggest that the participants in this study used similar strategies to comprehend the texts in both languages. This finding indicates that the strategies used in Chinese reading corresponded to the strategies used in English reading. This result demonstrates a moderately strong consistency or stability in the strategies used by the participants when processing reading tasks across the two languages concerned. That is, most of strategies used by the participants when reading the expository texts in L1 and L2 were the same.

### 5.2.3. Finding 5 to Question 2: The Frequency of Strategy Categories

A close examination of the categories of strategies used by the participants in the two reading performances was conducted so as to obtain more detailed information about whether there was difference among the strategy categories used by the participants when processing the L1 and L2 texts and the extent of the difference or similarity. This examination indicates that the participants not only used similar numbers of strategies, but also that the frequency of the strategy categories used was very comparable between the two reading tasks. Table 11 presents the frequencies and percentages of strategy category used by the readers in L1 and L2 reading tasks.

Table 11

**Table of Group Frequency and Percentage of Strategy Categories**

Strategy Category	Chinese		English	
	Group <i>F</i>	%	Group <i>F</i>	%
I. Text-based strategy	91	21%	106	21%
II. Text structure-based strategy	47	11%	53	11%
III. Text & prior knowledge combined strategy	166	39%	215	43%
IV. Self-corrective strategy	124	29%	122	25%
<b>Total</b>	<b>428</b>	<b>100%</b>	<b>496</b>	<b>100%</b>

N=8

Group *F*= Group frequency

The examination of strategy categories reveals that the participants used text and prior knowledge combined strategies most frequently in both languages. The self-corrective strategies were second, the text-based strategies were third, and the text structure strategies ranked fourth. This finding suggests that the participants used comprehension strategies very flexibly in both languages, and that the frequencies of use of each strategy category were similar or close. This finding, from another angle, also suggests that the participants processed the texts in the two languages in a similar manner.

To sum up, the findings from different angles provide evidence to suggest that the eight participants as a group processed reading tasks in the two languages in a similar manner. 24 strategies were observed being used by the participants as a group in the L1 and L2 reading tasks. Over 80% of the strategies were used in both reading tasks. The frequencies of strategy category used by the participants when reading the L1 and L2 texts were similar or comparable. When reading the Chinese text, these readers as a group used comparatively fewer strategies than they did when reading the English text. The frequency

of strategy use also showed that they used these strategies less frequently when reading the Chinese text than the English text. Table 7 and table 8 show that some strategies were used more frequently in Chinese reading tasks than in English reading tasks, or vice versa.

As a group, these readers demonstrated similar comprehension processes.

However, did the individual readers process the L1 text and the L2 text similarly or differently? To better answer the research questions, a qualitative examination of individual readers' comprehension processes was undertaken. In the following section, a qualitative description of four participant's comprehension processes is presented.

### 5.3. Results of Individual Readers' Comprehension Processes

In this section, data relating to the comprehension processes of individual readers are investigated to find answers to the two research questions from 1) individual reader's comprehension strategy repertoire, 2) individual reader's comprehension processes.

#### 5.3.1. Finding 6 to Question 2: Each Individual Reader's Strategy Repertoire

To better understand each individual participant's comprehension processes when she or he read the L1 and L1 expository texts, the data obtained from each reader's comprehension processes were re-examined to find out whether she or he processed the L1 and L2 texts similarly or differently, and whether differences of comprehension processes existed among individual readers. Table 12 illustrates the number of strategies were used by each reader when she or he read the Chinese and the English texts.

Table 12

**Table of Each Individual Reader's Comprehension Strategies in L1 and L2**

Participant	Chinese	English
P#1	17	19
P#2	15	17
P#3	20	17
P#4	13	11
P#5	10	12
P#6	18	17
P#7	14	17
P#8	14	19

Graph 1

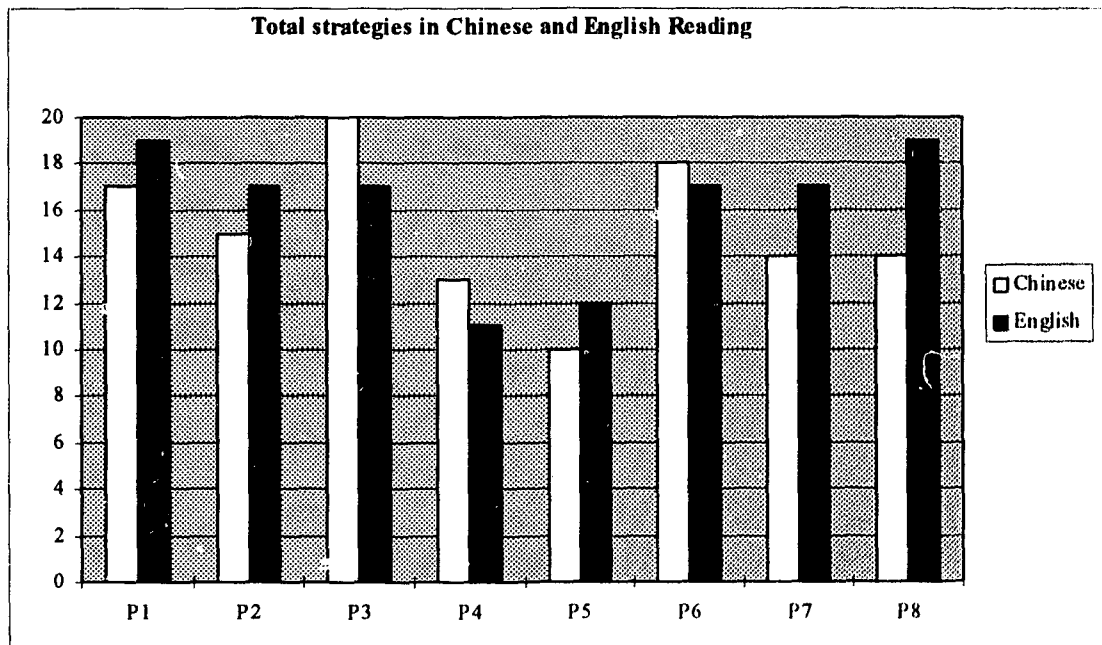


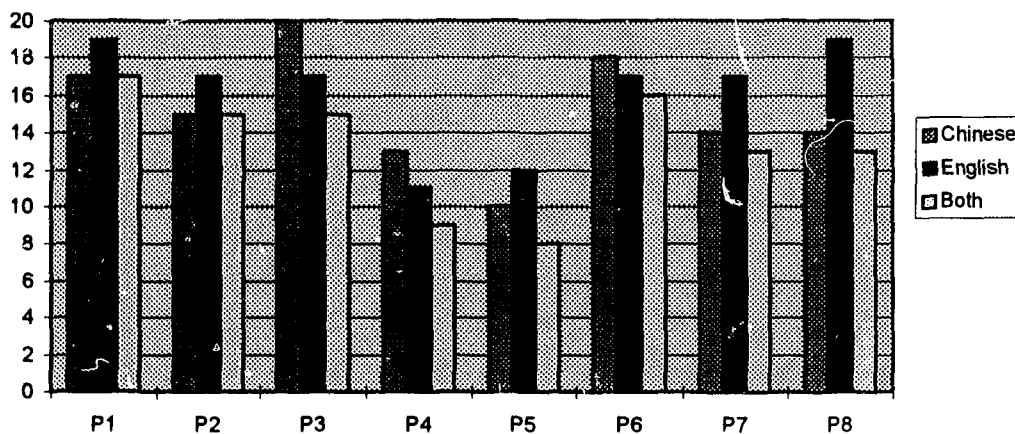
Table 12 and Graph 1 reveal that the strategy use of each participant ranged from 10 to 20 in Chinese and from 11 to 19 in English. Comparing the strategy use across languages, the

researcher noticed that the strategy use of most individuals was matched. Namely, the difference was only one or two strategies across languages except for participants 3, 7 and 8. Among these three readers, P7 and P8 used three or five more strategies when they read the English text than the Chinese text. In contrast, P3 used three more strategies when reading the Chinese text than the English text. The other finding is that five participants used slightly more strategies in English reading than in Chinese reading. In contrast to these five participants, three participants used slightly more strategies when reading the L1 text than the L2 text.

An investigation of the strategies used by each of these participants also indicates that among the individual total strategy use, most of the strategies were used in both Chinese and English reading tasks. The following graph presents the individual total strategy use, and the strategies used in both Chinese and English reading tasks.

**Graph 2**

**Total Strategies Used in Both L1 and L2 Reading Performances**



The above graph shows that most of the strategies used by each participant were used in both reading performances. This finding suggests, from another aspect, that the participants both as a group and as individual readers processed their reading comprehension similarly in their L1 and L2. It also indicates that variations exist among participants as individual readers.

### 5.3.2. Finding 7 to Question 2: Frequency of Strategy Use of Each Individual Reader

The participants used varying numbers of strategies when they processed the two expository texts in L1 and L2. The frequency of strategy used by each reader also varied. Table 13 presents the frequencies of strategy use by each reader in the L1 and L2 reading tasks.

**Table 13**

**Table of Individual Frequency of Strategy Use in L1 and L2 Reading**

<b>Participant</b>	<b>Chinese</b>	<b>English</b>
P#1	69	87
P#2	64	66
P#3	69	56
P#4	57	51
P#5	31	35
P#6	63	64
P#7	35	47
P#8	40	86

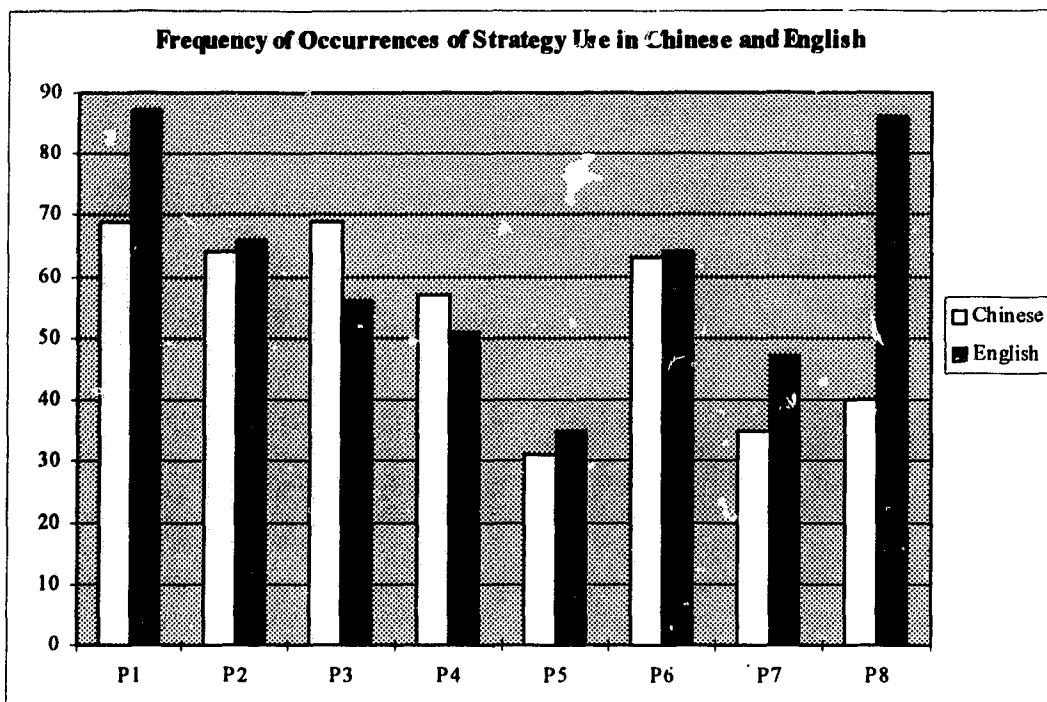
**Graph 3**

Table 13 and Graph 3 indicate that frequencies of strategy use differed from one participant to another. However, the frequencies of strategy use by each participant for Chinese and English were similar except for participants 1 and 8. Participant 1 used the strategies 18 times more in L2 than in L1. Participant 8 doubled the frequency of her strategy use in L2 reading. To better understand the phenomenon of differences among individual readers and similarities within individual readers, a description of some individual readers' comprehension processes is presented in the following section.

### 5.3.3. Description of Individual Readers' Comprehension Processes

In this section, four individuals' comprehension processes are described in order to present further detailed information about how each individual processed text differently from another, meanwhile they processed texts similarly across languages. The description:

focuses on four participants because each of them presented a specific pattern of comprehension processes, or he or she processed the texts, in some way, differently in L1 and L2. For instance, participant 1 was chosen because she was the contributor of the strategy "focusing on vocabulary", participant 3 was one of readers who used more strategies in the L1 than in the L2 reading task; participant 4 was a typically critical reader among the participants, and participant 8 doubled her frequency of strategy use in L2 reading tasks. In the course of the description, some think-aloud protocols are quoted. To present a real picture of the participant's comprehension processes, unfinished utterances, silence and filling-in pauses such as "em", "en" and "um" are included.

#### Participant 1

Participant 1 was a graduate student in economics. This was the fourth year since she came to study in Canada. She had learned English as a foreign language (EFL) for 15 years, and had taught EFL courses at a university, and had been an interpreter and translator in China before she came to Canada. She reported that she often read English written materials before she came to Canada. When participating in this research, she was writing her Master's thesis.

This reader talked about her understanding with a pen in her hand. She made some gestures, such as nodding her head, and tapping on the desk with her pen to emphasize her words. All of these gestures seemed to suggest that she was comfortable with the reading and think-aloud tasks. The way she performed the think-aloud was more like she was talking with the researcher in a friendly way about her understanding of the

text and whatever was on her mind. She made a hypothesis immediately after she read the first Chinese sentence: "I *think* it is going to talk more about social intercourse". It was evident that this hypothesis was based on her prior knowledge and world experience about social intercourse. She went on by giving some examples of social activities such as "having parties, making friends". However, as she read along, she noticed that her understanding about social activities and communication was not exactly the same as presented in the text. Therefore, she made continual efforts to revise and adjust her understanding according to the new information in the subsequent text. The first time, she revised her understanding and stated: "It seems to me that social intercourse or communication in the article is more simple than what is in my mind". Later, she made another revision: "Social intercourse is an inclusive concept in this article. It includes everything the article talks about".

She paid great attention to certain single words or phrases, which were obviously not unknown words, but which had in the context some unfamiliar meaning for her; for example, "artificial matters". She frequently guessed or paraphrased this term. As a result, this reader used about 29% to 32% of text-based strategies in Chinese and in English. She was the participant who contributed 75% and 61% to the strategy of "focusing on vocabulary" in Chinese and in English. After solving the vocabulary problems, she went on by representing the whole sentence. If she was confused or found a link missing in her understanding of the text information, she reread the unclear portion of the text again and again. She also very often related to her background knowledge by giving examples or adding information to facilitate her comprehension. For example, when she processed

sentence #3 of the Chinese passage, she stated: " I can relate it to some man-made things such as furniture, em, or I can put it in this way, if a child is taken to the outside, what the child can understand, things are moving such as cars, or some stable things such as toys like a wooden horse, I think all these are so-called 'artificial matters'...".

When she read the English passage, she seemed to be very aware that the article was not in her native language. She relied even more on the text, paraphrased every single word she thought to be key or unfamiliar, analyzed the grammatical structure of every long sentence by verbalizing the grammatical function of some sentence components, such as the modifier, the attributive clauses etc. She was the participant who contributed about 91% to the group strategy use of "using grammatical structure" in English reading. As she mentioned several times in the think-aloud protocols "my grammar training helps me". She also paid great attention to the organization of the text, trying to locate the main idea or key words.

She frequently used "*I think ...*" when reading the Chinese passage. In contrast, she did not use "*I think*" at all when reading the English passage, neither did she add any information to explain the English text. The other difference to be noticed was that the think-aloud protocols of the Chinese passages indicated that she evidently monitored her comprehension only once, and she did not monitor her own comprehension strategies at all. The field-notes provided some evidence that she was more confident and managed her reading comprehension processes comfortably and automatically in Chinese. However, when reading in English she was not as comfortable as reading in Chinese. The think-aloud protocols of the English reading indicated that she monitored her comprehension

five times and checked her own comprehension strategy three times. This could be explained by her being too aware that she was dealing with a language other than her native language. She tried a variety of ways to facilitate her understanding, such as analyzing grammatical structure and using her knowledge of the text structure. All these strategies, as she mentioned in her protocols, "came from my formal EFL training".

The other difference noticed between the comprehension processes of this reader in L1 and L2 was that she provided more background knowledge when reading the Chinese passage than the English one. This difference also distinguished her from other participants. Participant 1 related to her background knowledge six times when reading the Chinese passage, but she only related to her prior knowledge about the English passage twice when reading the English passage. In the contrast, six of the eight participants related to their background knowledge more than four times in English, and less than four times in Chinese. The possible explanation might be either that she needed more background knowledge to help her comprehend the Chinese text, or that the Chinese text itself provided more chances for her to relate to her background knowledge about the topic, or both.

Taking a close look at the whole picture of participant 1's comprehension strategies in Chinese and English reading, the researcher noticed that she used 17 strategies 69 times when reading the Chinese passage versus 19 strategies 87 times when reading the English passage, that 17 strategies were used in both languages, that two more strategies were used when she read the English passage, and that the frequency of strategy

use was higher in English than in Chinese. The top five strategies she used when reading in the two languages are presented in Table 14.

**Table 14**

**Table of P1's Frequently-used Strategies and Frequency of Strategy Use/Percentage**

<b>Strategy</b>	<b>Chinese</b>		<b>Strategy</b>	<b>English</b>	
	<b><i>F</i></b>	<b><i>%</i></b>		<b><i>F</i></b>	<b><i>%</i></b>
Representing text sentences	15	22%	Focusing on vocabulary	13	15%
Focusing on vocabulary	9	13%	Representing text sentences	11	13%
Rereading	7	10%	Using grammatical structure	10	11%
Relating to prior knowledge	6	9%	Rereading	9	10%
Recognizing text structure	5	7%	Recognizing text structure	8	9%
<b>Total</b>	<b>42</b>	<b>60.9%</b>	<b>Total</b>	<b>51</b>	<b>58.6%</b>

*Ind. F.* = individual frequency

*F* = frequency

The strategies and the frequencies of strategy use of this reader demonstrated that she was able to use text-based, text and background knowledge combined and self-corrective strategies with ease. She related to her background knowledge only when the text information reminded her to do so. The data obtained from both the think-aloud protocols and the comprehension strategy check-lists suggested that many comprehension strategies were in her repertoire. The patterns of her comprehension processes in Chinese and English were the same. That is, she started from a whole sentence, made hypotheses when she had some clues about the content, either from the context or from her background knowledge, focused on unfamiliar or key words by paraphrasing, represented the meaning of the original text sentences by relating to her background knowledge, and reread when she felt confused or it seemed necessary to do so.

The text, however, seemed to be the most important source of information for her. She relied heavily on the texts in both languages, processed and paraphrased a whole sentence a time, focusing attention on some key words or unfamiliar words at first. After solving the vocabulary problems, she either explained or paraphrased the whole sentence again. This kind of process also occurred in other participants, such as P8 and P2's reading performances. It seemed that constructing the meaning of the text or interpreting the information was characteristic of these participants' comprehension processes. It is apparent that these participants were doing what Pugh (1978) calls receptive reading -- following quite sequentially along the print in order to get the author's meaning accurately.

### Participant 3

Participant 3 was one of the participants who used more strategies and had a higher frequency of strategy use when reading the Chinese passage than the English one, 20 strategies 69 times in Chinese versus 17 strategies 56 times in English. He was a graduate student in business administration, working on his Master's thesis when he participated in this research. He had learned English as a foreign language for five years, and sometimes read English materials in his home country. He had recently married a Canadian woman, whom he had dated for several years.

At the very beginning he mentioned that he had not read in Chinese for a long time, and that his daily reading was mostly in English, no matter whether it was for academic purposes or for entertainment. His think-aloud protocols did support what he

said. He actually used a few more strategies when reading the Chinese passage than he did for the English passage. An examination of his think-aloud protocols in both languages and the field-notes revealed a pattern in this participant's comprehension processes. When he started reading, he skimmed the text to find out whether there was a title to give him some clues about the content of the texts. As he found that there was no title, he quickly scanned for the first sentence of each paragraph to grasp some information about the content. He mentioned in both of his think-aloud protocols that "The first sentence of a paragraph usually tells you the main idea of the paragraph". He put all the main ideas in each paragraph together so as to obtain the frame of the content.

P3 was very aware of the text organization structure in both languages; he frequently verbalized "here comes the next point" or "OK, next paragraph, now it is a kind of conclusion" as he processed the texts. He evaluated the content of the texts and the structure of the English text. For example, he said: "I don't like the way the author organized the text. ... The author should number the issues rather than use dashes". As he processed the texts, he asked comprehension questions and looked for answers in the text or presented answers of his own to facilitate his comprehension. A good example was the protocol of the English passage: "why? because those are controlled by the government". In this utterance, he first raised the question "why", then answered the question himself from the information presented in the text.

This reader readily used several strategies together to help him construct the meaning. For example, in his Chinese think-aloud protocols he responded to the text in the following way: "Why should it aim to people? I am not quite clear. I should read the

following part". It was evident that when processing the sentence he used four strategies: **questioning, monitoring comprehension, monitoring his comprehension strategy, and reading on.** He reread when confused and related to his prior knowledge frequently, particular when reading the English passage. He also summarized at the end of each paragraph and at the end of the whole passage in order to monitor his own comprehension.

Investigation of the different strategies used by this participant demonstrated that he used three additional unique strategies when reading the Chinese passage, namely, "skipping unknown words", "borrowing words from English", and "marking a certain part of the text". The Chinese think-aloud protocols indicated that he borrowed words from English three times. On his comprehension strategy check-list in Chinese, he reported that when he processed sentence #12 of the Chinese passage, he skipped the expression "stimuli" (in Chinese). Another strategy that this reader used when processing the Chinese passage was "marking or underlining a certain part of the text". He marked the Chinese passage 5 times. The portions that he marked were some key words which could give him clues about the content and some difficult parts. Instead of simply underlining the part, he kept his pen there and repeated marked the part. Consulting the field-notes and his think-aloud protocols, the researcher noticed that as he was marking the text, his mind was working on integrating the text information with his background knowledge or prior text information, or planning his way to figure out the meaning. For example, when processing sentence #3 of the Chinese passage, he underlined the portion of "the association with adults" three times. At the same time he verbalized: "It says that the relation between

children and the world around them is involved ... in the association or interaction with adults. Em, em the relation between the children and the world around them will influence, affect their social intercourse after they grow up, why? I don't understand. Why, I should read on, it perhaps will talk about it later".

Among the 20 strategies used in Chinese and the 17 in English, 15 strategies were used in both reading tasks. This finding suggests that despite the different languages and topics involved, this reader could be considered to process the texts similarly in the two languages. The frequency and percentage of frequently-used strategies in both reading performances of P3 are displayed in Table 15.

**Table 15**

**Table of P3's Frequently-used Strategies and Frequency of Strategy Use/Percentage**

<b>Chinese</b>	<b>Ind. <i>F</i></b>		<b>English</b>	<b>Ind. <i>F</i></b>	
<b>Strategy</b>	<b><i>F</i></b>	<b>%</b>	<b>Strategy</b>	<b><i>F</i></b>	<b>%</b>
Representing text sentences	12	17%	Representing text sentences	11	20%
Rereading	6	9%	Relating to prior knowledge	7	13%
Forming hypotheses	5	7%	Evaluating the content	6	11%
Monitoring comprehension	5	7%	Monitoring comprehension	5	8%
<b>Total</b>	<b>28</b>	<b>40.6%</b>	<b>Total</b>	<b>29</b>	<b>51.8%</b>

Ind. *F*. = Individual frequency

*F*= frequency

The difference of the frequency of the strategies being used revealed that he reread more times, formed more hypotheses, and self-questioned more times in Chinese. This finding might lend support to his statement that for four and half years he had seldom read

in Chinese. In contrast to the other participants, he is living a Canadian life both at university and at home.

The comprehension processes exhibited by P3 during Chinese and English reading may be described as purposeful. Each reading task was initiated by a searching for title or sub-title, scanning for the first sentence of each paragraph, representing the meaning of the texts, monitoring his understanding and rereading when necessary. The pattern of his comprehension processes suggested that he read similarly and used similar strategies to process texts in the two different languages. It should also be mentioned that another participant, P6, processed the texts in the same way as P3 did.

#### Participant 4

Participant 4 was a graduate student in the field of administration. He had studied and taught English as a foreign language in China for about fifteen years before he came to Canada. He was writing his Master's thesis when this research took place. He had been in Canada for two and half years. He, seemed, however, to be very Canadianized in some ways. For example, he thought of English as his first language. His think-aloud protocols for the English passage reflected that he sometimes seemed to think like a Canadian.

This participant was found to be a very critical reader in both languages. When reading the two passages, he spent a lot time on evaluating and making critiques of the concepts or the structure of the two passages. He commented very positively on this kind of responses: "Since I came to Canada I learned to criticize everything. This must be the

biggest progress. Now no matter what I am reading, I criticize it and try to view it from the other side".

His think-aloud protocols provided evidence that he evaluated and critiqued the content of the Chinese passage 11 times and that of the English passage 14 times. His evaluation of the texts included comments such as "This is very interesting", or "This view is basically right"; disagreements such as "I do not quite agree with this"; and his personal ideas based on his background knowledge, such as "I think he (a child) does so to make some noise, not to communicate...the purpose is to draw other people's attention. The child does not want to be ignored//". He frequently presented his own opinions based on his beliefs and background knowledge. Even though the English passage had nothing to do with China directly or indirectly, he used his knowledge about the education system in China to support or disagree to the author's point of view. Very often he questioned the content not because he did not understand a certain part, but because he was testing the text information against his background knowledge, and challenging the author. His think-aloud protocols sounded as though he were talking or negotiating with the author. For example, he often verbalized: "Can you give more examples". He also suggested that had the author "provided some statistics, it would be much more convincing". Besides evaluating the content of the text, he also evaluated the structure of the two articles, offering such comments as "I think this paragraph is well-organized. It is very logical and coherent". In another case, he suggested "It would be better or clearer if the author replaced 'mean' for 'media' ".

Another phenomenon demonstrated in this reader's comprehension processes was that he frequently changed his role as a reader. For instance, when processing sentence #9 of the English passage, he said: "In China, for example, at the national level *we* only have two or three percent senior high school students enter all kinds of universities. ... The admission rate is very low compared with North American countries such as Canada". When reading sentence #16 of the same passage, he said: "*We* are doing very well in mathematics compared with North American countries". In these protocols, he was speaking as a Chinese; his argument was based on his Chinese standpoint, and his background knowledge related to China. However, when reading sentence #6 of the same English passage, he sounds like a Canadian, "Why do *we* criticize governments of the third world countries? Do *we* consider *our own* case? Recently, the Canadian government is doing very poorly in education, ... The government has cut a lot of educational funding ///". During reading, participant 4 kept changing his role as a Chinese or as a Canadian reader, which might help him to argue with the author. Through this kind of arguments he facilitated his understanding and moved toward another sentence.

On the whole, this reader's comprehension processes revealed him to be a critical reader who evaluated and criticized the contents and structures of texts in both languages. He distinguished himself from other participants in the way that he did not simply evaluate the text, but critiqued the texts all the time during reading. This participant happened to be one of the readers who used more strategies and had higher frequency of strategy use when reading the Chinese passage, 13 strategies 57 times in Chinese versus 11 strategies 51 times in English. Among these strategies, 9 strategies were used when reading both

passages. Table 16 presents frequency and percentage of frequently-used strategies of P4 when reading the two expository texts.

**Table 16**

**Table of P4's Frequently-used Strategies and Frequency of Strategy Use/Percentage**

Chinese Strategy	Indi. <i>F</i>		English Strategy	Indi. <i>F</i>	
	<i>F</i>	%		<i>F</i>	%
Evaluating the content	11	19%	Evaluating the content	14	27%
Rereading	10	17.5%	Relating to prior knowledge	8	16%
Representing text sentences	7	12%	Representing text sentences	8	16%
Evaluating the text structure	6	10.5%	Rereading	6	12%
<b>Total</b>	<b>34</b>	<b>59.6%</b>	<b>Total</b>	<b>36</b>	<b>70.6%</b>

Indi. *F* = Individual frequency

*F* = frequency

% = percentage of individual frequency of strategy use

In contrast to P1 or P3, P4 was most likely to test the text information against his background knowledge and to argue with the author. He did not rely on the text information as did other readers such as P1. During the comprehension processes, P4 referred to his prior knowledge about the topics, commented, discussed and argued with the author. It seemed that as long as the argument was taking place, meaning was constructed, and comprehension was increased.

It should be mentioned here that another participant, P7, was also found to be a critical reader. Participant 7 did not argue with the author as frequently as did P4, but he made several critical comments on the author's point of view. For example, when reading sentence #14 of the Chinese passage he argued with the author by saying: "Sometimes,

people talk to themselves, like think-aloud, it is not communication". At the end of the Chinese passage, he argued: "There is debate about this, I mean about the ownership of using tools and language belonging to human beings only". These kinds of arguments were based on his background knowledge about the topic. He talked of his experiences, his prior knowledge, and his beliefs. For instance, at the end of the English passage, he brought his personal beliefs and attitudes to the reading task, and commented: "This article was written from an American point of view. I don't quite agree with these issues. The author is trying to say that the way we select ///, Chinese educational institutions select students (...) ///. The author is an outsider, he should not have much to say because Chinese educational administrators know better".

#### Participant 8

Participant 8 was a graduate student in the department of biochemistry. She had been in Canada for two and half years. Before she came to Canada she had studied English as a foreign language for 14 years. When the researcher met her the first time and told her about the topic of this study she showed great interest. She was curious about this kind of study, and also wanted to know her own reading comprehension processes. She told the researcher that she was willing to take part in this study and hoped that the findings would help foreign language teaching in China. Therefore, when the researcher's proposal was accepted, she was the first person who agreed to participate immediately. When this study took place, although she was busy with the final copy of her Master thesis, she was very

happy to spend time with the researcher on this study. The researcher was grateful for her help and promised to let her know the findings of her comprehension processes.

When this participant started reading, she first attempted to obtain clues about the content from the first sentence. According to the clues she got, she made hypotheses about the content. Most time she paraphrased sentence by sentence. As a result, the strategy of “representing original text sentences” turned out to be the most frequently-used strategy in the two reading activities. The think-aloud protocols also revealed when processing the text, she verbalized some information from her long-term memory. For example, when processing sentence #10 of the English passage she verbalized: “Financial support, em, yes, they have to get financial support from public, but it usually does not happen in our country because everything is free ...”. It seemed that the information in the text reminded her of her prior knowledge, which in turn facilitated her constructing of the author’s viewpoint.

At the end of each paragraph she attempted to summarize the content of the paragraph, and tried to make some connection between the paragraph that she was reading and the one she read earlier. By doing so, she built up her understanding of the passage. As she did with paragraphs, she also tried to relate the sentence she was reading with the previous sentences to build up a whole picture of a paragraph. For example, when she read sentence #9 in the English passage, she verbalized: “I don’t understand how this sentence is related to the previous sentence”. She evaluated the content of the text against her prior knowledge, and talked about her agreement or disagreement. When reading the English passage, she also raised some questions about the content, and tried to answer

these questions. When she raised a question and could not find an answer either in the text or from her prior knowledge, she appeared to monitor her understanding stage and verbalized “I don’t think I understand it”. For example, she processed sentence #6 in the Chinese passage as follows: “children (...), I am not quite sure, does it mean (...), em, I cannot understand it ...”. It was evident that she tried several times to construct meaning of the sentence, and to group some pieces of understanding together. Other times she responded: “Yes, I understand it, but I don’t know why it is like this”. The investigation of this participant’s comprehension processes also suggested that she was most likely to rely on the text itself, and attempted to get meaning from the text. On the other hand, she did use her background knowledge and self-corrective strategies to adjust her comprehension processes in both languages. Some frequently-used strategies involved in this reader’s L1 and L2 reading performances is presented in the following table.

**Table 17**

**Table of P8’s Frequently-used Strategies and Frequency of Strategy Use/Percentage**

Chinese			English		
Strategy	Indi. <i>F</i>	%	Strategy	Indi. <i>F</i>	%
Representing text sentences	15	37.5%	Representing text sentences	16	18.6%
Rereading	6	15%	Monitoring comprehension	9	10.5%
Evaluating the content	4	10%	Evaluating the content	9	10.5%
			Questioning and looking for	9	10.5%
			Reading	8	9.3%
<b>Total</b>	<b>25</b>	<b>62.5%</b>	<b>Total</b>	<b>51</b>	<b>59.3%</b>

Indi. *F* = Individual frequency

*F* = frequency

% = percentage of individual frequency of strategy use

Table 17 shows that participant 8 used three versus five strategies relatively frequently in Chinese and English reading tasks. Table 12 (in section 5.3.1.) illustrates participant 8 using 14 strategies 40 times in Chinese versus 19 strategies 86 times in English, five strategies more in L2 than in L1. Table 13 (in section 5.3.2.) indicates that this reader doubled her frequency of strategy use when processing the English passage. Even though this reader doubled her frequency of strategy use when processing the English passage, she exhibited a number of similar comprehension strategies when approaching Chinese and English expository texts. That is, 14 strategies were used in both reading tasks. As mentioned earlier, the most frequently-used strategy in both languages was “representing original text sentences” which made up 37.5% and 18.6% of a frequency of strategy use in L1 and L2. The examination of this reader’s comprehension processes also indicated that there was a tendency to increase the frequency of strategy use and a tendency of using more strategies in L2 reading. Why did this individual reader, out of eight participants, double her frequency of strategy use in L2? The researcher conjectured that this reader was more apt to view misunderstanding as her tasks in L2. Therefore, when she monitored some misunderstanding, or some mismatch between the text information and her previous understanding or her prior knowledge, she tried several other ways to fix the misunderstanding before she moved on to next sentence. For instance, she several times verbalized in English: “I cannot understand the structure of the sentence very well”, or “ I don’t think I understand this sentence very well, let me try it again”. When processing sentence #7 in the English passage, she verbalized: “I don’t

understand what is the 'expressed student' ("...") often those kinds of students, they have no, little influence on, on these kinds of study...".

The differences in the comprehension processes of this reader in L1 and L2 seemed to be more obvious than that of other participants. The reason for the variation may be due to topics of the passages, or due to the languages involved. Since this reader was more aware that she was reading in her L2, she became more likely rely on deriving meaning in the text than on constructing meaning of the text. Similar to participant 1, participant 8 was also a reader who was doing what Pugh (1978) calls receptive reading -- following quite sequentially along the print in order to get the author's meaning accurately.

The difference of this reader's comprehension processes in L1 and L2 could not be ignored. However, it should also be noticed the fact that this reader used 14 strategies with different frequencies in both L1 and L2 reading performances. That is, similarities also exist in this reader's comprehension processes. Compared with other participants, the difference is obvious. However, compared with her own comprehension processes, the researcher would point out the similarity is, at least, as important as the difference in her comprehension processes. Given this study is a within-subject designed study, the focus of comparison is on within-reader rather than on between or among readers. On the whole, the similarity in comprehension processes in L1 and L2 of this reader still provided evidence to suggest that this reader read similarly in this study. The different content of the texts and the differences of the print language did change, but not much her

comprehension processes. The change was more on the frequency of the strategy use than the type of strategies used.

To sum up, the description of the four participants' comprehension processes, from an individual perspective, enabled the researcher to better understand that each participant processed a given text differently. However, as an individual reader, he or she processed texts in L1 and L2 similarly. These four readers processed the same texts differently from one another. Some of them focused more on the text itself, others focused more on their prior knowledge, and still others preferred to test the text information against their own prior knowledge. No matter what processes the participant preferred, everything she or he did was intended to construct the meaning of the text, and to facilitate his or her understanding of the text. No matter to what extent the participants processed the texts differently from one another, they all processed the texts in the two languages similarly. Specifically, each participant's pattern of comprehension processes was similar in L1 and L2 reading performances. That is, the same type of strategies were frequently used by these individual readers when processing the L1 and the L2 texts. It is the similarity of each individual participant's comprehension processes across languages that revealed a picture of similar comprehension processes as a group.

#### 5.4. Summary of findings

This chapter has presented findings from a group perspective and from individual perspectives. These findings from different angles answered the two research questions. Two findings answered the first research questions -- what specific strategies were used by

these participants when they read the Chinese and the English expository texts. Five findings from different angles answered the second research question--to what extent did these participants use similar or different strategies when they read the expository texts in the two languages. These findings provided evidence to suggest that these participants used similar strategies when they read the texts in two different languages. That is, the strategies that they used in the two languages were similar, and the frequencies of strategy use for the two languages were also similar or comparable. The findings and the description of individual readers' comprehension processes also indicated that the participants might process the texts differently from one another. However, each of them processed the texts in the two languages similarly, if one compared his or her comprehension processes in L1 with those in L2. Overall, the results of this study demonstrate that these participants processed expository texts in a similar manner in the two languages. There is a positive relation between comprehension strategies in L1 and L2 reading. Some strategies that were frequently used in both languages could be considered universal.

## Chapter Six: Discussion

The primary purpose of this study was to investigate the relationship of reading comprehension strategies between Chinese (L1) and English (L2). The comprehension processes of eight Chinese graduate students reading expository texts in L1 and L2 were examined. Data presented in the previous chapter were analyzed to provide answers to the two research questions. There were seven findings obtained from this study. Findings 1 and 2 provided answers to research question one: What comprehension strategies did the Chinese readers use when they read expository texts in Chinese (L1) and English (L2)? Findings 3, 4, 5, 6 and 7 from different angles answered the second research question: To what extent did these Chinese readers use similar or different strategies when reading expository texts in L1 and L2?

The purpose of this chapter is two-fold: (1) to present an overview and discussion of the findings, (2) to discuss the findings of this study by using existing theory as a foundation and framework for achieving an enriched and deeper understanding of the particular cases comprising this study.

### 6.1. Findings to Research Question 1: What Comprehension Strategies did these Chinese Readers Use When They Read Expository Texts in Chinese (L1) and English (L2)?

#### 6.1.1. Finding 1: Twenty-four Comprehension Strategies Observed in the Study

Finding 1 presented the categories of responses and strategies with examples from the participants' comprehension processes in L1 and L2. Examples and definitions of these responses and strategies also provided evidence of when and under what circumstances the participants used these strategies, and which strategies were more likely to be combined by the participants to construct meaning of the texts.

Twenty-four types of responses and strategies were identified in the participants' comprehension processes and organized into four categories. The 24 types of responses and strategies across the two languages concerned provide a context within which to understand the participants' comprehension processes. These 24 strategies seemed to be under the control of the participants no matter in which language they read. The use of these strategies indicated that, as bilingual readers, the participants had the ability to keep their reading purposes in mind when they processed the reading tasks in either L1 or L2. They planned their approaches to meet their purposes before, during, and after reading, as noted by Anderson (1980). They were able to use their problem solving strategies from various sources such as content clues, prior knowledge about the content or about the organization of text, and self-corrective strategies to facilitate their comprehension in both reading tasks. The four categories of comprehension strategies identified in the study suggest that these readers applied their knowledge and experience of reading to the two reading tasks in L1 and L2. Strategy use of these readers in L1 and L2 did not vary according to language.

Strategies used by the participants in the two reading tasks revealed a pattern by which the participants planned to construct meaning of the text gradually by processing

the text and integrating their relevant prior knowledge into their current reading task. Planning is considered to be a key factor in comprehension processes, which indicates the participants were aware of the purpose of reading. Reading without an awareness of reading purpose is like reading without direction. Being aware of reading purpose, in turn, enabled the readers to plan their processing, monitor their processes, and assess their comprehension. Before reading, some of the participants tried in one way or another to get some clues to the content of the text. They skimmed or scanned the text to search for titles, subtitles, or first sentences of each paragraph. For example, participant 3 verbalized when processing the Chinese passage: "No title, I am going to read the first sentence of each paragraph, then I will probably know what the passage is about". This response indicated that the participant used his knowledge about the organization of text. His reading experience or knowledge enabled him to know that the title would give him some clues about the text. Under the circumstance in which there was no title, he tried another way - reading the first sentence. As participant 3 mentioned in another case: "Usually the first sentence will tell you what the paragraph is about. When I read the first sentence of each paragraph, I will get a pretty good idea about the content of the text".

During reading, when the participants realized that they did not get the author's point, they adjusted their strategies, either questioning their current understanding, slowing down their reading speed, rereading, or summarizing what they had understood so far so as to check the consistency of the text information or their comprehension at the current stage. The participants also frequently activated their prior knowledge to construct a reference framework, thereby enabling them to construct meaning of the text. Under

most circumstances, the information in the text reminded them of some prior knowledge directly or indirectly related to the text. By integrating the relevant prior knowledge with the text information, the participants constructed meaning.

For example, participant 6 responded to the Chinese passage: "This reminds me the definition of language made by linguists". This response indicated that the text information triggered this reader's prior knowledge about language. He did not state the definitions though he may have compared the definition in his mind so as to understand the text information.

Relating to prior knowledge also occurred when the participants attempted to represent the meaning of text sentences. For example, participant 5 responded to the Chinese passage: "I think it is found by observing that a child who is likely to interact with other children around him learns very fast, gets to know his environment faster, and adjusts to a new environment very quickly". As the original text did not provide any information about learning faster and the like, it was evident that he activated this information from his prior knowledge or experience to facilitate his understanding.

Participant 2, English passage: "... in China ... the national examination can be used to evaluate the quality of students from high school... but some of students may be qualified in high school, but they just by accident failed to pass the national exams, so they failed to continue their study". This response revealed that the reader brought the information stored in his long-term memory, which was related to his experience in China, and might not be stored in English. However, when he read the English passage he could retrieve this experience to help him understand the passage. The phenomenon provided

evidence to support the schema theory that information is stored as meaning not in the form of language. When reading, a reader can retrieve relevant experience from the long-term memory no matter in which language the experience was obtained.

Relating to prior knowledge was one of the strategies used frequently by all of the eight participants when reading both L1 and L2 texts, and it tended to occur more frequently in L2 reading performance. Relating to prior knowledge is also well-recognized in reading research literature. However, Bereiter and Bird (1984) noted that recall of related knowledge is not in itself evidence of strategic behavior. It may be automatic, a natural consequence of processing the meaning of the text. Trying to solve a comprehension problem often entails recall of related information.

The occurrences of these 24 categories of responses and strategies indicated that the participants not only knew how to plan their way to meet their reading purposes, but also knew what they could do and when they should do what. They were able to evaluate their comprehension and comprehension strategies and to combine or shift strategies when necessary. In other words, they processed the text in a strategic and flexible way. The flexibility of strategy use enabled them to construct meaning of the passages efficiently.

#### 6.1.2. Finding 2: The Frequency of Strategy Used in L1 and L2 Reading Tasks

The frequency of strategy use in L1 and L2 reading revealed that the 24 strategies were used with various frequencies in the two reading tasks, which implies that these readers knew “how to use strategies successfully” (Anderson, 1991). The analysis of this finding presents detailed information about the specific strategies used most frequently, very frequently, frequently, or infrequently in L1 and L2. The comparative data in L1 and

L2 reading enables us to see more clearly the similarities and differences of strategy use across the two languages. Sixty-two point five percent of strategies were used frequently to different extents by the participants when reading the Chinese passage, and the total number of combined strategies were 380, which covered 88.8% of the group frequency. For the English passage, 71% of strategies were most frequently, very frequently, or frequently used by the participants when they read the English passages, and the total number of combined strategies were 463, which made up 93.3% of the group frequency. Furthermore, this finding showed that the frequency of occurrences of the infrequently-used strategies covered only 11% or 6.6% of the group frequency in the Chinese and English reading tasks.

The data showed that overwhelming choices of strategies for both reading tasks were “summarizing and making conclusions”, “relating to prior knowledge”, “evaluating the content of the text”, “representing the text”, and “recognizing text structure” in both languages. These strategies have been recognized in the literature (Block, 1986 among others) and were used by the participants in the two reading tasks. These strategies can be considered as often-used strategies across languages.

These data lead to one of the major findings in this study: from 62.5% to 71% of the comprehension strategies observed were frequently used by the participants in the two languages. Based on these data, it can be assumed that most of the comprehension strategies are universal. This finding differs from Sarig’s (1987), who found in her study that “87% of reading moves observed were unique”. Based on her findings, she concluded that most of the reading comprehension processes consist of readers’ use of unique,

personal combinations of strategies which characterize them as individuals. The inconsistency between the results of the current study and Sarig's may be due to the different educational backgrounds of the research participants of Sarig's study and this one. The subjects of Sarig's study were high school students reading in Hebrew (L1) and English (L2), who were considered to be at the stage of learning or developing their reading skills. The participants of the current study were graduate students, who are bilingual readers, not L2 learners. The comprehension processes of the participants in this study demonstrated that they applied comprehension strategies flexibly in both reading tasks, and their comprehension processes identified them as balanced bilingual readers.

The two findings to research question one indicated that the participants of this study had procedural knowledge (O'Malley & Chamot, 1990) or operation knowledge (Bernhardt, (1991); they know exactly how to process an expository text, when and what strategy should be used when necessary. Procedural knowledge seems to compensate to some degree for deficits, if any, in the participants' linguistic knowledge, background knowledge, or self-confidence. Most important, procedural knowledge seems not to be language specific; the participants in this study could apply this knowledge to reading tasks in both languages.

## 6.2. Findings to Research Question Two: To What Extent did These Chinese Readers Use Similar or Different Strategies When Reading Expository Text in L1 and L2?

To answer this question, the comprehension processes of the participants were investigated initially as a group, then as individuals. Findings 3, 4, 5, 6 and 7 in the previous chapter presented data leading to answers to research question two.

#### 6.2.1. Finding 3: Total Strategies and Frequencies of Strategies Used by the Group in L1 and L2 Reading Performances

The data of group total strategy use and group frequency of strategy use of the participants when reading in L1 and L2 lead to a finding that participants as a group used a similar number of strategies with comparable group frequencies in L1 and L2 reading tasks. The mean and standard deviation of the group total strategies used in the two reading tasks were very close (SD: 3.1 versus 3.0 in Chinese and in English), and so were the mean and standard deviation of the group frequencies of strategies used in the two reading tasks (SD: 15.7 versus 18.4 in Chinese and in English). Recall that most of the strategies were derived from the participants' think-aloud protocols and backed up by their reports on the comprehension strategy check-lists. In addition, the two reading performances and data collection in the two languages were conducted in two sessions a month apart. It was considered that there was no possibility that the participants manipulated the data. Therefore, this finding suggests that the participants processed the texts similarly in the two languages, and a similar number of strategies were used with comparable frequencies in both L1 and L2 reading tasks.

#### 6.2.2. Finding 4: Strategies Used in Both L1 and L2 Reading Performances

Among the group total strategies found in L1 and L2 reading tasks, 106 strategies were used in both L1 and L2 reading performances. These strategies covered 87.6% of

strategies used by the participants when reading the L1 passage, and 83% of strategies used by the participants when reading the L2 passage. The high percentage of strategies identified in both reading tasks indicated again that the participants as a group used similar strategies when processing the L1 and L2 texts. This finding suggests a stability of strategy use in L1 and L2 reading. This finding is in line with Block's (1986) finding, in which she compared L2 reading performances of ESL learners from various language backgrounds with English native readers, and concluded that L1 readers and L2 readers of English used similar strategies when reading the same English texts. This finding supports Block's conclusion by providing comparative data of the same individual readers performing similar reading tasks in two different languages.

#### 6.2.3. Finding 5: The Frequency of Strategy Categories

Further information suggests that that the frequency and percentage of occurrences of each strategy category involved in the L1 and L2 reading tasks were similar or comparable (refer to Table 11). The data also suggested that the participants used self-corrective strategies with very similar frequencies in the two reading tasks, (122 in Chinese and 124 in English). This finding is consistent with Davis and Bistodeau's study (1993), in which the researchers found that the comments of this kind from their subjects "did not differ significantly according to the language or the topic of the text read" (p.465). The finding, from another angle, provided confirmatory evidence that the participants handled these two reading tasks in a similar manner, and that the same strategy categories were employed in the two reading performances. The passage

language did not affect the way in which they processed the texts, monitored their comprehension, and adjusted their strategies when necessary.

Findings 3, 4, and 5 from a group perspective answered research question two. Based on these findings, the researcher concludes that as a group, the participants used the same types of strategies with comparable frequencies to process the expository texts in L1 and L2. No great difference exists between the comprehension processes in L1 and L2 of these participants. In other words, the passage language did not change the participants' comprehension processes. On the other hand, these findings also suggest that the reading materials of this study were matched since the comprehension processes in the two languages did not show significant difference.

#### 6.2.4. Finding 6: Each Individual Reader's Strategy Repertoire

As a group, the strategies that emerged from the two reading tasks were indistinguishable. The participants used the same types of strategies with similar frequencies to perform similar reading tasks but on different topics in L1 and L2. Finding 6 provided an answer to the research question two from an individual perspective. The finding (refer to Table 12) shows that each reader used a similar number of strategies in L1 and L2 reading, and that most strategies were used in both reading tasks by each participant (refer to Graph 2). Within each reader, the strategy use varied from one to five across languages. The intra-degree of variance of types of strategies used by each reader reading the L1 and the L2 texts is rather low (variance of 2.4 average). This means that readers did not differ as greatly as to the types of strategies they used to construct the meaning of the texts in L1 and L2.

#### 6.2.5. Finding 7: Frequency of Strategy Use by Each Individual Reader

Finding 7 shows that a variation also existed in the number of times strategies were used. The frequency of strategy use within each reader varied from four to 46. The intra-degree of variance of frequency of occurrences of strategies used is high, particularly within P1 and P8 (refer to Graph 3). Each participant followed his or her own pattern in processing the two texts; that is, the same strategies occurred in both L1 and L2 reading tasks. However, differences became apparent when these readers were examined individually. An individual reader used some strategies more frequently in one language than in another. The difference of frequency of strategy use characterized each participant as an individual reader. The finding also implies that reading comprehension is a personal process in which a reader uses strategies as many times as he or she needs to reach his or her goal of reading. What type of strategies a reader used depended more on clues available to the reader and prior knowledge reference he or she brought to the reading task than on the language of the text.

The findings also reflected considerable individual variations in the type of strategy used, particularly in the frequency of strategy use among participants. For example, the data indicated that the frequency of strategy use by participant 8 was 86 in English, while the frequency of strategy use by participant 5 in English was 35. However, the quality of strategy use is a more important factor than the quantity of strategy use in constructing meaning of the passages. In other words, the appropriateness of the particular strategy chosen and the effectiveness with which it is used had a greater impact on comprehension than the frequency with which the strategies were used. In addition, participant 1 was the

only person who employed the strategy of “using sentence or grammar structure” very frequently in English reading. The factors which bring about individual differences in comprehension processes and strategy use are uncertain. The difference in frequency might be due to personal reading style, or the levels of familiarity with the two languages concerned, that is, whether the participants were more comfortable with L1 than with L2. Comparatively, the readers had longer experience of reading in their L1 than in L2. However, the cognitive awareness of relative comfort with L1 is not clear because readers were not explicitly questioned about this.

Overall, the findings of this study provide evidence to suggest that the participants in this study brought their full strategic arsenal into play whether they were reading in Chinese or in English. The passage language did not affect the type of strategies used in the two reading tasks. The participants processed the two expository texts in L1 and L2 similarly. The similarities in the comprehension processes of the participants of this study further suggest that comprehension strategies in L1 and L2 are positively related. Given the small size of the sample, it may not be possible to establish a statistically significant relationship between L1 and L2 comprehension strategies. The findings of this study provide evidence to suggest that significant relationships exist in L1 and L2 reading comprehension strategies. What are the underlying factors which determine this significant relationship? This question might be answered by existing theories.

### 6.3. Reading Comprehension Hypotheses and the Findings of This Study

#### 6.3.1. The Reading Transfer Hypothesis

The findings of this study strongly suggest that the participants used similar strategies when they read in L1 and L2. However, the similarity of strategy use cannot corroborate the reading transfer hypothesis (Esling & Downing, 1986) because this study did not employ a procedure which would allow for investigation of which strategy or strategies were developed in or specific to L1 or L2. It is impossible in this study to obtain information about which strategy or strategies were specific to or developed in L1 reading, and which strategies were more likely and ready to be transferred simply because these participants were balanced bilingual readers. They were able to apply their strategies flexibly and selectively in both languages. In particular, this study focused on the comprehension processes which are considered more cognitive demanding than linguistic demanding. Beyond the stage of word recognition, it is very difficult to distinguish which strategy belongs to L1 reading experience, and which strategy belongs to L2 reading training. It could be very risky to explain findings and similarities of strategy use of this study by using the reading transfer hypothesis. If there were a tendency to strategy transfer, the transfer might be two-way transfer. That is, comprehension strategies could be transferred from L1 to L2 and vice versa. The possibility of two-way transfer is due to the fact that these participants were bilingual readers. They have reading experience, particular for academic purposes, in both L1 and L2. For these bilingual readers, reading experiences in L1 and L2 function as two channels for them to improve and perfect their

cognitive procedural knowledge in reading. As a result, they can apply their procedural knowledge in reading in any language.

### 6.3.2. The Common Underlying Proficiency Hypothesis

It seems that Cummins' (1984, 1991a, 1991b) Common Underlying Proficiency Hypothesis can explain the findings of this study. A major finding which emerges from this study is that each participant processed the texts similarly in both languages. They used similar strategies, and the occurrences of these strategies in the two languages were comparable. The participants of this study were graduate students; they had a great deal of reading experience in their first language - Chinese. Reading as an academic skill had been developed in their first language after so many years of formal education and reading experience. They also had experience in reading the second language - English, since they learned English as a foreign language for an average of 12 years in their home country and had been doing graduate study in their second language for an average of three and a half years. Comparatively, their Chinese reading experience was longer than their English reading experience. However, the shorter reading experience in L2 did not seem to disadvantage their processing of the L2 text. They had no problem applying their comprehension strategies to the L2 reading task and reaching their goal of comprehension. The data indicates that they planned their way through the reading, monitored their comprehension, adjusted their strategies when necessary, activated their relevant prior knowledge, and evaluated the text information. The employment of these strategies suggests that language was not a problem when they processed the L2 texts.

The underlying factors which enabled these participants to process the texts as flexibly in L2 as in their L1 might be their developed cognitive or academic abilities. As Cummins (1984, 1991a, 1991b) suggests that despite the obvious differences in phonology, syntax and lexicon between L1 and L2 there exists a common conceptual resource that determines an individual's performance in cognitive or academic tasks such as reading. Beyond decoding or word recognition, comprehending is more a cognitive demanding process involving the coordination of attention, memory, perceptual process and comprehension process, in which a reader constructs meaning from a written text. In this process, language is no doubt a prime determinant in reading comprehension. However, at the level of constructing meaning of written material, cognitive strategies such as problem solving strategies used by the readers in this study seem to take more responsibility. Regardless of the obvious differences in writing systems between L1 and L2, there exists a common conceptual resource that determines an individual's performance on cognitive or academic tasks such as reading in L1 and L2. Cognitive strategies appear to underlie comprehension processes in both L1 and L2. Once these strategies are developed, they enable readers to apply them to any other similar situations, such as reading in L2. The data also reflected that the participants used the category of self-corrective strategies with similar frequencies in L1 and L2. The use of these strategies indicated that the participants consciously planned and adjusted processes when necessary. It implies that the participants were aware of their processing strategies.

The interdependence between L1 and L2 comprehension strategies clearly operates in procedural or operational knowledge. Literacy in any language is a significant

component in comprehension processes in both languages. The more literate readers are, the higher is the probability that they will apply their comprehension strategies to reading in any language involved, that their comprehension processes in the two languages concerned will be universal.

### 6.3.3. The Reading Universal Hypothesis

When Goodman (1970, 1971, 1973) proposed his reading universal hypothesis, he suggested that research would be needed to test this hypothesis. More than twenty years have passed, however, but to the researcher's knowledge, few studies had been done to test this hypothesis. The results of the current exploratory study provide evidence to support Goodman's reading universal hypothesis. First of all, the findings from both a group perspective and an individual perspective suggest that the participants in this study used similar strategies to construct the meaning of expository texts in L1 and L2. Twenty-four strategies were derived from both the participants' comprehension processes in Chinese and in English. Second, these readers used the identified strategies with similar frequencies. The frequency of strategy categories used in the comprehension processes was also similar. In addition, the comprehension processes within each participant revealed a similar pattern across the two languages. The reason that these similarities occurred in the comprehension processes can be better explained by Goodman's reading universal hypothesis. The primary goal of reading the two expository texts was the same--to understand the texts. To reach the primary goal of reading requires of the readers not just their proficiency in the language, but most important, requires them to bring all their cognitive and metacognitive strategies into play, such as problem solving strategies,

predicting, logical analysis abilities, summarizing, and monitoring skills. Reading comprehension in any language also needs readers to bring their procedural knowledge (O'Malley & Chamot, 1990) into full play. The participants in this study used all the strategies that they believed appropriate under a certain condition to construct meaning of the texts. Furthermore, they were performing similar tasks so that their processing strategies were similar despite different languages involved.

#### 6.4. Summary

The picture that emerges from the present study is a complicated one. The results of this study provide evidence that comprehension strategies used in L1 and L2 reading performances are substantially related. The comprehension strategies derived from the study suggest that the interdependence between L1 and L2 comprehension strategies is influenced by cognitive universals. It is important to note that what is universal is primarily operational or procedural knowledge rather than specific language elements. The results of this study support, and are supported by, the Common Underlying Proficiency Hypothesis (Cummins, 1984, 1991a, 1991b) and by the Universal Hypothesis (Goodman, 1970, 1971, 1973).

The reason that both the common underlying proficiency hypothesis and the universal hypotheses support the results of the study seems to be as follows. These two hypotheses seem to overlap some factors in language comprehension processes. The Common Underlying Proficiency Hypothesis proposes that the development of literacy-related strategies in L2 is partly a function of prior development of literacy-related skills in

L1. This hypothesis implies that L1 and L2 academic skills are manifestations of a common underlying proficiency. Cummins (1991b) explained this hypothesis and emphasized: “L1 literacy and conceptual knowledge constitute central attributes of the individual that help to make academic input in the L2 comprehensible” (p. 77). In his explanation, Cummins (1991b) emphasized the “conceptual knowledge”, but went further: “If a second language learner already understands concept X in her L1 then L2 input containing that concept will be considerably more comprehensible than if she does not understand the concept X in her L1” (P. 78). According to the present researcher’s understanding, the common underlying proficiency hypothesis, particularly the upgraded common underlying proficiency hypothesis, focuses more on conceptual knowledge or knowledge about the content of input. In reading, conceptual knowledge can be considered as prior knowledge about the content of texts. If a reader has relevant prior knowledge, it will be easier for the reader to process and understand the text. This view is supported by the schema theory in reading research and also by the comprehension processes of this study. Recall that all the participants used their prior knowledge to comprehend the two texts. The frequent use of the strategy of “relating to prior knowledge” can be explained by Cummins’s note that the participants had conceptual knowledge about the texts in either or both languages. This conceptual knowledge helped them to facilitate comprehension of the texts in both languages. In addition, Cummins (1991a, 1991b) also claims that cognitive-demanding skills in L1 and L2 are at least partially interdependent.

However, Goodman's universal hypothesis focused on the primary goal of reading. In order to reach the goal, beyond knowing the language, a reader has to do whatever one should do and can do to construct meaning of the texts. In explaining his universal hypothesis, Goodman (1970) argued that reading comprehension "is not simply a question of meanings for words but the much larger question of the reader having sufficient experience and conceptual background knowledge to feed into the reading processes so that he can make sense of what he's reading" (p. 107). This explanation clearly suggests that comprehension needs conceptual knowledge, which was covered in Cummins' common underlying proficiency hypothesis. In addition, Goodman also emphasized "sufficient experience" of reading. Sufficient reading experience enables a reader to develop his or her procedural knowledge of reading comprehension, which later will facilitate reading comprehension in any language provided the reader has overcome the "language ceiling" (Clark, 1979) or "language threshold" (Cummins, 1979). The actions a reader takes to construct meaning consciously or subconsciously depend on the procedural knowledge the reader has. That is, the reader should know how to approach text, why one approaches it, and what to do when problems occur. The operational knowledge is more cognitive demanding than language demanding. The knowledge of knowing how and if-then can only come from readers' reading experience. Once the operational knowledge has been developed in either language, it can be applied to similar performances in any other language provided the reader knows the language. The universal hypothesis focuses more on cognitive universals in comprehension processes than linguistic universals. The comprehension processes of the participants in this study

consist more of cognitive processes than language processes. That is why the participants in this study processed the texts in the two languages similarly. The results of this study strongly suggest that beyond decoding or the low level of reading, the comprehension processes in any language should be the same within individual readers.

Comprehension processes in any language require a reader's conceptual knowledge (Cummins, 1991) which is content-based, operational knowledge (Bernhardt, 1989) and other knowledge. The universal hypothesis in some way covers all the knowledge that a reader needs to comprehend a text in any language.

In sum, the results of this study show that there were parallels between the comprehension strategies used in the readers' L1 and L2 reading tasks. That is, the participants knew of and used the same types of strategies in both languages, but used them more frequently in the L2 reading task. Readers have great control over their comprehension strategies. The flexibility of strategy use shown by each participant indicates a strength in their reading, and control of their cognitive processes.

The findings of this study strongly suggests that the language of the passages did not seem to result in a different pattern of comprehension processes. The participants did not appear to use different types of strategy when reading L1 and L2 texts. The findings further suggest that comprehension strategies are not tied to specific language features. The application of comprehension strategies is not dependent on the languages involved. Strategy use in comprehension processes was found to be positively related in L1 and L2 reading in this study. One may conclude then, that comprehension processes are universal across languages, as far as expository or academic texts are concerned.

## Chapter Seven: Conclusion and Implications

### 7.1. General Conclusion

Research on reading comprehension processes has recently come to the forefront in the study of second language (L2) reading. However, the major problem with previous studies of L2 reading is that they provide insufficient information on the relationship of reading comprehension strategies between the L1 and L2 reading of the same individuals (Alderson, 1984). More than ten years have passed since Alderson's call for research on the relationship of reading comprehension strategies between L1 and L2 reading of the same individuals. However, to the researcher's knowledge, few studies have been done to compare L1 and L2 reading comprehension processes or to explore relationships between them. In particular, little research of this kind has been conducted with adult already-literate or educated L2 readers. To make up for this hiatus, this study was designed and conducted to examine eight Chinese graduate students' comprehension processes when they read expository texts in Chinese (L1) and English (L2).

The present study differs from previous research by using a within-subject design, which allows for comparison of the same readers' comprehension processes in Chinese (L1) and English (L2). The participants read expository texts with a discourse structure of collection of descriptions (Meyer, 1975) in both languages. Analyses of the texts provided evidence that the two passages were similar in their organization structures despite content differences. The second feature of this study is that two data collection

instruments, think-aloud and comprehension strategy check-list, were used jointly to obtain extensive data on the comprehension processes of each reader. By examining the readers' comprehension processes in both languages, 24 types of strategies were identified in the participants' reading performances in L1 and L2. Patterns within an individual reader's L1 and L2 comprehension processes were revealed, and similarities and differences between the L1 and L2 comprehension processes of a group were determined. The seven major findings that emerged from this study demonstrate similarities and differences of comprehension processes within participants' L1 and L2 reading performances. The analysis of data provided evidence to suggest that the participants used the same types of strategies in L1 and L2 reading, that the pattern of comprehension processes within each individual reader was identical, that there was a tendency toward an increase in frequency of strategy use in L2, and that differences existed in the frequency of strategy use among the participants.

It is reasonable to accept differences between individuals and across languages, but this does not deny similarities or the possibility of universals. The similarities in the comprehension processes of the participants in L1 and L2 and the overall findings suggest that there is a positive relationship between L1 and L2 reading comprehension processes and strategy use. The findings suggest that the comprehension strategies which characterize an individual's particular approach to reading in L1 similarly characterize one's reading in L2. Comparing different phenomena leads to the discovery of universal characteristics that lie beneath the surface of apparent diversity. The universals exist

beneath the surface of a diversity of literate cultures and they exist as potentials in already-literate people.

In summary, the conclusions of this exploratory research suggest that there is a pool of cognitive resources which underlies comprehension processes in both L1 and L2. The results of this study provide confirmatory evidence to support, and are supported by, Cummins' (1984, 1991a, 1991b) Common Underlying Proficiency Hypothesis and Goodman's (1970, 1971, 1973) Reading Universal Hypothesis. An important feature of the two hypotheses, that major literacy skills are thought to be the same across languages, has been supported. The two theoretical positions supported by this empirical research help us to understand an important point about the relationship between L1 and L2 reading comprehension processes. The point is that the way in which a already-literate L2 reader processes text, constructs meaning from text, is highly similar to the way in which one constructs meaning of text in one's L1. Comprehension processes are similar in L1 and L2 because several aspects of cognitive processing, such as the retrieval of relevant information and the procedural knowledge of comprehension are common to both L1 and L2 comprehension processes. The procedural knowledge about processing text and conceptual knowledge can be applied to a similar situation in any other language provided the reader has overcome the "language threshold" (Cummins, 1979) in that language. Both theories posit that a common set of proficiencies underlies both L1 and L2 comprehension processes. That is, comprehension strategies can be applied to another language once they have been developed.

Having examined the participants' approach to the two texts and their comprehension processes in each of them, the researcher concluded that the uses of comprehension strategies among this group of readers were similar within themselves and across the two languages concerned. The results of this study contribute to L2 reading research by providing insights into the same readers' comprehension processes in general and adult educated L2 readers' comprehension processes in two languages in particular. The results shed light on the existing body of theoretical knowledge about comprehension processes through which researchers and L2 instructors may look anew at our students' performance and at the instructional methods and the techniques we have adopted. In addition, these conclusions do, however, prompt questions about the comprehension processes of other adult educated L2 readers and therefore may serve in the building of hypotheses which address the L1 and L2 comprehension strategies of larger and more varied populations.

## 7.2. Implications

### 7.2.1. Implications for L2 Reading Instruction

This study was undertaken under certain circumstances with eight particular readers reading two particular texts in Chinese and English. Caution should be exercised when drawing implications for classroom practice based on results of a single study such as this one. Even so, given the results of the current study, some assumptions about L2 reading instruction can be made.

First, this study provides evidence to suggest that already-literate or academic L2 readers may process texts in L1 and L2 similarly after years of reading experience in both languages. It implies that the already-literate L2 readers who can read in their L1 do not need to learn how to process reading in another language. Since the already-literate L2 readers have developed comprehension strategies in L1 they do not “begin again” (Bernhardt & Kamil, 1995), but are able to draw upon their L1 reading comprehension strategies and make them work for them in L2. The results of this study remind us as teachers to be aware, first of all, that not all L2 readers are beginning readers. Most of them are literate to some extent in their first language (L1), but they may need help when reading in their L2. Therefore, L2 instructors should look closely at what our students can do before we decide what to teach them. It would seem prudent not to lose effective strategies already established in their first language.

As for already-literate L2 readers, L2 teachers can provide more reading opportunities for them. The reading materials should be authentic materials. By reading authentic material, L2 readers will feel that reading in L2 has a purpose. Reading in L2 is not the final goal. One reads in L2, not just for the language’s sake, but rather to learn, to obtain information. Reading with purposes in mind will enable L2 readers to apply their procedural knowledge about reading comprehension in their first language to their L2 reading. In so doing, L2 readers’ reading comprehension in L2 may be improved.

Furthermore, given the variety of types and combinations of strategies used by the participants, the evidence suggests that there is not a single set of strategies that is more effective for all learners than others. The most effective strategy training may consist of

encouraging readers to become more aware of their existing comprehension strategies and aware of their strategy use.

#### 7.2.2. Implications for L2 Reading Research

Although the findings of this study focus on the relationships between comprehension strategies in Chinese and English in particular, they bring to light the much larger and still debatable relationship between L1 and L2 reading. The present research has served as much to illustrate the ways in which responses and strategies are used by bilingual readers as to raise questions about the differences in strategy use and frequency of strategy use among individual readers. The results of this study indicate that we still have a lot to discover about comprehension processes. For example, the impact of L1 comprehension strategies on L2 reading comprehension is still uncertain. Nonetheless, this kind of research will enable us to understand comprehension processes better, and provide L2 researchers and L2 instructors with revealing insights into the reading comprehension processes of already-literate L2 readers reading in two languages.

There are three directions for future research. First of all, as always, one possibility for future research lies in the area of replication. Replications of the study in various contexts may be undertaken to test the generalizability of the findings. The results of this study suggest that reading comprehension processes in L1 and L2 are similar, in that readers use similar types of strategies in Chinese and English. A possibility for future study would be to test the results of this study with readers of different language backgrounds, such as Japanese, German etc. Secondly, this study was undertaken with graduate students. Future research on the relationship between comprehension strategies in L1 and

L2 can also be conducted with other kinds of L2 readers of different educational backgrounds. Thirdly, this study investigated the participants' comprehension processes when reading expository texts in both L1 and L2. Future study can compare comprehension processes when readers reading other types of texts such as narrative, fiction or non-fiction. It seems that the possibilities of replication are endless.

The second area of future research on relationships of comprehension strategies between L1 and L2 reading is that of individual differences in comprehension processes in L1 and L2. Research is needed to explore the factors that cause the difference in frequency of comprehension strategy use in L1 and L2. Answers to this question may help us to reach a deeper understanding of comprehension processes.

The third area for this kind of research would be to explore whether there is a causal relation of comprehension strategies between L1 and L2. To investigate causal relation, a larger group of participants and a quantitative research design would be needed.

### 7.3. Limitations

This study suffers from the same limitations encountered in other studies. First, the number of research participants was small. It is not possible to make generalizations from a group of eight participants. Trends, however, can be seen.

A second restriction on generalizability results from the educational backgrounds of participants of this study. The participants in this study were graduate students; they had relatively higher levels of education. The results obtained in a study of this type may not be generalized to L2 readers of different educational backgrounds.

A third restriction on generalizability comes from the languages involved in this study. This study compared readers' comprehension processes in Chinese and English. The results seem to suggest that the participants processed the Chinese and the English expository texts similarly. Over 80% of comprehension strategies were used in both languages. However, the results may not be generalized to readers of other different linguistic backgrounds.

A further limitation is that the participants in this study were reading aloud, which is certainly not their normal mode of reading. The participants were asked to talk about their thinking and understanding whenever and wherever anything occurred to them. Many verbalizations were given in mid-sentence. If the participants had read silently, it would have been very difficult or impossible for the researcher to determine which part of the text the participants were talking about. However, it is possible that the think-aloud performance itself may have affected the nature of data collected. For instance, more "rereading" was used due to the need to indicate that a given part of the text was being talked about.

In summary, this study investigated the comprehension processes of the same individual readers who read in their L1 and L2. Comparing the comprehension processes across the two languages lead to the discovery of some similarities in the participants' comprehension processes. These similarities may be thought as characteristics that lie beneath the surface of apparent diversity. For example, L2 readers in general read slower in L2 than in L1, or they used some strategies more frequently in L2 than in L1, and vice

versa. However, when these similarities, or universals, are recognized, differences may be better understood and can be more effectively brought under deliberate control in L2 reading instruction.

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## The Letter of Consent

Dear Fellow Student,

I am looking for Chinese graduate students to participate in a study on the relationship of reading comprehension strategies between a first language and second language. This research study is not a test. The purpose of the study is to establish how Chinese graduate students read in Chinese and in English as a second language. Therefore, there is no right or wrong answer. Everything you speak about and report will be of equal value, and will be of importance in this study. So please be free to read and understand the passages in your own way.

For the purpose of the study, you will be asked to talk about your thinking during reading, and your talk will be tape-recorded. However, please be assured that your name and identity will remain confidential throughout the study. Any raw data such as tapes and field notes will be kept on secret file until the study is done, and then destroyed.

Furthermore, you will have the right to withdraw at any time from the study without any explanation to the researcher. If you agree to participate in the study please sign below. Your participation and cooperation are very much appreciated.

Thank you very much for your time and cooperation!

Yours truly,

Hua Tang

Date

Participant's signature

Researcher's signature

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# 中文阅读技巧调查表

姓名: \_\_\_\_\_

日期: \_\_\_\_\_

## 第一部分

1. 阅读本段文章所用时间: \_\_\_\_\_
2. 理解率: A. 90 - 100%    B. 80%    C. 70%    D. 60%或 60% 以下
3. 请标出阅读本文所用的技巧 并举例说明

1) 猜测下文可能读到的内容。

举例: \_\_\_\_\_

2) 跳过不熟悉或不认识的字。

举例: \_\_\_\_\_

3) 猜测不熟悉或不认识的字。

举例: \_\_\_\_\_

4) 查字典。

举例: \_\_\_\_\_

5) 调整阅读速度 (比如改变阅读速度 快读或慢读)

举例: \_\_\_\_\_

6) 监测理解 (比如自问是否理解某个句子? 还是不清楚?)

举例: \_\_\_\_\_

7) 重读。

举例: \_\_\_\_\_

8) 识别文章结构 ( 比如识别主题句等 ) .

举例: \_\_\_\_\_  
\_\_\_\_\_

9) 找出文章的中心思想 .

举例: \_\_\_\_\_  
\_\_\_\_\_

10) 评估文章内容 ( 比如同意或不同意作者观点 与作者商榷等 )

举例: \_\_\_\_\_  
\_\_\_\_\_

11) 联系本人经历 ( 比如联想到已有的知识或个人经历 )

举例: \_\_\_\_\_  
\_\_\_\_\_

12) 联系前面的句子 .

举例: \_\_\_\_\_  
\_\_\_\_\_

13) 用替换字词的方法帮助理解某个句子或某个部分

举例: \_\_\_\_\_  
\_\_\_\_\_

14) 解释文章内容 .

举例: \_\_\_\_\_  
\_\_\_\_\_

15) 对文章内容提出质疑 .

举例: \_\_\_\_\_  
\_\_\_\_\_

16) 总结或得出结论 .

举例: \_\_\_\_\_  
\_\_\_\_\_

17) 将某些字词或句子划线。

举例: \_\_\_\_\_  
\_\_\_\_\_

18) 修正原来的理解或猜测。

举例: \_\_\_\_\_  
\_\_\_\_\_

19) 继续阅读 (比如掠过不理解的部分, 试图通过阅读下文来理解前文等)

举例: \_\_\_\_\_  
\_\_\_\_\_

20) 掠读 (比如快速掠过某段试图尽快得到有关本文内容的线索)

举例: \_\_\_\_\_  
\_\_\_\_\_

21) 翻译。

举例: \_\_\_\_\_  
\_\_\_\_\_

## 第二部分

请提供本调查表中未提及的其它阅读技巧。

举例: \_\_\_\_\_

举例: \_\_\_\_\_

举例: \_\_\_\_\_

举例: \_\_\_\_\_

举例: \_\_\_\_\_

真诚感谢您的协助!

**SELF-CHECK LIST OF READING COMPREHENSION STRATEGIES FOR  
THE ENGLISH PASSAGE**

Name \_\_\_\_\_ Date \_\_\_\_\_

Male \_\_\_\_\_ Female \_\_\_\_\_

**Section 1**

1. Age: **A.** 20 - 25    **B.** 26 -30    **C.** 31- 35    **D.** 36 - 40    **E.** 41 up

2. TOEFL Score \_\_\_\_\_

3. Years of English learning before you arrived Canada \_\_\_\_\_

4. English Instruction you received in your home country emphasized on:

**A.** speaking and listening    **B.** reading    **C.** writing    **D.** both B and C

5. How often did you read English written material (e.g., academic journal articles, magazines, newspapers, novels etc.) when you were in your home country?

**A.** very often    **B.** often    **C.** sometimes    **D.** rarely

6. Final Degree earned in home country \_\_\_\_\_

7. Major Study Field \_\_\_\_\_

8. Length of Stay in an English Speaking Country \_\_\_\_\_

9. Expected Degree \_\_\_\_\_

**Section 2**

Time spent reading this passage \_\_\_\_\_

Comprehension Rate (check only one):

**A.** 90-100%    **B.** 80%    **C.** 70%    **D.** 60% or below

Check the strategies that you used when reading the passage and give example(s) briefly (e.g., write down the line number or page number):

1. Predicting (i.e., anticipating what might be in succeeding portions of text)

EXAMPLE: \_\_\_\_\_

2. Skipping unknown words

EXAMPLE: \_\_\_\_\_

3. Guessing unknown words

EXAMPLE: \_\_\_\_\_

4. Consulting dictionaries

EXAMPLE: \_\_\_\_\_ How many times \_\_\_\_\_

5. Adjusting reading speed (e.g., changing speed, reading more slowly or faster)

EXAMPLE: \_\_\_\_\_

6. Monitoring comprehension (e.g., questioning whether you understand a certain part or why you do not understand the part)

EXAMPLE: \_\_\_\_\_

7. Rereading

EXAMPLE: \_\_\_\_\_

8. Recognizing the patterns of structures of the article (e.g., finding topic sentences)

EXAMPLE: \_\_\_\_\_

9. Stating or looking for the main idea

EXAMPLE: \_\_\_\_\_

10. Negotiating with the author (e.g., agreeing or disagreeing to the author's opinion).

EXAMPLE: \_\_\_\_\_

11. Relating to previous experience (e.g., assimilating with previous knowledge or your personal experience).

EXAMPLE: \_\_\_\_\_

12. Relating to previous sentences

EXAMPLE: \_\_\_\_\_

13. Paraphrasing (e.g., using other English words to explain or help understand a certain part of the passage)

EXAMPLE: \_\_\_\_\_

14. Raising questions about the content of the article

EXAMPLE: \_\_\_\_\_

15. Drawing conclusions

EXAMPLE: \_\_\_\_\_

16. Summarizing the article

EXAMPLE: \_\_\_\_\_

17. Translating (Please write down the page number and the line number you translated)

EXAMPLE: \_\_\_\_\_

18. Marking or underlining a word or a certain part

EXAMPLE: \_\_\_\_\_

19. Forming a hypothesis (e.g., guessing the meaning of a sentence or a certain part)

EXAMPLE: \_\_\_\_\_

20. Revising your comprehension or hypothesis of a former part

EXAMPLE: \_\_\_\_\_

21. Skimming (e.g., going through a paragraph or the article quickly to get some clues of the content of the article)

EXAMPLE: \_\_\_\_\_

22. Reading on (e.g., ignoring an unclear part and keep on reading in order to find an answer in the following text)

EXAMPLE: \_\_\_\_\_

### Section 3

Please do not hesitate to add strategies not included on the list but you used when reading the article.

Other strategies:

Examples: \_\_\_\_\_

Examples: \_\_\_\_\_

Examples: \_\_\_\_\_

Examples: \_\_\_\_\_

Thank you for your cooperation!

## VITA

Surname: Tang

Given Names: Hua

Place of Birth: Wuhan, Hubei, P. R. China

### Educational Institutions Attended:

University of Victoria	1991 to 1996
Henan Normal University	1978 to 1982

### Degrees Awarded:

Master of Education	University of Victoria	1992
Bachelor of Arts	Henan Normal University	1982

### Honours and Awards:

Fellowship of University of Victoria	1991-1995
The Award of Achievement on Teaching of Pingyuan University	1989
The Award of Excellent Young Scientist of Pingyuan University	1986
The Award of Excellent Young Scientist of Xinxiang, Henan Province	1986
The Award of Excellent Instructor of Pingyuan university	1983

### Publications:

Tang, H. (co-editor, 1993). An English-Chinese Dictionary for Abbreviations and Acronyms. Shanghai Science and Technology Publishing.

Tang, H. & Zhao, J. S. (1993). Error analysis. PASSA, 22, 81-87.

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Title of Dissertation:

A Cross-linguistic Within-subject Designed Study on the Relationship between Comprehension Strategies in First and Second language reading

Author

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Hua Tang  
April 1, 1996