

METACOGNITIVE STRATEGY USE: A COMPARATIVE STUDY OF
CHINESE GRADUATE STUDENTS READING ENGLISH AS A
SECOND LANGUAGE AT UNIVERSITIES IN
THE UNITED STATES

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CHAPTER I

INTRODUCTION

In the early 1980s, as a result of the policy of opening to the outside world, China started sending thousands of students to study abroad. By the end of 1988, there were over 40,000 Chinese students on American campuses (Lord, 1989). Understandably, studying in a foreign land can be a big challenge to all these Chinese students: they need to make many adjustments, culturally, financially, and linguistically. Because English is a foreign language to them, these students must acquire enough proficiency in English in order to succeed, or at least to survive, academically.

Proficiency in English, as in any other language, covers a broad scope. It refers to both the knowledge of the language and the ability to use the language appropriately. Usually, language proficiency is subdivided into four categories of communicative abilities: speaking, listening, writing, and reading (Clark, 1972). Studies (Larson, 1985; Hosley & Meredith, 1979; Henning, 1975) have claimed that among these abilities, the reading ability is the most representative of an apparent underlying linguistic proficiency factor: it is a key predictor of overall language proficiency. Obviously, reading ability in English is an

extremely important vehicle for all the Chinese students in America to achieve academic advancement.

Since coming to the U.S., the researcher has been in contact with his fellow Chinese students studying in various academic areas. One of the topics that has always aroused great interest in the researcher is the English reading ability of his fellow Chinese students. The related response the researcher has received from them can be put into two categories; most of those students voiced dissatisfaction with their English reading ability, only a few of them voiced some degree of satisfaction with their English reading ability.

In trying to identify the sources of these two types of response, the researcher has found that most of those who voiced dissatisfaction were engineering students, who consisted of the overwhelming majority of the whole Chinese student population in the United States. While most of those who voiced satisfaction were students currently studying in the social-science areas and were in fact very few in number compared with the number of the engineering students. A further look at their undergraduate academic background reveals that virtually all the contacted students of the "satisfaction group" have bachelor's degrees in English; while most of the students of the "dissatisfaction group" have bachelor's degrees in engineering areas.

Such a situation seems understandable. Studies (Berhart, 1983; Berman, 1984; Devine, 1981; Cziko, 1978) have indicated

that foreign language (FL) reading proficiency is directly affected by a reader's phonological, syntactic, semantic, and lexical knowledge of and proficiency in that particular language; it is also directly related to the reader's cultural, contextual and structural background knowledge (Carrel, 1981; Johnston, 1982). Since the students with bachelor's degrees in English have had more concentration on English learning and more exposure to English materials than those with bachelor's degrees in engineering, they could be expected to be better English readers. However, a recent view expressed by Casanave (1988) on the issue of FL reading proficiency challenges the above explanation as incomplete. She argues that FL reading depends on a reader's access to strategy schemata as well as those factors mentioned above. According to Casavane, strategy schemata are a reader's underlying knowledge base about his monitoring behaviors during reading. They consist of the reader's ability to monitor what he understands and his ability to take appropriate strategic action (p. 289). This view, based on metacognitive theory (Flavell, 1987; Wellman, 1985; Baker & Brown, 1984; Brown, 1980), adds one more dimension i.e., the strategy schema dimension, to the research in FL reading which, until recently, has focused solely on the knowledge base. The researcher believes that the issue of Chinese students' English reading strategy use can be studied more thoroughly from the metacognitive perspective.

Statement of the Problem

This study is designed to investigate the problem of metacognitive strategy use by Chinese students when they read English texts. More specifically, do native Chinese students with varying academic backgrounds read English texts differently in terms of metacognitive strategy use? If they do, what kinds of differences are there?

Purpose of the Study

The purpose of this study was twofold: (1) to examine the metacognitive strategies used by the two groups of Chinese students while they read English materials; (2) to determine if differences exist between the two groups of Chinese students in metacognitive strategy use during their English reading. The subjects of the study were the Chinese students at three American universities in the Southwest. They were studying in various graduate programs. The subjects were assigned into two groups according to their undergraduate and graduate majors. Group I included those who already have bachelor's degrees in English and were currently studying in the social-science areas; Group II consisted of those who already have bachelor's degrees in engineering and were currently studying in various engineering areas.

Hypotheses

This study proposes to test the following null hypotheses:

1. There is no significant difference between the subjects of Group One and the subjects of Group Two in the types of metacognitive strategies which are used while reading English texts.
2. There is no significant difference between the subjects of Group One and the subjects of Group Two in the frequency of metacognitive strategy use while reading English texts.

Definition of Terms

Metacognition: understanding of one's own knowledge state (Brown, 1981). In this study, it refers to a reader's knowledge concerning his own cognitive processes during reading. It includes both comprehension monitoring and regulation of cognition.

Thinking-aloud protocols: verbal data collected from a task which requires a subject to say aloud everything he thinks and everything that occurs to him during reading (Garner, 1987, p. 69; Hayers & Flower, 1980, p. 4).

Reading: a psycholinguistic process for active reconstruction of a message from written language (Goodman, 1967, p. 129).

Reading strategies: general patterns that reveal a reader's resources for understanding (Langer, 1982). They are used to monitor understanding and take action when necessary (Johnston, 1983).

Significance of the Study

The significance of this study is three-fold. It will add to our knowledge about the nature of the English as a second language (ESL) reading processes of Chinese graduate students. It will examine the usefulness of the thinking-aloud (TA) task with the Chinese ESL readers (TA is one version of verbal reporting methods used in reading research; detailed description is provided in the second chapter). Also, it can provide valuable implications for improving ESL reading instruction and learning in China.

Most research on ESL reading tends to treat international students as a homogeneous group. It is the researcher's belief that inter-cultural differences can influence the way a foreign language is taught, learned and used (Connor, 1984; Carrell, 1983; Burtoff, 1983; Johnson, 1982;). Thus, research on ESL reading should give consideration to the factor of inter-cultural differences. In other words, the ESL reading processes of students from different countries deserve separate and more thorough studies. The present study is such an attempt. Research has shown that the thinking-aloud (TA) task is a valid and useful instrument in investigation of a reader's reading processes (Garner, 1982; Hayers & Flower, 1980). Similar studies have been conducted in the foreign language reading area (Block, 1986) to investigate the reading processes of foreign language readers. However, these studies have two common defects: the recruited subjects were always readers at low

foreign language proficiency level and the investigators could not speak the subjects' native languages. In such a situation, doubt can be cast on the validity and reliability of the collected data, since the communication between the subjects and their investigators was limited and the quantity and quality of the subject's verbalization could be adversely affected. In this study, such problems can be reduced to the minimum for two reasons. First, the subjects are all advanced level ESL learners (they all passed the Test of English as a Foreign Language, TOEFL, a standardized English proficiency test designed for international students who apply to American universities; also, they all passed the Test of English Language Proficiency, TELP, a university-made English proficiency test, designed for those who have already passed the TOEFL). Secondly, the investigator speaks the same native language as his subjects, which can minimize any possible verbal communication hindrance. Whether or not these two alterations would help yield worthwhile information about the reading processes of Chinese ESL readers has been examined in this study.

The results of testing the hypotheses of this study can provide useful information about Chinese students' English reading behavior. For instance, if either of the two null hypotheses is rejected, findings of this study may provide valuable implications for instruction and learning of English reading in China and help Chinese students improve their English reading ability.

Viewed in a broad sense, research on foreign language reading is only part of reading research, which, as a whole, includes both research on reading in a native language and that on reading in a foreign language. Thus, findings of this study can contribute to the body of knowledge about native language reading as well as to that about foreign language reading.

Assumptions

1. Metacognitive strategy use reflects the actual reading behavior of the reader (Baker & Brown, 1984). Thus, it is the best aspect to deal with in studying the ESL reading process (Goodman, 1970; Flavell, 1976; Brown, 1980).
2. The thinking-aloud protocols can be used to study a reader's cognitive processes (Hayes & Flower, 1980; Olshavsky, 1976-1977; Garner, 1987).
3. The subjects recruited in this study can be considered representative of the Chinese student population in the U.S., because of the diversity of the subjects' academic areas, academic program levels, sex, age, length of being in the U.S., and the geographical locations of the universities they attended while in China.

Limitation

A limitation of this study is that the sample size is

relatively small. Thus, results obtained from this study should be considered tentative until the study can be replicated with a larger sample.

Organization of the Study

Chapter I has served as an introduction to the problem to be examined and the purpose to be accomplished in this study. Also, it has included related hypotheses, definition of terms, the significance of this study, assumptions, and limitation of the study. Chapter II presents a review of literature. It covers three areas: reading in a foreign language, metacognition, and thinking-aloud protocols as a reading research method. Chapter III describes the population and sample, data collection methods and procedures, etc. A description of a pilot study is also included. Chapter IV presents the statistical analysis of the collected data. Chapter V concludes with a discussion of the results and findings of this study. Also, some implications are drawn and suggestions made.

CHAPTER II

REVIEW OF LITERATURE

This study is conducted to investigate the metacognitive strategy use by Chinese students when they read in English and to compare the differences between two groups of Chinese students with different academic backgrounds. Because of the characteristics of the subjects (nonnative English speakers), the problem being investigated (metacognitive behavior in reading), and the instrumentation being used for data collection (the thinking-aloud task, which is a verbal reporting method), this chapter presents a review of literature with focus on three areas: reading in a foreign language, metacognition, and thinking-aloud task as an instrument for investigation of reading strategies. A summary is also provided at the end of the chapter.

Reading in a Foreign Language

In this section, literature on some issues related to reading in a foreign language (FL) is reviewed. These issues are the universality of cross-language reading, differences between reading in a native language (NL) and reading in an FL, and the causes of problems in reading in an FL.

A review of literature on cross-language reading suggests that the processes of reading in all languages share

some commonalities. W. S. Gray was among the first researchers studying the processes of cross-language reading. In 1952, Gray conducted a study on the processes of reading in six languages, which included French, German, English, Chinese, Japanese, and Spanish. A year later, he expanded the previous study by involving a total of fourteen languages. All the subjects recruited in both studies were mature readers in their own native languages. After comparing the subjects' basic reading processes, Gray found that despite some radical differences among those languages, the subjects used basically the same strategies and followed very similar steps during reading. He concluded that the general processes of reading were essentially the same among mature readers of all languages.

An eye-movement study was conducted by Waterman (1971) to investigate the reading patterns of native German and English speaking students when reading in their own native languages. Waterman found that there were no discernible variations between the reading patterns of literate native readers of these two languages.

Goodman (1970) points out that the processes of reading in English would not differ, except in minor degrees, from that of reading in any other languages. Although different syntactic structures exist among languages, the semantic aspect of reading processes does not vary much from one language to another. Readers with different linguistic backgrounds develop and use basically the same reading

strategies, such as sampling, predicting, correcting, and confirming (Goodman & Goodman, 1978). This view has been supported by many subsequent studies (Rigg, 1977; Perkins, 1983; Benitez, 1984; Renault, 1985).

With a close look at the above view of cross-language reading universality, one can notice that this view is actually concerned with reading in different native languages. In Gray's (1956) study, the subjects all read in their respective native languages, and no foreign language reading was involved. So was the case in Waterman's (1954) study. Thus, the universality view is not directly related to reading in a foreign language. However, because reading in a foreign language and reading in a native language are two variations of reading in general, logically, they would both share some of the reading universals.

However, the sharing of universals in cross-language reading cannot overshadow differences that exist between reading in a native language and reading in a foreign language. Generally speaking, reading in a foreign language, if compared with reading in a native language, usually proceeds in a less advantaged situation (Cziko, 1978; Berman, 1984; Carrell, 1981). This disadvantaged situation can be viewed from the perspectives of a reader's knowledge of and proficiency in a foreign language, the reader's schemata which are culturally related to a foreign language, and the native language interference with reading in a foreign language.

Yorio (1971) identifies four factors in reading: [a] knowledge of the language (the code); [b] the ability to predict or guess in order to make the correct choices; [c] the ability to remember the previous cues; [d] the ability to make the necessary associations between the different cues that have been selected. But when one switches from the NL reading to FL reading, the four variables described above would change in a way that Yorio describes as follows:

1. The reader's knowledge of the FL is not like that of a native speaker;
2. the guessing or predicting ability necessary to pick up theoretical cues is hindered by the imperfect knowledge of the FL;
3. the wrong choice of cues or the uncertainty of the choice makes association more difficult;
4. due to the unfamiliarity with the material and the lack of training, the memory span in FL in the early stage of its acquisition is usually shorter than that in one's NL;
recollection of previous cues then, is more difficult in FL than in the NL;
5. at all levels, and at all times, there is an interference of the native language (p. 108).

Such changes normally do not occur in reading in a native language.

According to the schematic model of reading (Rumelhart, 1980), reading is an interactive process between the reader's schemata and the text. When reading in a native language, a reader does not always need schemata about another culture, unless the content of the text he reads involves information about that culture. However, when reading in a foreign language, a reader should always have certain schemata that are culturally related to that particular language; if this requirement is not met, the

reader's comprehension would be either impaired or broken down easily.

For reading in an FL, cultural background knowledge constitutes a major portion of the content schemata and has great impact on reading comprehension. Studies (Steffesen et al 1979; Johnston, 1982; Carrell, 1981) have shown that the implicit culturally-related content knowledge presupposed in a text interacts with the reader's content schemata; such interaction makes a culturally-related text easier to comprehend than a text, which is syntactically and rhetorically equivalent, but less or not culturally related.

Coady (1979) observed that non-native speakers of English from a western cultural background learn English faster, on the average, than those without such a cultural background. This implicates that the background knowledge is an important variable affecting foreign language learning.

A third difference is the factor of language interference. Perkins (1983) suggests that English as a second language (ESL) readers read in English in very much the same way as they read in their native languages, e.g., using their knowledge of the world and contributing to information found in the text. But because of their inevitable deficiency in both foreign language knowledge and cultural content knowledge, their contribution to the text information is often hindered. In other words, reading in a foreign language is subject to interference from the previous language, which is usually the native language. Yorio (1971)

suggests that at all levels and at all time, there is always an interference from the native language. Yorio's opinion could be a little bit overstated, but as an important phenomenon, native language interference certainly affects reading in a foreign language to a significant degree. The issue of native language interference with foreign language is associated with inter-language differences. These differences are often viewed in the aspects of morphology, phonology, orthography, syntactics semantics, and vocabulary (Berman, 1985; Greene, 1983; Hatch, 1974).

The differences between reading in a foreign language and reading in a native language discussed above usually create problems and difficulties for a foreign language reader. These problems can be classified into three general categories: [1] poor comprehension; [2] low reading rate; and [3] short retention (Yorio, 1971; Steffensen, 1979; Connor, 1984).

Although the similar problems can also be found in native language reading, they are understandably far more prevalent in foreign language reading. For quite a period of time in the area of foreign language reading research, there have been some conflicting views on the causes of those problems. These views identify three factors as the causes of the problems, each with its own emphasis. The first view maintains that the problems are derived from a reader's inadequate knowledge of that foreign language; the second view claims that the problems are caused by the reader's

inadequacy of his own native language knowledge and reading proficiency; the third view holds that the problems are a result of the reader's schema inadequacy.

Cziko (1978) identifies three types of contextual constraints: syntactic, semantic, and discourse constraints. His definition of the three types of constraints are as follows:

Syntactic constraints are the constraints provided by the preceding words and the syntactic rules of the language (e.g., the word the will most likely to be followed by a noun. Semantic constraints are those provided by the meaning and selection restrictions of the preceding words (e.g., the words The boy at the beginning of a sentence will most likely followed by a verb phrase describing something a boy is likely to do). And discourse constraints are those provided by the topic of the text (e.g., all the sentences in a reading about cross-country skiing will be in some way related to this topic (p. 473).

Cziko compared the abilities of native speakers of French with that of nonnative speakers of French in using the three constraints during reading a French text and found that even nonnative beginning readers were able to make use of syntactic constraints when reading a French text; but only the advanced nonnative learners and the native speakers were able to make use of semantic and discourse constraints. Cziko suggests that the use of all the three constraints is crucial for reading comprehension because it determines the proficiency level of foreign language reading. But, to be able to use all the three constraints during reading in a foreign language, a reader must acquire relatively high level

of foreign language knowledge and proficiency. Otherwise, good comprehension can not be achieved.

The relationship between ESL learners' syntactic knowledge and their reading comprehension is examined in Devine's (1981) study. Her subjects included both adults and children. She tested them and divided them into either the lower proficiency group or the higher proficiency group. The Reading Miscue Inventory (Goodman & Burk, 1972) was used to analyze the miscues made by the subjects. She found that the higher proficiency group's miscues were more syntactically and semantically acceptable than those of the low proficiency group. Devine suggests that such finding indicates a positive relationship between ESL readers' syntactic and semantic knowledge and reading comprehension.

Berhart's (1983) study reveals the relationship between grammatical ability and comprehension in foreign language reading. In his study, the subjects were fourteen fourth-semester native English speaking students who majored in German. The subjects were given two German expository passages to read, one for silent reading, one for oral reading. They were allowed to read each passage three times and told to provide written recalling. The results showed, among other things, that students with good grammatical knowledge had higher comprehension and more recalling than did those with poor grammatical knowledge. Barnett (1986) suggests that during the foreign language reading processes there is an interaction between the syntactic

factor and the semantic factor, which affects reading comprehension. The reader's syntactic and semantic proficiencies account for the interaction quality. Berman (1984) also points out that efficient reading must rely, at least in part, on syntactic devices to comprehend the text. In addition, successful reading requires the reader to extract the semantic gist of the text. Although Berman was discussing reading in English, his point fits well with reading in an FL.

When one reads in an FL, he uses the same amount of information from an FL text as from an NL text. But, he has to spend more time on either the sampling of the text or the reconstruction of text when reading in a FL because of the inevitable inadequacy in his knowledge of the FL (Yorio, 1971). FL readers usually need to sample much more from a text than fluent native language readers would do in order to derive the same amount of information. Besides, an FL reader may also depend more on his background knowledge of the topic than on linguistic analysis of the text.

Problems of FL reading have also been studied in the perspectives of phonology, syntax, and semantics. Hatch (1974) has examined the effect of phonological deficiency on ESL reading comprehension. She administered a test to fourth-grade native Spanish-speaking children enrolled in two English-reading schools in order to tap distinctions in English phonology not present in Spanish. She found many phonological miscues made by the subjects. For example, the

word fit often was misread as feet. She also found phonological interference in their oral reading. For instance, the sentence The ship docked at the harbor was misread as The sheep docked at the harbor. Hatch noticed that those miscues often resulted in misunderstanding. Hatch claimed that articulation difficulty, caused mainly by phonological interference, creates comprehension problems in ESL reading.

A second view relates the causes of problems of reading in an FL to the reader's knowledge of and proficiency in his native language, (Goodman, 1970; Jolly, 1978; Coady, 1979; Robson, 1981; Benedetto, 1981). Goodman claims that learning to read in an FL should be easier for someone who is already literate in his NL than someone who is less literate in the NL, regardless of how similar or dissimilar the two languages are to each other.

Jolly (1978) conducted a study on an ESL intensive reading program, investigating the factors affecting FL reading ability. His study shows that good reading in an FL is greatly determined by the reader's NL knowledge and reading ability rather than by the reader's knowledge of the FL. According to Jolly, reading in an FL required no more skills than those used by the reader in his NL reading, by transferring them from the NL to the FL. Coady (1979) established a psycholinguistic model for the ESL readers, in which he viewed the problems of reading in a foreign language as a reflection of NL reading problems. In other words, the

reader's behavior in reading in his NL would be precisely reflected in reading in an FL. He points out that a reader could transfer poor reading habits from his native language reading to the foreign language reading, thus, resulting in problems in FL reading. Benedetto (1981) studies the NL and FL reading behavior of advanced ESL readers at college level. She found that even though the ESL readers may acquire sufficient knowledge of a FL which permits less reliance on their NL, they continue to rely on whatever strategies they have developed for use in NL when reading in an FL.

Robson (1981) claims that literacy plays an important role in learning to read in an FL. Robson investigated the relationship between NL literacy and FL acquisition. He found that those who were already literate in their NL had better comprehension than those who were not or half literate in their native languages. Such finding is in agreement with Goodman (1970)'s view on this issue and supported by recent studies on refugee ESL programs in the U.S. (Tollefson, 1985; Hudelson, 1984).

Since the emergence of the schema theory in the later 1970s (Rumelhart, 1981; Carrell, 1981; Steffesen et al, 1979), the difficulty issue of reading in an FL has been explored in a new perspective. According to the schema theory, reading is a process of interaction between the text and the reader's prior knowledge; it involves the reader's knowledge of the related areas, which may be culturally based or biased.

One of the fundamental tenets of the theory is that any text, either spoken or written, carries no meaning by itself; rather, a text provides only directions for the listener or reader as to how they should retrieve or reconstruct meaning based on their own already acquired knowledge (Carrell, 1983). More information is contributed by the reader rather than by the text (Rumelhart, 1980). For instance, Chomsky's Syntactic Structure would be meaningless to a reader who has no knowledge of linguistic theory.

Carrell (1983) identifies two types of schemata: formal schemata and content schemata. The formal schemata refer to the background knowledge of the formal, rhetorical organizational structures of different types of texts; the content schemata refer to the background knowledge of the content area of a text. Studies have shown that FL reading comprehension can be affected by text structure knowledge (Hinds, 1983; Carrell, 1983; Burtoff, 1983). Hinds (1983) compared native Japanese and English speakers in reading texts which were written in a typical Japanese rhetorical style. The texts had both Japanese and English versions, so the subjects could read them in their own native languages. The results showed that the English-speaking subjects had great difficulty with the textual structure, which resulted in comprehension breakdown and low recalling rate.

The effects of different English rhetorical patterns on the reading recall of ESL readers from different linguistic background have been examined in Carrell's (1983) study. Her

study shows that certain types of expository organization are more facilitative of recall for ESL readers than other types. Specifically, the more tightly organized comparison, causation types tend to be more facilitative of recall of specific ideas from a text than is the less tightly organized collection of descriptions. In another related study, Floyd and Carrell (1987) conducted a study to examine the effects of teaching cultural content schemata on ESL reading. Their subjects were intermediate-level ESL students. After being assigned to either the experimental or control group, half of each group received more complete versions of test passages than the other half, and the experimental group was taught appropriate cultural background knowledge between tests. Test results showed that the experimental group yielded better comprehension than the control group.

Johnson (1982) conducted an experimental study to investigate the effects on reading comprehension of building culturally-related content schemata. The subjects in his study were advanced ESL students at college level. There were asked to read a passage about Halloween, which contained both familiar and unfamiliar information related to the subjects' recent experience of that custom. The subjects studied the meaning of the pre-selected unfamiliar vocabulary before reading the passage. Finally, the subjects were tested on their recall of their reading. The study results indicated that prior cultural experience prepared the readers for comprehension of the passage and enhanced information

retention. Johnson concluded that cultural content schemata facilitated comprehension of reading in an FL.

Background knowledge can sometimes even compensate for certain linguistic deficiencies (Ulijn & Kempen, 1979). If the content of a reading material is related to the background knowledge of a reader, then strong input can help comprehension when syntactical control is weak. Johnson (1982) has found that ESL readers have better recalling of a text with a familiar topic than that of a similar text with an unfamiliar topic. The background knowledge will enable the reader to comprehend at a reasonable rate and keep him involved in the material in spite of its syntactic difficulty.

Connor (1984) examined the differences between NL and FL readers' recall of an English expository passage. In her study, the subjects were adult students from three different language backgrounds: English, Spanish, and Japanese. After comparing the reading comprehension of the ESL Japanese and Spanish readers with that of the native English speaking reader, Connor noticed that the native English speaking readers scored significantly higher than did their ESL counterparts in immediate recalling. Connor explains that both the culturally-related content and structurally related patterns had their effects.

Ulijn and Kempen (1976) used the term "conceptual knowledge" in their discussion of FL reading. The conceptual knowledge includes both the reader's knowledge of word

meaning and his knowledge of text content. Under normal conditions, reading comprehension is little dependent on syntactic analysis. Since reading material with an unfamiliar content is difficult to comprehend, poor FL reading is not always due to insufficient knowledge of grammar but may also be due to lack of conceptual knowledge. It is possible that a reader can achieve comprehension in FL reading without mastering the syntactic knowledge of the FL if the reader acquires the conceptual knowledge which can compensate for his deficiency in syntactics. Perkins (1983) claims that when one reads in an FL, he does intend to contribute to the reading process in a constructive manner as he usually does in reading in his NL. However, the contribution may be marred by his possible lack of cultural background knowledge.

It is true that reading in an FL definitely requires the reader to have certain knowledge of and proficiency in that language. Otherwise, there would be no way for the reader to get into the text, even at the decoding level. The role of a reader's native language knowledge and proficiency should not be underestimated either. Due to the reading universals, reading in a foreign language shares some commonalties with reading in a native language, such as the basic requirements and procedures of reading. Once some general knowledge and proficiencies are acquired in one language, one does not need to learn them again when reading in a foreign language. As Coady (1979) points out, many mechanical aspects of reading transfer automatically to reading in a new language. For

instance, readers who can read in an alphabetic language do not need to a "relearn" the principle of the alphabet. Thus, the reader's native language knowledge and proficiency are indispensable for him to both learn and use (reading included) an FL. The schematic view seems to cover a broader domain of the issue. As a lot of studies (Johnston, 1982; Carrell, 1983; Burtoff, 1983) have shown, schemata have a great impact on reading in an FL.

The differences in examining the three factors result in three different views on the causes of these reading problems. A personal reflection of these three views is that the issue over the causes of problems of FL reading should be discussed in a holistical way. In other words, the three factors should be viewed as a whole in terms of how they affect foreign language reading. Each of the three factors do function differently at different levels of foreign language reading. For example, at the beginning level, a reader's basic grammatical knowledge would seem to play a more important role than the schema factor does. But when one reads at a higher level, he usually has acquired a certain amount of knowledge of that particular language; reading comprehension at this level would require more schemata and native language reading proficiencies than merely the foreign language knowledge. Namely, different factors affect FL reading jointly rather than separately. They are equally important in the sense of achieving comprehension in foreign language reading, although their functions vary from one

situation to another.

In summary, reading in a FL is both similar to and different from reading in an NL. The similarities, precisely, universals, refer to the general reading processes and the basic reading behavior and strategies. Their differences lie more in the two different situations in which they proceed. Under most circumstances, one would expect that reading in an FL proceeds in a disadvantageous situation. The three major factors, i.e., the FL knowledge and proficiency, the NL knowledge and proficiency, and schema level, account for the differences between reading in an FL and reading in an NL. They also account for the causes of the FL reading problems, which are poor comprehension, low reading rate, and short retention. The three views about the causes of problems in FL reading are good explorations from different perspectives. Each view has its own merits.

Metacognition

Metacognition has been considered relatively new as a term, but old as a concept (Baker & Brown, 1984; Reynolds & Wade, 1986). Over two decades ago, Goodman (1967) describes reading as a process of interaction between thought and language, an active process of reconstruction of meaning from what the author has been trying to say. Throughout this process, an adequate knowledge of the purpose of reading and of the major variables that affect reading performance are required and employed. Here, the so-called "adequate

knowledge" actually refers to metacognition.

Flavell (1976) was the first one to initiate the term metacognition. Since then, there have been many attempts to define metacognition. The following two definitions are somewhat representative and are widely cited:

Metacognition refers to one's knowledge concerning one's own cognitive processes and products and anything related to them, e.g., the learning relevant properties of information or data. (Flavell, 1976, p. 232)

Metacognition refers to understanding of knowledge, an understanding that can be reflected in either effective use or overt description of the knowledge in question. (Brown, 1987, p. 65)

Metacognition differs from cognition in the sense that it refers to both the awareness and conscious control of one's cognitive actions. In other words, this is the distinction between knowledge and the understanding of that knowledge (Brown, 1980). Addressing the two concepts, Reynolds and Wade (1986) relate metacognition to cognition in the following way:

Cognition, then is the superordinate term under which the more specific cognitive processes of attention, memory, comprehension, and so on are grouped. Analogously, metacognition is the superordinate term under which conscious control of these specific cognitive processes is grouped (p. 308).

Over the issue of the development of metacognition, there is a general consensus which states that metacognition development is related to both age and experiences (Garner, 1987; DeLoache et al, 1985; Flavell, 1987; Brown, 1980; Wellman, 1985). Because of the general assumption that

metacognition develops in children and exists in adults (Wellman, 1985), studies over the issue of metacognitive development have been conducted mainly with children (Flavell, 1987; DeLoache et al, 1985; Brown, 1980). Flavell (1987) suggests that two types of changes and two kinds of experiences account for the development of metacognition in children. The two types of changes are the development of self-knowledge and the increase in planfulness which refers to the ability to make decision in advance about what to do.

As an old saying goes, one begins to know the world by starting to know oneself. For a young reader, beginning to have self-knowledge comes as the first development. According to Flavell (1987), the development of such an internal locus of cognitive control could promote the monitoring and regulation of one's own cognitive processes in later development as a reader. Self-knowledge includes things like the awareness of one's strengths and weaknesses, knowledge about how these variables affect reading; and how reading behaviors could and should be adjusted (Brown, 1980). In essence, this change leads to the developing sense of the self as an active agent and as the causal center of one's own cognitive activities (Flavell, 1987).

A second type of change is the development of planfulness in children. As an ability to plan and determine in advance what to do, planfulness plays an essential role in all problem-solving situations, reading included (Brown, 1980). If a reader can make a prediction of what is going to

happen next, he is more likely to foresee some impending problems; thus, he would be in a good position to adopt appropriate strategies or skills to attack these problems. According to Flavell (1987), the above changes are derived from two kinds of experiences children have gone through which are called socially mediated learning. It is through these experiences that children acquire metacognitive development (Flavell, 1987). The two kinds of experiences involved are: those involving direct practice in metacognitive activities, and those, which, though not metacognitive activities themselves, are heuristic to metacognitive development.

It is interesting to notice that in their discussions of how metacognition develops, all the researchers tend to be vague about the issue of when metacognition begins to develop in children. Wellman (1985) suggests that children must first be able to reflect on a mental world in order to achieve metacognitive development. However he does not discuss specifically when a child begins to have such development. Flavell (1987) mentions the possible existence of inherent aspects of metacognition but he fails to identify what they are. It seems to the researcher that such vagueness is understandable and necessary at the present stage, considering that metacognition, as a type of mental development, does not develop overnight in children; and what is more, such development is affected by personal variables. Thus, it is not feasible to specify a certain age when

children begin to develop metacognition.

Since metacognition is defined as the knowledge that takes as its object or regulates any aspect of any cognitive endeavor (Flavell, 1978), one may rightly ask: what components then constitute metacognition? A review of literature on this issue shows that there are two different views. One suggests that there are basically two primary components in metacognition: comprehension monitoring and cognitive regulation (Baker & Brown, 1984; Brown et al, 1986; Brown, 1980). The other view suggests that metacognition includes four components: metacognitive knowledge, metacognitive experiences, cognitive goals, and strategy use (Flavell, 1987; 1981).

Comprehension monitoring refers to a reader's knowledge and awareness about his own cognitive resources and the compatibility between the reader himself and the reading situation (Baker & Brown, 1984). This function is to maintain the reader's awareness of his own cognitive state, which includes: [1] awareness of the task goal; [2] awareness of what is known; [3] awareness of what need to be known; and [4] awareness of appropriate strategies (Langer, 1986). Cognitive regulation, unlike comprehension monitoring, focuses on strategic intervention during reading. Its main function is to identify comprehension problems and adopt appropriate strategies to deal with them. A basic difference between comprehension monitoring and cognitive regulation is that the former is more knowledge-oriented and the latter is

more action-oriented. However, it should be pointed out that, though classified as two components, comprehension monitoring and cognitive regulation are interdependent on each other in the reading processes.

Flavell's (1981) classification of metacognition involves four components: metacognitive knowledge, metacognitive experiences, cognitive goals, and strategy use. Metacognitive knowledge refers to the knowledge or beliefs about what variables are involved in and affect the reading processes. Its function, as Meyers and Paris (1978) suggest, is to serve an executive function of coordinating and directing the reader's thinking and behavior. Flavell (1987) subdivides metacognitive knowledge into three variables: reader characteristics, task, and strategy use.

The reader variable includes factors like background knowledge, interest, motivation, strengths and weaknesses; they also include a reader's awareness of how those factors affect reading. What is more, they include a reader's knowledge of how to make necessary adjustments with those factors in order to achieve reading comprehension. The task variable refers to the reading goal. Baker and Brown (1984) suggest that there are basically two types of reading: reading for meaning and reading for studying. The purpose of reading for meaning is to achieve comprehension; while reading for remembering requires the reader to do more than just comprehending; the reader needs to retain some learned information for future use. The strategy use variable is

closely related to and determined by the task variable. This variable has two functions: to maintain good comprehension and information retention when reading proceeds smoothly, and to achieve the first goal through strategic intervention when comprehension is broken down.

Metacognitive experiences refer to the feelings and emotions, as well as activities that have something to do with cognitive endeavor (Flavell, 1987). In other words, such experiences are conscious experiences, both cognitively and affectively related. Flavell describes metacognitive experiences as follows:

For example, if one suddenly has the anxious feeling that one is not understanding something and wants and needs to understand it, that feeling would be a metacognitive experience. One is having a metacognitive experience whenever one has the feeling that something is hard to perceive, comprehend, remember, or solve; if there is the feeling that one is far from the cognitive goal; if the feeling exists that one is, in fact, just about to reach the cognitive goal; or if one has the sense that the material is getting easier or more difficult than it was a moment ago. Thus, a metacognitive experience can be any kind of effective or cognitive conscious experience that is pertinent to the conduct of intellectual like; often, it is pertinent to conduct in an ongoing cognitive situation or enterprise (p. 24).

The last two metacognitive components in Flavell's (1981) classification, i.e., cognitive goal and strategy use, overlap to a large extent with the task and strategy use variables mentioned above. It should be noted that some researchers have offered different explanations about metacognitive knowledge. Chi (1987) classifies metacognitive knowledge into two categories: declarative knowledge and

procedural knowledge. Declarative knowledge refers to factual, verbally-expressible knowledge about memory; procedural knowledge refers to the translation of knowledge into effective processes and strategies (Reynolds & Wade, 1986). In addition to the two types of knowledge discussed by Chi, Paris et al (1983) raise one more: conditional knowledge, which refers to the knowledge of when and why to use various strategies.

Garner (1987) suggests that metacognitive knowledge serves as a basis for metacognitive experiences which, in turn, activate the strategy use by the reader. Metacognitive knowledge serves as a guide for the reader's approach to reading; while metacognitive experiences have the functions of checking, either confirming or disconfirming the metacognitive knowledge. Their consequences, i.e., metacognitive strategy use, can also help check metacognitive knowledge, and promote new metacognitive experiences. In short, "each component of metacognition can prompt each of the others" (Garner, 1987, p. 21).

It seems to this researcher that the two types of classification of metacognitive components are essentially the same, despite the differences in some terms used and the number of components classified. Flavell's classification tends to be more abstract and general, while Brown's more concrete and specific; however, both include the same basic elements of metacognition, knowledge and strategic behavior, and both emphasize the interrelationships between/among the

identified components.

After comparing the two views, the researcher tends to agree with Flavell's classification, but with reservation that the last two variables, i.e., cognitive goals and strategy use, which are already included in metacognitive knowledge and experiences, should not be identified as separate components. While there is still a lot of "fuzziness" over metacognition (Garner, 1987), when metacognition is considered to emphasize broad control processes rather than highly specific task strategies (McNeil, 1984), the researcher would argue that it seems appropriate to use relatively more general and inclusive terms in describing and explaining metacognitive phenomena. Otherwise, it would be very likely to result in exclusion of some concepts and behavior which are metacognitive in nature but currently have not yet been clearly specified. Of course, using broad terms could also possibly include some non-metacognitive things. Until metacognition becomes a well studied and well known concept, such problems seem inevitable.

Reading has been considered as a reader-text interactive process (Rumelhart, 1977). Throughout the process, the reader would use all information available and interact with the text simultaneously. The information used comes mainly from two sources. One is the formal knowledge, which refers to linguistic knowledge such as syntactic, semantic, lexical knowledge and the other one is the schematic knowledge, which

refers to the knowledge of specific content areas and textual structure (McNeil, 1984).

Based on their review of the recent reading research literature, Brown et al (1986) specify the following four important variables which are closely related to reading comprehension:

- (1). Text: the feature of reading materials that influence comprehension and memory (for example, difficulty, clarity, structure;
- (2). Task: the requirements of various tasks and purposes of reading that learners commonly encounter in school;
- (3). Strategies: the activities the readers engage in to understand and remember the information from the text;
- (4). learner characteristics, such as ability, familiarity with the material, motivation, and the personal attributes and states that influence learning. Metacognition in reading also involves control or self-regulation; the effective learner must coordinate effectively the complex interaction of these four variables (p. 51).

The knowledge of text covers a broad range of content. Specifically, it includes the reader's sensitivity to the following aspects: text difficulty level, contextual constraints, text structure, and textual anomalies; it also includes the ability to differentiate important information from the secondary ones. Knowledge about reading task is an important variable because it makes the reading purpose clear to the reader, who, as a result, knows what should be retrieved from the text. Reading strategies have some basic functions, such as, to ensure comprehension, to retain knowledge, and to solve comprehension problems during

reading. Among the four variables, the reader characteristics embrace the broadest scope, which ranges from schematic knowledge to intellectual level, from interest to motivation, from strengths to weaknesses.

Baker and Brown (1984) suggest that any attempt to achieve reading comprehension must involve metacognition. Cognitive monitoring is involved throughout the reading processes, keeping the reader on the right track and detecting the occurrence of any comprehension problems. Once a problem is detected, cognitive monitoring is replaced by cognitive regulation, which plays the role of trouble-shooter. Cognitive regulation would decide how to tackle the detected problems according to the reading purpose. If considered insignificant, the problems may be simply ignored and the reading process keeps on moving; if the problem is seen as a threat to comprehension, efforts would be made to solve it by using appropriate strategies.

Good readers are characterized with active use of metacognitive knowledge during reading (Baker & Brown, 1984). They use a variety of metacognitive strategies, such as, task recognition, sampling, selecting, inferring, predicting, confirming or disconfirming, planning and evaluating. From a metacognitive perspective, before one reads the reader should have awareness of the following things: the goal of reading; what is known and unknown; what needs to be known; and finally, the reader should have awareness of what appropriate strategies are going to be used in order to reach the reading

goal. In other words, monitoring of cognition includes the knowledge the reader has about his own "cognitive resources" (Langer, 1986), and the compatibility between the reader himself and the demands of various reading situations.

According to Flavell (1981) and Brown (1981), metacognitive monitoring is conducted through six activities, which are assessing task difficulty, estimating chances of success, specifying appropriate strategies, and monitoring the whole reading process.

Although both poor and good readers use comprehension monitoring, there are differences between their monitoring processes. Brown (1981) has observed that poor readers often exhibit very limited comprehension behavior; they either exhibit too little or too laborious verbal monitoring during reading. In the latter case, the great degree of laborious and verbal monitoring, loaded with too much affective responses, hinders their reading comprehension. Good readers have different monitoring of comprehension. Theirs usually proceeds automatically and subconsciously. When reading is smooth, a good reader proceeds as if "on automatic pilot" (Brown, 1980, p. 455). Although a good reader engages in comprehension monitoring, the procedure is usually not a conscious experience. Conscious monitoring and efforts are not made by the good readers until comprehension failures occur.

Monitoring of cognition is the first stage of one's metacognitive state. Its purpose is to detect any

comprehension problems and try to deal with them according to the reader's goal, reading requirements and personal factors involved in reading. When reading comprehension fails, cognitive monitoring becomes a conscious effort and is followed immediately by regulation of cognition.

Regulation of cognition is the conscious manipulation of one's cognitive strategies. Brown et al (1986) points out that if a reader decides to take some actions, he must choose from the following options: storing the problems in memory as a pending question in the hope that clarification would be coming; rereading the part of the text where the problem occurs; looking ahead in the text; or consulting another source. Langer (1986) suggests that regulation of cognition may also proceed through the following procedures: relating the problem to similar problems; checking problem-solution attempts; revising strategies; and anticipating what to do next.

Brown (1986) claims that regulation of cognition consists of processes that are relatively unstable, without considerable effort, and relatively age dependent. Throughout the reading process, a good reader always engages himself in self-regulatory mechanisms, such as planning his next move; checking the outcome of any strategies one might use; monitoring the effectiveness of any conducted action, testing, revising, and evaluating one's strategies for learning.

Although metacognition is often classified into

comprehension monitoring and regulation of cognition, the two components are interwoven throughout the reading processes. They represent two aspects of the same issue. Whimbey (1975) describes good reading processes as follows:

A good reader proceeds smoothly and quickly as long as his understanding of the materials is complete. But as soon as he senses that he has missed an idea, that the tract has been lost he brings smooth progress to a grinding halt. Advancing more slowly, he seeks clarification in the subsequent material, examining it for the light it can throw on the early trouble spot. If still dissatisfied with his grasp, he returns to the point here the difficulty began and rereads the section more carefully. He probes and analyzes phrases and sentences for their exact meaning. He tries to visualize abstruse descriptions; and through a series of approximations, deduction, and corrections, he makes adjustments and achieves good comprehension (p. 47).

The above description explains well that in the actual reading process, comprehension and cognitive regulation work hand in hand and one can not do without the other.

There are some issues which are left still unsolved in metacognition research. One is that the origin of metacognition is still not clear. Another problem is that the scope of metacognitive concepts and behavior has not been clearly defined yet, causing a lot of controversies over defining a particular behavior and concept. The researcher is under the impression that the biggest problem, which is closely related to the previous one, is the confusion over the so-called "metacognitive strategies" and the "traditional strategies" (Brown et al, 1986). Two reasons account for the confusion. Theoretically, those "metacognitive strategies" are always considered as both new and better than the

traditional ones; but on the other hand, it is often difficult to clearly distinguish one from another, since in most cases, they function in very much the same way; what is more, they even often share the same terms. The researcher feels that the so-called "metacognitive strategies" and the "traditional strategies" actually refer to the same strategic behaviors; they are termed differently because they are interpreted from different perspectives. The emergence of metacognition theory itself does not create a new set of reading strategies; rather, it just offers a new perspective of viewing and explaining the strategies that have been used in our reading. Thus, the confusion over the distinction between "metacognitive strategies" and "traditional strategies" should be cleared by simply avoiding using these terms at the same time.

In summary, metacognition is a relatively new concept that can help researchers obtain insight of the reading processes by examining a reader's related knowledge and behavior. Metacognition develops in children and exists in adults. Although metacognitive components are classified differently by reading researchers, two cores are always included: strategic knowledge and behavior. These core components interact with each other actively to ensure good

Thinking-aloud Protocols

During recent years, verbal reporting (VR) has become a very popular methodology in cognitive research. Many reading

researchers have been using it as a method to study a variety of issues in the reading area (Brown & Day, 1983; Olshavsky, 1976-77; Peterson, Swing, Braveman, & Buss, 1982; Lundeberg, 1987).

There are two important developments which account for the popularity of VR. Studies have shown that the previously used methods, such as reading comprehension assessment, reading rate, etc, which often focus on reading product, are inadequate and have serious limitations in obtaining knowledge about the reading processes (Johnston, 1983; Gray, 1986). Also, the rise in popularity of cognitive science brought forth an increased emphasis on study of the cognitive processes (Thomas, 1983; Harker, 1987; Langer, 1982; Kibby, 1980; McLeod, 1985; Ruddell & Speaker, 1986).

Verbal reporting is a method which requires the subject to report his reading processes by performing two tasks. The first task is called the primary experimental task in which the subject is required to engage in reading comprehension activities. The second task is verbalization, in which the subject is asked to report what he remembers thinking or doing during reading (Garner, 1982; Brown & Day, 1983; Hayers & Flower, 1980).

In a review study of the use of VR in reading research, Afflerbach & Johnston (1984) discuss four advantages of VR as follows:

One major advantage of verbal reporting is that their validity lies on a different set of assumptions from

those of most other methods of investigating cognitive processes. This affords them a valuable role in the collection of converging data sources. Second, under certain circumstances they provide verdict descriptions of cognitive processes which otherwise could only be investigated indirectly. A third advantage of verbal reports is that they allow access to the reasoning processes underlying higher level of cognitive activity. Fourth, retrospective reports are sometimes the only available avenue for historical or genetic analysis of mental processes. Finally, verbal reports allow an analysis of the affective components of reading processes (p. 308).

However, there are also some concerns about the VR data and the way the data are obtained. These concerns focus on four aspects: accessibility, the inadvertent cuing effect on data, the disruption effect, and the memory factor. Accessibility refers to the issue of whether we have access to our cognitive processes; the inadvertent cuing effect refers to the issue of how the researcher's elicitation of the subject's response would affect the subject's VR data; disruption is related to whether the regular discontinuity of the reading processes during the VR procedure would affect the subject's actual reading behavior; the memory factor is related to whether the VR data are a record of the subject's cognitive activities or something else (the concerns over accessibility, disruption, and the memory factor will be discussed in the upcoming sections).

One concern is over the inadvertent cuing effect of VR. For example, by asking the subjects to respond, the researcher may, either consciously or subconsciously, guide the subject's responses. As Bower (1978) points out that in a normal conversation even with a child, the answer one would

get to a question depends very much on what his listener assumes the speaker wants. If this is the case during the VR procedure, the data would certainly be invalid.

The VR methodology has three modes: retrospection, introspection, and thinking-aloud protocols (TAP). They differ from each other in terms of reporting time and the extent to which the subjects are expected to perform the verbal reporting task.

In the retrospection mode, the researcher would ask the subjects to read a text and then provide verbal reports. The produced verbal data are a verbalization of what they can remember thinking or doing during reading. An advantage of using retrospection is that this method does not disrupt the subject's reading process as the other two modes do, thus "freeing the reader from some of the cognitive load" (Afflerbach & Johnston, 1984, p. 311). However, this advantage, on the other hand, could also result in some very serious problems. Since the retrospective verbal reports are given after reading, the memory factor plays an extremely important role. Some critics point out that in retrospective reporting, the great distance between the primary experimental task and the reporting task would cause memory failure, resulting in possibly conscious talking, i.e., an explanatory version by the subject, other than valid reporting. The subjects may provide incomplete reports. Newell and Simon (1972) criticize that the retrospection mode leaves much opportunity for the subjects to mix the current

knowledge with the past knowledge. Thus, distortion of the data through retrospection could be caused by factors like the subject's memory inadequacy, the confounding effects of inference on actual cognitive processes, and the subject's perceptions of the researcher's expectations.

To reduce the retrospection contamination of VR data, the introspection mode is introduced. Unlike its predecessor, introspection requires the subjects to report their thinking and related behaviors on task. In addition, the subjects are told to theorize about the processes of their reading. The introspection mode has a series of advantages. In this mode, the distance between reading and reporting is minimized; there is almost no delay between the two activities; further, the no-delay effect changes the situation in which the subject totally relies on memory to provide verbal reports. Thus, the data reflect the readers' ongoing behavior.

Yet two general concerns are often raised over introspection. It is true that in this mode there is a minimum delay between reading a clause and verbal reporting, but this virtue also has a side effect: it regularly disrupts the flow of the reading processes. The effect of such disruption on the reading processes, "though not clarified" is considered undesirable (Ballstaed & Mandl, 1984, p. 334; Garner, 1987). A second concern is over its requiring the subjects to theorize their reading processes. Afflerbach and Johnston (1984) argue that such requirement imposes an

additional burden on the reader's cognitive processing. A worse effect could be that the subjects would both make verbal reports and then theorize them primarily according to the strategy patterns informed by the researcher. Such theorization by the subjects could confound the VR data.

The third mode of thinking-aloud task (TAT) is a slightly modified version of the introspection mode. The only difference is that this mode does not ask the subjects to theorize their reading processes, thus avoiding the second concern of the introspection mode. Olshavsky (1976-77) discusses five major advantages of the TA mode: [1] the subjects report behavior, rather than the reading processes which are too complicated to report; [2] memory failure is not a problem for the TA mode because there is almost no delay between reading and reporting; [3] the TA data are collected during, not beyond the reading processes, as in the case of retrospection, and are a record of the ongoing behavior, which makes them closely related to the text; [4] the data are analyzed by the researcher for evidence of the subjects' strategy use, which reduces the subjects' burden and enables them to provide more accurate data.

Garner (1987) summarizes the advantages of using the TA mode as a research method as follows:

It is true that memory failure is not a problem, for the distance between reading and reporting is one of seconds rather than of days or weeks. It is also true that knowledge-use discrepancies are rather improbable, as the report is blow-by-blow description of what resources are actually being used; product data...accompany the process report and provide corroborative data on

processing. Furthermore, the highly specific tasks given subjects cannot be described as either "hypothetical" or "general", so those concerns that apply to interview do not pose difficulties for TA protocols. Finally, both consistency in output overtime (the inter-rater agreement and subjects are asked to solve a series of problems for which solution behavior is examined (p. 73).

Olson et al (1984) claim that the primary goal in using TAP is to explicate the comprehension processes at the higher level. According to Olson et al, there are three levels of analysis in reading: the perceptual analysis, the development of within-sentence representation, and the development of integrated representation across sentences. They range from the lower level to the higher level. For a skilled reader, the lower processes usually proceed too rapidly to be aware of, while the higher level processes take more conscious work and effort. The higher level strategies like inference, prediction, hypothesis, evaluation are often used by skilled readers and are most available to consciousness during reading. Thus, Olson et al claim that TAP are best used to study the higher level processes of reading.

Although generally considered better than the other two modes, TAP are not free of concerns and criticism. Actually, it inherits some of the general concerns over the other two modes, for instance the concerns over accessibility, the inadvertent cuing effect, and the disruption effect.

Researchers (Olson et al, 1980 & 1984; Afflerbach & Johnston, 1984; Garner, 1987) suggest that TAP, despite their weaknesses, can and should be used as a tool in the reading

research. The following caution expressed by Olson et al (1984) should be borne in mind when one chooses to use TAP:

First, the focus of the TA task should be to get the subjects to get the content of their immediate awareness rather than to report their explanations of their behavior. Further, subjects should be asked to report what they are thinking about right now, not what they remember thinking about some time ago. The TA task should also have the subject talk about aspects of their immediate experience that they can talk about..... Furthermore, TA data should not be taken as direct reflections of thought processes but rather as data that correlated with underlying thought processes (p. 254).

Because of TAP's great similarities to the introspection mode, the discussion of both the validity and reliability of TAP is usually associated with the discussion of introspection (Nisbett & Wilson, 1977; Ericson & Simon, 1984; Kellogg, 1982; Cavanaugh & Perlmutter, 1982; Garner, 1987; Kail & Bisanz, 1982).

The validity of the introspection mode used to be a controversial issue, which aroused a heated debate during the later 1970s. Nisbett and Wilson (1977) challenged the validity of this verbal reporting mode by casting doubts on its accessibility to the workings of human brains. They argued that human cognitive processes were unconscious; people were unaware of their mental processes, such as the operation of memory, attention, comprehension processes, etc. For instance, when we are asked to explain how we have remembered a date or an address, how we have understood an instruction, usually we find ourselves having a hard time to articulate the processes, because the processes proceed under

our consciousness. Nisbett and Wilson claimed that since we had no access to the insight of our cognitive processes, introspection is an invalid research tool of cognitive processes.

Ericsson and Simon (1980; 1984), Kellogg (1982) dismiss the above view by arguing that the cognitive processes that direct our mental performance are consciously controlled. Unconsciousness, they claim, is relative. In other words, the cognitive processes are unconscious only in a sense that conscious attention is not necessary for their activation (Cavanaugh & Perlmutter, 1982). Thus, our cognitive processes are not inaccessible as assumed. Ericsson & Simon (1980) suggest that accessibility itself does not constitute a problem with the validity of introspection. They point out further that the validity of verbal reports depends on the methods an investigator would use and the condition in which verbal reports are given. They claim that "verbal reports, elicited with care and interpreted with full understanding of the circumstances under which they were obtained, are a valuable and thoroughly reliable source of information about cognitive processes" (p. 247).

Kellogg (1982) voices a view similar to that of Ericsson and Simon in his discussion of the validity issue of verbal reporting. He used introspection as an example. According to Kellogg, introspection itself can be either a valid or an invalid research tool, depending on the demands of a particular experimental task of concept learning. There are

two important components in the process of concept learning, the conscious processes, or hypothesis testing, and the unconscious processes, or feature frequency processing (Reber, Kassin, Lewis, & Cantor, 1980). The conscious processes presumably always occur whenever a person perceptually encodes the stimulus features of a concept exemplar. If the concept learning task focuses on allocating conscious attention to learning processes, introspection can reveal the details of such processes. But, if concept learning relies solely on the feature frequency processing, introspection would have little access to the processes and would be an invalid tool.

The reliability issue of the introspection focuses on the encoding of data. Encoding reliability refers to the degree of agreement independent encoders achieve when encoding protocols. In testing encoding reliability, encoding categories are usually determined in advance through inferences from protocols. Ericsson and Simon (1984) claim that making the encoding process as objective as possible is a central task in using verbally reported information. During the encoding process, the encoders must pay attention to some factors which could affect the consistency and reliability of their judgments. One factor is the extent to which the encoder would make inferences; another factor is the independence degree the encoders have among themselves.

The TA mode includes different types of tasks. Among them, the three most commonly used ones are

sentence-by-sentence talking, selective talking, and after-the-fact talking (Olson et al, 1984).

The first type of task requires the subjects to give verbal reporting after reading each sentence. Such procedure continues until the whole text is completed. This task has two variations of presenting a text to the subjects. The so-called restrictive presentation allows the subjects to have access to only one sentence at a time; the non-restrictive presentation allows the subjects to have exposure to all the previously read sentences as well as the current one. This task also has two variations for verbal report elicitation. One is called the general instruction which elicits verbal responses by asking the subjects to talk about a wide range of things in the text. The other variation is called the focused instruction task, in which the investigator tells the subjects exactly what they are expected to talk about.

The selective talking is the second type of task. In this task, the subjects are told to talk at only certain points specified by the investigator in a text. The third one is the after-the-fact-talking TA task. In a sense, this task is like a retrospection mode, because the subjects are told to talk after they read through a short text. But since the texts used in this task are very short, usually ranging from three to four sentences long, and the memory factor does not confound the verbal reports (Afflerbach & Johnston, 1984), it is still considered as a thinking aloud task. In these two

tasks, the two variations of presentation of texts and variations of response elicitation are also used.

Each of the three versions of TAP has its own unique virtues. Selection of a particular version should be made according to the purpose of research, the experimental setting, and the testing material (Olson et al, 1984). As the frequency of use is concerned, the sentence-by-sentence talking version is the most frequently used one, because it yields more data than the other two. In this proposed study, the researcher intends to use the nonrestrictive presentation along with the general instruction variation of the sentence-by-sentence talking TA task (more discussion related to the this selection is made in Chapter III). TAP has been widely used with all kinds of subjects to investigate a variety of reading issues (Johnston & Afflerbach, 1984; Olson et al, 1980; Olshavsky, 1976-77; Hosenfeld, 1977; Block, 1986; Lundeberg, 1987; Hare & Smith, 1982; Hayers Flowers, 1980).

Olshavsky (1976-77) conducted a study to identify the types of reading strategies used by elementary school students in reading short stories. The subjects were identified as either good or poor readers based on their scores on the Iowa Silent Reading Test. Strategy use by the subjects was related to three factors: interest, reading proficiency and textual structure. Each subject was given a short story to read. The researcher did not prompt the subjects during their reading. They were told to verbalize

their thinking after reading each clause of a story. Based on transcription, analysis, and identification of the obtained protocols, three strategy levels which included ten specific strategies are identified. At the word-related level, there are three strategies: use of context to define a word, synonym substitution, and stated failure to understand a word. At the clause-related level, six strategies are identified: rereading, inference, addition of information, personal identification, hypothesis, and stated failure to understand a clause. The third level, the story-related level, includes only one strategy: the use of information about the story.

Olshavsky's study is considered a pioneer study for its applying the TA protocols to reading research. The researcher concludes that as a direct method of obtaining a record of ongoing reading behavior, the TA protocols prove to be a useful method of investigating reading behavior.

Olson et al (1981) examine the general conventions governing written communication, and the application of these conventions to reading two types of texts, i.e., stories and essays. The subjects recruited in their study were good college readers. Both well-formed and ill-formed versions of short stories and essays were used as testing materials. Following the restrictive presentation procedure of the sentence-by-sentence talking TA task, each subject was told to perform selective verbalization. The subjects were told to verbalize any inferences or elaborations based on their

reading of the current sentence, to assume connections between the current sentence and the previous ones, to make any predictions about what might happen. The subjects' verbal reports were taped and transcribed. Then, the transcriptions were segmented into idea units, which, in turn, were classified by types of statement. The findings of this study through the TA protocols reveal some differences of strategy patterns between story reading and essay reading. The strategies used in a story reading were characterized by prospectiveness. In other words, in story reading, the reader was looking ahead, trying to anticipate the further development of the story. However, the basic orientation of essay reading was retrospective. The reader showed little anticipation of what would come up next, except at the most general level. Commenting on using the TAP as a tool for reading strategy research, Olson et al (1980) claim that the TA protocols are quite revealing of both the knowledge possessed by the readers and the processes in which they read and comprehend a text.

Lundeberg (1987) conducted a study of reading strategies used by expert readers (experienced lawyers and law professors) and novice readers (law students). The TAP were used as the instrument for data collection. The researcher chose the after-the-fact-talking task in her study. After transcription of the TA protocols and analyzing the obtained data, the researcher identified six general comprehension strategies: use of context, overview, rereading analytically,

underlining, synthesis, and evaluation.

An emphasis of Lundeberg's (1987) study was on the metacognitive aspect of the strategy use by the subjects. She found that there was no difference between the expert and novice readers in terms of cognitive regulation, but the expert readers definitely were more benefited by their intimate knowledge of text type.

Block (1986) examined the cognitive strategy use by non-proficient college readers. The subjects, including both bilingual and native speakers of English, were nine college students enrolled in a remedial reading class. The TAP were used in the study to investigate the strategy use by the subjects. Two ninth-grade reading level rated passages from an introductory psychology textbooks were used as the testing materials. During the TA protocol process, the subjects were told to perform the sentence-by-sentence talking task with one passage, the after-the-fact-talk TA task with the other. The study results showed that there was no difference between native speakers and nonnative speakers in the patterns of strategy use. Also, the strategy use differences, which were caused by differences of reading proficiency rather than different linguistic background, accounted for reading performance difference.

These studies provide further evidence that TAP is a useful tool for reading research. As long as the researcher uses it carefully and appropriately, this tool can be very helpful for us to gain more insight knowledge about our

cognitive processes.

In summary, verbal reporting becomes an important method in reading research because of its access to a reader's cognitive processes. Among the different modes of verbal reporting, think-aloud protocol analysis is relatively new. But it absorbs many advantages and at the same time it avoids some disadvantages of the retrospection and introspection modes, which enables it to be a mode superior to the other two in many aspects. Studies in the reading area have shown that think-aloud protocol analysis can and should be used in exploring the reading processes.

Summary

To lay a theoretical foundation for this proposed study, this chapter serves as the review of literature. Three major issues are covered and related literature is reviewed. The three issues are: reading in a foreign language, metacognition, and using thinking-aloud protocol analysis as a reading research method.

When one reads in a foreign language, there are both similarities to and differences from the way he reads in his native language. Reading universals account for the similarities; while both linguistic and cultural factors cause differences and difficulties in foreign language. Until recently, studies on the foreign language reading have focused on the knowledge dimension but neglected the processing dimension. Metacognitive theory provides the

process dimension for foreign language reading research. One of the unique characteristics of the metacognitive theory lies in its holistic view of reading as a process consisting of both the knowledge phase and the strategy phase, i.e., the comprehension monitoring and the regulation of cognition. Good comprehension is achieved through a reader's constant monitoring of his state of comprehension and his instant regulation of appropriate strategies upon comprehension breakdown. Such cognitive processes involved in reading can be either conscious or subconscious; and they are also accessible. Studies have shown that thinking-aloud is a valid and very useful method to explore the cognitive processes of reading.

CHAPTER III

METHODS AND PROCEDURES

This study is conducted to investigate two basic issues. The first issue involves identification of the types of metacognitive strategies Chinese graduate students normally employ while reading in English. The second issue involves investigation of differences between Chinese students with English major background and those with engineering background over their frequency of using the metacognitive strategies while reading in English.

This chapter is a description of the methods and procedures of the study. It includes descriptions of the population, the instrumentation, materials, the strategy categorization, the procedures, and the research design of the study. Also, a description of a pilot study conducted by the researcher is presented.

Description of the Population and Sample

The population of this study consisted of all the Chinese graduate students studying in the U. S. up to the fall semester of the 1989 academic year. The sample used in this study referred to all the Chinese graduate students at three American public universities in the Southwest. All these students were from the mainland areas of China.

The population consisted of two different subgroups: Subgroup I included the Chinese students who had bachelor's degrees in English and were currently studying in the social science areas; Subgroup II included those who had bachelor's degrees in engineering and were currently studying in the engineering areas. Because the existence of two subgroups in the population, it is desirable to use the stratified sampling method to recruit subjects. In this study, the basis for stratification is the subjects' undergraduate and graduate academic majors that involved the characteristics of the sample. The major concern of this study was with the related differences between the two subgroups. The stratified sampling followed these steps: [1]. identifying the accessible population, which included the Chinese student communities at three universities in the Southwest; [2]. identifying the strata of interest according to the undergraduate and graduate major areas; [3]. randomly drawing thirty subjects from each stratum.

The Nelson-Denny Reading Test (Form E) (NDRT-E) was administered to all the subjects. The administration of this test served two purposes. Firstly, it assessed the subjects' English reading proficiency; secondly, the test results were used as reference material when the thinking aloud data were analyzed and interpreted. More discussion about the NDRT-E is provided in the Material section of this chapter.

The NDRT-E test results have shown that there was a significant difference between the two student groups in

English reading proficiency as measured by the test.

Significant difference between the two groups was found over the total grade scale, $t = 9.05$, with $\alpha = .05$. Over the vocabulary section, the difference between the two groups was significant, $t = 7.88$, with $\alpha = .05$. Significant difference between the two groups was also found on the comprehension section, $t = 8.25$, with $\alpha = .05$.

The randomly selected subjects were assigned into two groups. Group I consisted of those who had a bachelor's degrees in English before coming to the U.S. and were currently majoring in the following social science areas: home economics, journalism, political science, educational administration, English literature, Teaching English as a Second Language (TESL), occupational education, adult education, industrial education; Group II consisted of those, who majored in engineering areas during their undergraduate study before coming to the U.S. and currently were studying in these areas: chemical engineering, civil engineering, mechanical engineering, agricultural engineering, agricultural machinery, architecture, computer science, electric engineering, biological engineering. The sixty subjects were selected in the fall semester of the 1989 academic year. All of them met the following requirements:

1. The subject must be from the mainland areas of China.
2. The subject must have completed at least his or her undergraduate study in China before coming to the U.S. for graduate study.

3. The subject must be currently enrolled in a graduate program.

Instrumentation

1. A standardized English reading test, namely, the NDRT-E was administered as part of the study, in order to assess the subjects' English reading proficiency and to help data analysis and interpretation.
2. A verbal reporting mode, i.e., the thinking-aloud mode, was conducted to investigate the subjects' metacognitive strategy use in their ESL reading.

Materials

The standardized reading test used in this study is the Nelson-Denny Reading Test (Form E) (NDRT-E). The NDRT-E is the most widely used test of reading proficiency at college level in the U.S. (Perkins, 1984). According to Brown et al (1981), the primary goal of the test is to provide a trustworthy ranking of American college students' ability in three areas of academic achievement: reading comprehension, vocabulary development, and reading rate. Studies (Heerman and Seltzer, 1983; Perkins, 1984) have shown that the NDRT-E provides predictive, screening, and diagnostic use for the reading proficiency of college students. The NDRT-E is considered a valid norm-referenced survey test for student's reading achievement, assessing individual differences and

deriving group means (Cummins, 1981, p. 58). High reliability findings of the NDRT-E are also reported. For example, test-retest reliabilities for the vocabulary subtest range from .89 to .95; the comprehension subtest reliabilities range from .75 to .82; only the reliabilities for reading rate are slightly lower, ranging from .62 to .82 (Ysseldyke, 1985, p. 1037).

Most international students need to pass the TOEFL before they are accepted by American universities. However, they have no idea about their actual English reading proficiency levels, because as a screening test, the TOEFL does not provide such information. The researcher believes that there is a need to get a clearer picture of the actual English reading level of a nonnative speaker, bearing in mind that in the real learning situation, all students, native and nonnative alike, always use the same textbooks, reference materials, and are always given the same amount of reading assignments. As a standardized reading test, the NDRT-E has the function of assessing a test-taker's reading ability in terms of grade reading levels. Testing nonnative English speaking students with the NDRT-E can help to provide more information about their English reading proficiency levels. The main purpose of using the NDRT-E in this proposed study is to assess the subjects' English reading proficiency and to find out whether there is a significant difference between the reading performance of the two groups on such a standardized reading test. The test results can provide some

useful information about the English reading proficiency level of each individual subject and that about the average English reading proficiency level of each subject group as well. Such information is used in the forthcoming analysis and interpretation of the protocol data in this study.

The NDRT-E includes two sections. Section I, Vocabulary Test, consists of one hundred items, each with five answer choices; Section Two, Comprehension Test, has eight short reading passages and a total of thirty-six multiple-choice questions. The test-takers have fifteen minutes to complete the first section and twenty minutes to complete the second section (with the first minute to determine reading rate). Studies (Gallagher, et al, 1985; Lin, 1986) have claimed that the time factor does not have significant effect on reading performance. In Gallagher et al's (1985) study, it is found that when extra time was given on a timed reading test, no significant advantages were obtained by test-takers; while Lin (1986) suggests that time limits do not jeopardize a test's construct and predicative validities.

An English excerpt entitled "Urban Changes" was selected for being used with the TA protocol task. This selection was a complete section of an article published in International Regional Science Review (Vol. 11, No. 1, p. 324, 1988), a professional journal. It had 326 words, with 16 sentences in total. The readability of the selection was measured to be at the 15th grade level by using the Dale-Chall Readability Formula (the text is attached in Appendix B). Selection of

the text for this study met these two criteria: [1] the readability of the selection must be at college reading level at least (the Dale-Chall Readability Formula was used to determine the readability); [2]. the selection should have the possibly minimized content bias against either group of the subjects, in order to reduce schema effects on the subjects' strategy use (Afflerbach & Johnston, 1984).

In order to examine the appropriateness of using this text in the study, the researcher invited eight of his fellow doctoral students in the reading area to form a panel of experts. The panel members were given copies of two candidate texts; they were asked to read both selections and rate their respective difficulty levels for graduate students from different academic areas. Each panel member worked independently. After close examination, the panel approved the appropriateness of using the Urban Changes selection for this study.

Formation of the Strategy Categories

Based on some related research and studies (Olshavsky, 1977; Lundeberg, 1985; Block, 1986; Brown, et al, 1986; Wiener & Bazerman, 1985), the researcher formed the tentative categories of reading strategies for this study. The process of forming strategy categories began with a close examination of the strategies identified in the related reading research and studies, particularly those using thinking-aloud protocol analysis as a method to investigate metacognitive behaviors.

Understandably, in different studies, reading strategies are often categorized differently. In Olshavsky's (1977) study, strategies are categorized under word-related strategies, clause-related strategies, and story-related strategy, mainly based on text structure levels. Block (1986) classifies all strategies into two categories: the general strategies which include comprehension-gathering and comprehension-monitoring strategies (p. 472), and local strategies which deal with attempts to understand specific linguistic unit (p. 473). Lundeberg's (1987) study has a different way of categorization, which was based on analysis of protocols of so-called expert and novice readers from the law discipline. Her strategy categorization focused on only those strategies frequently used by the law experts and law students.

As reviewed in Chapter Two, metacognitive theory views reading as a process consisting of both comprehension monitoring and cognitive regulation (Baker & Brown, 1984; Brown, et al, 1986; Brown, 1986). This is a good explanation of the nature of reading. The researcher believes that this view itself makes a good categorization of metacognitive strategies and thus strongly feels that strategies can and should be so categorized.

After forming the two general categories, eight basic metacognitive strategies were tentatively identified: awareness, preview, hypothesizing, commenting, inferential thinking, associating, identifying problems, and fixing-up. After conducting a pilot study (for more description, see the

Pilot Study section), the researcher found that these eight categories fit in well with the strategies revealed by the two subjects through their thinking-aloud tasks.

These eight categories function differently throughout the reading processes. The following is a description of these eight strategies.

Categories of Protocols: a Description

I. Comprehension Monitoring

1. Awareness. Awareness refers to a reader's knowledge of his own cognitive state (Baker & Brown, 1984). Such awareness focuses on a reader's awareness and consciousness about comprehension difficulty and comprehension problems.

2. Previewing. Previewing is a strategy a reader uses to look ahead to the content of a text before reading (Wiener & Bazerman, 1985, p. 83). Usually, it occurs right after a subject is given a text to read. This strategy can be observed directly by the researcher.

3. Hypothesizing. Hypothesizing is a strategy of predicting meaning or outcome during reading (Olshavsky, 1977, p. 103). This category classifies a subject's protocols that indicate that the subject makes hypotheses about the text content development.

4. Commenting. Commenting refers to a subject's personal reflection of accomplishment or frustration over reading a text (Block, 1986). This category classifies a subject's protocols of making comments on whatever he or she

feels important.

5. Inferential thinking. Inferential thinking refers to the addition of interpretation or suggestions to the information in a text (Olshavsky, 1977, p. 102). This category classifies a subject's protocols of making inferences based on the comprehended text information and his related background knowledge.

6. Associating. Associating is a strategy used to consolidate comprehension by synthesizing related information.

II. Regulation of Cognition

7. Identifying problems. Between the awareness of a comprehension problem and finding a solution to the problem lies the process of identifying the problem. This category classifies a subject's protocols which indicate the subject's strategies of detecting a problem.

8. Fixing-up. Fixing-up strategies refer to actions a subject takes after identifying comprehension problems (Alessi, Anderson, & Goetz, 1979; Brown, et al, 1986). This category classifies a subject's protocols which reveal his actions taken to solve the identified problems.

Collection of Data

In this study, two types of data were collected. The first type of data came from the administration of the NDRT-E, which revealed the English reading proficiency levels of the subjects. The second type of data was related to the

actual metacognitive strategy use of the subjects during English reading.

To collect the first type of data, the researcher tested the subjects in groups by administering the NDRT-E. The testing and grading procedures set by The Examiner's Manual to the Nelson-Denny Reading Test (Form E) were strictly followed.

Collection of the second type of data was the principle part of this study. This was conducted on a one-by-one basis. The procedures included the following steps:

1. Each subject was informed of the purpose of this study. The researcher told the subject that the thinking-aloud session was just one of the methods used in the reading research area, and was used here to examine how Chinese students read English materials. The subject was told to proceed with his English reading as he usually would.
2. The researcher briefly explained to each subject what the TA task was, and how it proceeded. Explanation was assisted using some examples taken from a previous study in which the TA task was performed.
3. The directions of the TA session were presented to the subject in a written form. The directions, which specified the steps to be followed by the subject during the session, were as follows:

[1]. You are going to read an English passage.

Please read it in a way you normally do your

English reading.

- [2]. When you finish reading a sentence, please stop reading and think aloud about:
 - A. whatever you have comprehended or whatever you feel you have failed to comprehend about the sentence;
 - B. whatever was on your mind when you either understood or failed to understand the sentence.
 - [3]. Repeat Step [2] until you finish a whole passage.
 - [4]. Just verbalize and report whatever occurred in your mind. There is nothing either wrong or right about what you verbalize.
 - [5]. You can talk in either Chinese or English, or in a Chinese-English mixture, as long as you feel comfortable to express yourself.
 - [6]. You can refer to any portion of the passage during reading, whenever you feel it necessary.
 - [7]. Your verbal reporting is audio-taped.
4. The researcher would make sure that the subject knew exactly what he or she was expected to do during the TA session. When necessary, practice time on the TA task was provided.
 5. The researcher audio-taped the subject's verbalization; in addition, the researcher wrote down any observable reading behavior revealed by the

subject during reading. Such observation would be used for later analysis and interpretation of data.

After the TA session, data analysis followed. The data analysis would begin with transcription, categorization, and identification of the TA protocols. The whole procedure was as follows:

1. The researcher transcribed all the recorded verbalizations.
2. The researcher matched the protocol transcriptions with their corresponding clauses in the passages, examine and compare the transcribed protocols with them accordingly.
3. A data sheet was prepared for each subject, with the transcribed protocols matched by their corresponding classifications.

After all the protocols were classified into the two general categories, further analyses were conducted to determine whether they fit in with the definition of the eight strategies. To illustrate the transcribing, analyzing, and categorization, a transcript of a subject's thinking-aloud protocols with protocol analysis and categorization is attached as Appendix E.

Treatment of the Data

This study was conducted to identify reading strategies and to compare the differences in the strategy used by two groups of Chinese graduate students in reading English. The

identification of strategies of the subjects was conducted through the subjects' performance of the TA tasks on an English text. Transcription of the subjects' verbalization, the transcribed protocols, and strategy classification were examined and analyzed. Specific between-group comparisons were also conducted in order to test the null hypotheses of the study.

In this study, t-test was selected as statistical technique for the data analysis. The statistical significance tests were calculated by the formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\left(\frac{(\sum X_1^2 - \frac{(\sum X_1)^2}{n_1}) + (\sum X_2^2 - \frac{(\sum X_2)^2}{n_2})}{n_1 + n_2 - 2} \right) \left(\frac{n_1 + n_2}{n_1 n_2} \right)}$$

where

X_1 = any score from Group I

\bar{X}_1 = the mean of Group I

n_1 = the number of subjects in Group I

X_2 = any score from Group II

\bar{X}_2 = the mean of Group II

n_2 = the number of subjects in Group II

The Pilot Study

To examine the feasibility and the appropriateness of the TA method, the text selected for the study, the transcription work, and the strategy categories, the investigator conducted a pilot study. Two subjects were recruited for establishing inter-rater reliability. Both of them are Chinese graduate students. One had a bachelor's degree in English and currently is studying political science; the other subject had a bachelor's degree in engineering and currently is studying civil engineering.

The two TA sessions were conducted separately but in the same manner. Each session began with the preparation stage at which the researcher informed the subject of the purpose of the pilot study and explained what TA task was. Then, the TA task directions were read and explained; examples selected from a previous study using TAP were used. Practice time was also provided (one subject used about ten minutes for practice; the other did not). When the subject felt ready to start, TA task began. Following the directions, the subject read a sentence and stopped to think aloud. This procedure continued until the last sentence was read and verbal reporting was completed. The subject's verbalizations were tape-recorded. One subject verbalized in English; the other mainly in Chinese, only using a few English phrases.

After the two TA sessions were completed, the researcher listened to the tapes twice before starting to transcribe

them. After transcribing, the researcher matched the protocols with their corresponding sentences. The classification of the protocols was completed by two steps. First, the researcher used the two general strategy categories (comprehension monitoring and regulation of cognition) to analyze the protocols and decided which of the two categories or both categories a protocol fit in. All the protocols fit in well with the strategies. Not surprisingly, the researcher found that some protocols fit in with both categories simultaneously. For example, after reading a sentence, one subject said, "This sentence is a little bit odd, let me re-read it", this protocol revealed both the subject's awareness of a comprehension problem, which fit in with the monitoring comprehension category, and also her use of a fixing-up strategy, i.e., re-reading. Similar protocols explained well the interrelationships between the two general categories.

After the data analysis and categorization, the researcher asked three fellow doctoral students in the reading area for help with the testing of inter-rater reliability. The three raters were told to read the metacognitive strategy categorization and familiarize themselves with the definitions of the strategies specified. Then, they read the transcriptions and classified the protocols. All of them worked independently. The inter-rater reliabilities obtained between each of them and the researcher ranged from 87%, 83% to 81%.

The pilot study had served two purposes. It provided the researcher with a chance to test the appropriateness of the methods, procedures, strategy categorization, the selected text, etc., which in turn, helped the investigator gain confidence and experience in this study. Also, the pilot study enabled the researcher to gain some working experience in TA data collection.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF THE DATA

Introduction

The purpose of this study was to investigate the differences between the Chinese graduate students with an English major background and those with an engineering background over the metacognitive strategy use while reading in English. This chapter presents the results of the statistical treatment of the data and interpretation of the results. The data analyses were focused on differences between the two subject groups over: [1]. the types of the metacognitive strategies used during English reading; [2]. the frequency of using the metacognitive strategies in English reading.

In this study, the subjects' English reading proficiency was examined administering the Nelson-Denny Reading Test (Form E). The strategies used by the subjects were identified through the thinking-aloud protocol data analyses. Also, the frequencies of the metacognitive strategy use of both groups were examined. Comparisons of the two groups' differences were made over the NDRT-E mean scores, types of the metacognitive strategies used, and frequencies of the metacognitive strategy use. Null Hypothesis I and Null Hypothesis II were stated and were tested for statistical

significance. The .05 significance level was set to test the null hypotheses.

Difference Over Types of Strategies Used

Null Hypothesis One states that there is no significant difference between the two groups over types of strategies used in English reading.

In this study, the types of metacognitive strategy used by the subjects in English reading were identified conducting thinking-aloud protocol tasks. The data are shown in Appendix A and Appendix B.

A t-test was conducted to find out whether significant difference existed between the two subject groups in the types of the metacognitive strategies used in English reading. The results of the t-test are summarized in Table I for the two subject groups.

Table I shows that the mean of the strategy types used by the Group I subjects was 7.6 and that of the Group II subjects' was 7.33. The obtained t value of the t-test was 1.55. This value is smaller than the critical value of 2.00 at the .05 significance level. Thus, Null Hypothesis One was not rejected. Therefore, there was no significant difference between Group I and Group II over the types of the metacognitive strategies they used during English reading.

TABLE I
 T-TEST TABLE: TYPES OF METACOGNITIVE STRATEGIES
 USE BY GROUP I AND GROUP II

Group	Mean	Standard Deviation	T-ratio	Critical t Value (.05 level)
Group I	7.57	.50	1.55*	2.00
Group II	7.27	.78		

* Nonsignificant at the .05 level of confidence.

Differences over the Frequency of Using the Metacognitive Strategies

Null Hypothesis Two has stated that there is no significant difference between Group I and Group II over the frequency of using the metacognitive strategies in English reading.

Like the types of the metacognitive strategies used, the frequencies of using the metacognitive strategies were examined analyzing the subjects' thinking-aloud protocol data. The frequency data collected from the thinking-aloud protocol tasks are shown in Table II and Table III.

To test this null hypothesis, a series of t-tests were conducted. The results of the t-test are summarized in Table IV.

For Group I, the mean frequency was 24.70; while the mean frequency for Group II was 44.47. The obtained t value of the t-test was -13.13. This value is greater than the critical value of 2.00 at the .05 significance level. Thus, Null Hypothesis Two was rejected. Therefore, there was a significant difference between Group I and Group II over the frequency of the use of the metacognitive strategies in English reading.

Because Null Hypothesis Two was rejected, additional t-tests were conducted to find out whether significant differences existed between Group I and Group II over each of the eight strategies. The test results are shown in Table V. The results revealed that significant differences existed

TABLE II
 FREQUENCIES OF THE USE OF METACOGNITIVE STRATEGIES — GROUP I

Subject	Strategy							
	Awareness	Reviewing	Hypothesizing	Commenting	Inferential Thinking	Associating	Identifying-Problems	Fix-up
1	4	1	2	3	4	3	4	4
2	3	0	3	5	3	6	3	3
3	2	0	5	4	3	5	2	2
4	3	1	1	6	6	3	3	3
5	5	0	3	4	5	3	4	5
6	6	1	2	3	5	5	6	6
7	1	1	4	3	4	4	1	1
8	3	1	3	6	2	5	3	3
9	4	1	2	4	2	6	2	4
10	2	1	4	3	5	1	2	2
11	4	1	2	5	3	2	4	4
12	3	1	1	3	6	4	3	3
13	6	1	3	1	2	5	6	6
14	4	1	2	2	1	4	4	4
15	4	0	3	4	3	3	4	4
16	3	0	4	3	4	4	3	3
17	2	0	4	6	5	5	2	2
18	3	1	4	1	1	3	3	3
19	2	1	2	3	2	4	2	2
20	2	1	3	4	4	5	2	2
21	4	0	4	2	3	6	4	4
22	3	1	4	3	5	3	3	3
23	2	0	3	4	2	7	1	2
24	2	1	3	6	4	3	2	2
25	5	0	1	3	5	4	5	5
26	2	0	1	4	6	4	2	2
27	4	0	3	5	2	3	4	4
28	6	1	2	4	5	1	6	6
29	2	0	4	3	4	6	2	2
30	5	1	2	5	4	1	5	5

TABLE III
 FREQUENCIES OF THE USE OF METACOGNITIVE STRATEGIES — GROUP II

Subject	Strategy							
	Awareness	Reviewing	Hypothesizing	Commenting	Inferential Thinking	Associating	Identifying-Problems	Fix-up
1	8	0	3	1	2	3	8	8
2	11	1	2	3	2	1	11	11
3	10	0	1	4	2	2	10	10
4	12	0	2	1	1	3	12	12
5	7	1	1	3	1	1	7	7
6	10	0	1	3	2	1	10	10
7	13	0	1	0	1	1	13	13
8	11	0	3	4	1	1	11	11
9	15	0	2	1	2	2	15	15
10	11	1	1	3	2	1	11	11
11	16	1	1	2	1	2	16	16
12	14	1	1	2	2	1	14	14
13	9	1	3	2	4	2	9	9
14	16	0	1	2	1	1	16	16
15	16	0	2	2	3	1	16	16
16	9	1	2	4	2	2	9	9
17	17	1	1	2	2	1	17	17
18	9	1	3	2	4	2	9	9
19	10	0	0	0	1	1	10	10
20	14	0	1	0	3	1	14	14
21	16	1	2	1	1	1	16	16
22	12	0	2	1	2	1	12	12
23	16	0	1	0	1	2	16	16
24	14	0	3	1	1	1	14	14
25	12	1	2	2	1	2	12	12
26	15	1	2	1	2	1	15	15
27	12	1	2	1	3	2	12	12
28	13	1	2	2	1	1	13	13
29	10	0	1	3	2	1	10	10
30	14	1	3	1	2	3	14	14

TABLE IV

T-TEST TABLE: FREQUENCIES OF THE USE OF THE METACOGNITIVE STRATEGIES OF GROUP I AND GROUP II

Group	Mean	Standard Deviation	T-ratio	Critical t Value (.05 level)
Group I	24.07	3.34	-13.13**	2.00
Group II	44.47	7.41		

** Significant at the .05 level of confidence.

between the two subject groups over all strategies except the previewing strategy.

Analysis of the frequency data collected from the thinking-aloud protocols revealed an unexpected result: the subjects of Group I showed a lower frequency of using the metacognitive strategies, while the subjects of Group II showed the higher frequency in the use of the metacognitive strategies during English reading. But a close examination of their frequency distribution showed that the two groups had very different distribution patterns (see Figure I). Specifically, the subjects of Group I showed a high frequency of using the comprehension monitoring strategies like associating, commenting, hypothesizing and inferential thinking; while the subjects of Group II showed a high frequency of using the cognitive regulation strategies like problem identifying and fixing-up.

Summary

Statistical analyses of the thinking-aloud protocol data were conducted to test the stated null hypotheses. Null Hypothesis One was not rejected based on the t-test results. The failure to reject this null hypothesis indicated that there was no significant difference between Group I and Group II over the types of strategies used by the subjects in English reading. The t-test results yielded significant differences between Group I and Group II over the frequency of using metacognitive strategies during English reading.

TABLE V

A COMPREHENSIVE T-TEST TABLE: FREQUENCIES OF THE USE OF
THE METACOGNITIVE STRATEGIES OF
GROUP I AND GROUP II

Strategy	Group	Mean	Standard Deviation	T-ratio	Critical t (5% level)
Awareness	Group I	3.37	1.35	-15.98*	2.00
	Group II	12.40	2.77		
Previewing	Group I	.60	.49	.77	2.00
	Group II	.50	.51		
Hypothe- sizing	Group I	2.80	1.08	4.26*	2.00
	Group II	1.73	.81		
Comment- ing	Group I	3.73	1.36	5.86*	2.00
	Group II	1.80	1.19		
Inferential Thinking	Group I	3.67	1.47	5.87*	2.00
	Group II	1.83	.87		
Associat- ing	Group I	3.93	1.55	7.86*	2.00
	Group II	1.50	.68		
Identifying Problem	Group I	3.37	1.35	-15.98*	2.00
	Group II	12.4	2.77		
Fixing-up	Group I	3.37	1.35	-15.98*	2.00
	Group II	12.40	2.27		

* Significant at the .05 level of confidence.

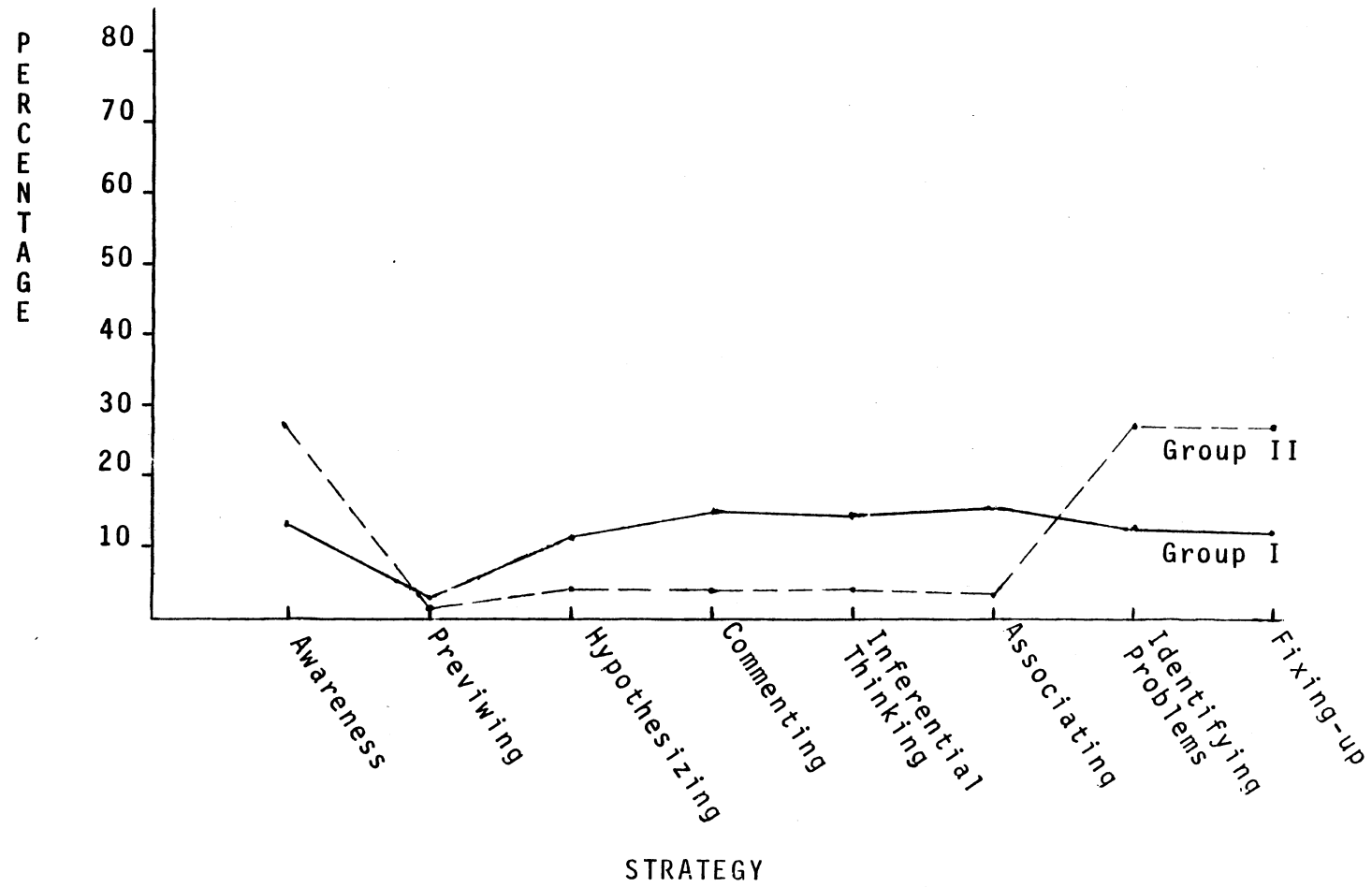


Figure 1. Frequency Distribution of Strategy Use: Group I and Group II

comparatively lower frequency of the use of the metacognitive strategies; while the subjects of Group II showed a comparatively higher frequency of the use of metacognitive strategies. A close look at the frequency differences showed that the subjects of Group I had a very heavy distribution of their strategy use frequency over comprehension monitoring strategies like inferential thinking, associating, hypothesizing, and commenting; the subjects of Group II had a very heavy distribution of their strategy use frequency over the cognitive regulation strategies like problem awareness, problem identification, and problem fixing-up.

CHAPTER V

SUMMARY, FINDINGS, DISCUSSION, AND IMPLICATIONS

Summary

This study was conducted to investigate the metacognitive strategy use by Chinese graduate students in English reading. Specifically, the problems under investigation in this study are:

- [1]. the types of metacognitive strategies used by Chinese graduate students;
- [2]. the patterns of metacognitive strategy use of these students while reading in English.

The sample for this research consisted of sixty Chinese graduate students studying at three American universities in the Southwest. The sixty subjects were randomly selected using the stratified sampling method and then assigned into two subject groups according to their undergraduate and graduate majors. Group I consisted of the subjects, who, with bachelor's degrees in English, were studying in the social sciences areas; Group II consisted of the subjects, who, with bachelor's degrees in engineering, were studying in various science and engineering areas.

The two instruments used in this study included a standardized reading test, i.e., the Nelson-Denny Reading

Test (Form E) and the thinking-aloud task, which is a verbal reporting mode. The Nelson-Denny Reading Test (Form E) was used to assess the students' English reading proficiency. The thinking-aloud task was performed by each subject individually in order to collect data pertaining to investigation of the student's use of the metacognitive strategies.

The two hypotheses involved four basic questions:

- [1]. What types of metacognitive strategies did Chinese graduate students use while reading in English?
- [2]. Were there significant differences between those Chinese graduate students with bachelor's degrees in English and those with bachelor's degrees in engineering over the types of metacognitive strategies used?
- [3]. What were the students' overall frequencies of using the metacognitive strategies in English reading?
- [4]. Were there significant differences between the two groups over the frequency of using these metacognitive strategies?

Findings

1. In Group I twenty-three subjects used all the eight metacognitive strategies. Seven of them used all except the previewing strategy during reading. In Group II, twenty subjects used all the eight metacognitive strategies; six

subjects used seven strategies, and four subjects used five out of the eight strategies.

2. There was no statistically significant difference between the two subject groups over the types of the metacognitive strategies used in English reading.

3. The counted frequencies of the metacognitive strategy use of the Group I subjects ranged from nineteen to thirty-one with the mean of 24.70; the frequency of the metacognitive strategy use of the Group II subjects ranged from thirty-four up to sixty-seven, with the mean of 44.47.

4. Statistically significant differences were found between the two subject groups over the frequency of metacognitive strategy use during English reading. The subjects of Group I had the lower frequency rate of metacognitive strategy use; while the subjects of Group II had the higher frequency rate of metacognitive strategy use. The subjects of Group I showed heavy distributions of the strategy use frequency over the strategies like associating, commenting, hypothesizing and inferential thinking; while the subjects of Group II had heavy distribution of their strategy use frequency over problem awareness, problem identification, and problem solving.

Discussion and Implications

Differences between the Chinese graduate students with bachelor's degrees in English and those with bachelor's degrees in engineering was found not statistically

significant over the types of metacognitive strategies used while reading in English reading. This result indicated that during the process of English reading, Chinese students with an English major background and those with an engineering major background used basically the same metacognitive strategies.

This finding is in agreement with some previous studies. Block (1987) found that all readers, both native and nonnative, used the same reading strategies. Similar findings were also obtained in a study conducted by Olshavsky (1976-1977). Brown (1984) also points out that good readers and poor readers use basically the same strategies during reading. Those findings indicate that knowledge of reading strategies alone does not distinguish good readers from poor ones. It is particularly true with adult readers. According to the current view about metacognitive development (Reynolds and Wade, 1986), metacognition, as an ability, develops in childhood. There are only a limited number of reading strategies; but there are numerous ways of how to use them. Thus, it was not surprising to find the non-significant difference between readers at different proficiency levels in terms of what types of strategies they use during reading.

Significant differences were found between the two groups of Chinese graduate students over the frequency of metacognitive strategy use during English reading. This finding indicated that despite the fact that the subjects of both groups used essentially the same metacognitive

strategies, the way those strategies were used by one group differed greatly from that by the other group. This is an issue more complicated than the issue of non-significant difference over strategy types.

The results of a series of t-tests conducted showed that significant differences existed between the two groups of Chinese graduate students over their frequency of using the eight metacognitive strategies. Such significant differences actually revealed different English reading patterns and processes of the two groups of Chinese graduate students.

Before data analysis, it was assumed by the researcher that the students with English major background would have overall higher frequency of strategy use than those with engineering major background. Unexpectedly, the results turned out to be otherwise. However, a close look at the frequency distribution of their strategy use reveals that for the Group II subjects, the three heaviest distributions of their strategy use frequency were over the strategies of awareness, problem identification, and problem fixing-up (see Table VI). The distribution of strategy use frequency of the Group I subjects indicated a different finding. For Group I there was only 40% of the strategy use frequency distributed over awareness, problem identification, and problem fixing-up. Their three heaviest distributions of the strategy use frequency were on associating, inferential thinking, and commenting, which accounted for 16%, 15%, and

TABLE VI
 FREQUENCY PERCENTAGE OF STRATEGY USE:
 GROUP I AND GROUP II

Strategy	Group I		Group II	
	Subtotal	Percentage	Subtotal	Percentage
Awareness	101	.14	372	.28
Previewing	18	.12	15	.02
Hypothesizing	84	.11	52	.04
Commenting	112	.15	54	.04
Inferential Thinking	110	.15	55	.04
Associating	118	.16	45	.03
Identifying problems	96	.13	372	.28
Fixing-up	96	.13	372	.28

15% respectively.

This significant difference between Group I and Group II showed that while the subjects of Group I reacted more with the deep meaning of the text, the subjects of Group II reacted more with the surface meaning of the text. For the subjects of Group II, too much time and efforts were spent on both problem identifying and problem solving. Table VI showed that the subjects of Group II had very high frequency of using cognitive regulation strategies while reading the selected text. Their total frequency percentage of using awareness, problem identification, and fixing-up was as high as 84%. Evidently, such a reading pattern affected their active use of the comprehension monitoring strategies.

Suggestions For Further Research

For Chinese graduate students, those with bachelor's degrees in English differ from those with bachelor's degrees in engineering significantly in terms of how the metacognitive strategies were used during English reading. This difference revealed their respective reading patterns and reading processes of the two groups of Chinese graduate students. However, it is still not known how closely such significant difference is correlated with the factor of academic background. Usually, social science students are exposed to more descriptive and argumentative essays than the engineering students; and the engineering students have more exposure to narrative materials than the social science

students. Further research is suggested to expand the investigation scope so as to obtain a more thorough understanding of the Chinese graduate students' English reading patterns and processes.

In recent years, thinking-aloud has been used not only as an instrument in reading research (Olshavsky, 1976-77; Ericsson & Simon, 1984; Olson, et al, 1984; Lundberg, 1987); it has also been used as an instrument in reading instruction and studies (Nickerson, 1981; Davey, 1983; Thurmond, 1986; Lochhead, et al, 1987) have claimed that thinking-aloud can be a very effective and useful reading teaching instrument. Only that all those studies were conducted in teaching to reading in English as native language. The researcher believes that thinking-aloud should have a place in teaching reading in English as a second language. Further research is suggested to explore the appropriateness and effectiveness of using thinking-aloud to teach reading in English as a second language.

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APPENDIXES

APPENDIX A

RAW DATA OF GROUP I: TYPES OF METACOGNITIVE
STRATEGIES USED DURING THE
THINKING ALOUD SESSIONS

Subject	Strategy							
	Awareness	Reviewing	Hypothesizing	Commenting	Inferential Thinking	Associating	Identifying Problem	Fix-up
1	+	+	+	+	+	+	+	+
2	+	-	+	+	+	+	+	+
3	+	-	+	+	+	+	+	+
4	+	+	+	+	+	+	+	+
5	+	-	+	+	+	+	+	+
6	+	+	+	+	+	+	+	+
7	+	+	+	+	+	+	+	+
8	+	+	+	+	+	+	+	+
9	+	+	+	+	+	+	+	+
10	+	+	+	+	+	+	+	+
11	+	+	+	+	+	+	+	+
12	+	+	+	+	+	+	+	+
13	+	+	+	+	+	+	+	+
14	+	-	+	+	+	+	+	+
15	+	-	+	+	+	+	+	+
16	+	-	+	+	+	+	+	+
17	+	-	+	+	+	+	+	+
18	+	+	+	+	+	+	+	+
19	+	+	+	+	+	+	+	+
20	+	+	+	+	+	+	+	+
21	+	-	+	+	+	+	+	+
22	+	+	+	+	+	+	+	+
23	+	-	+	+	+	+	+	+
24	+	+	+	+	+	+	+	+
25	+	-	+	+	+	+	+	+
26	+	-	+	+	+	+	+	+
27	+	-	+	+	+	+	+	+
28	+	+	+	+	+	+	+	+
29	+	-	+	+	+	+	+	+
30	+	+	+	+	+	+	+	+

APPENDIX B

RAW DATA OF GROUP II: TYPES OF METACOGNITIVE
STRATEGIES USED DURING THE
THINKING ALOUD SESSIONS

Subject	Strategy							
	Awareness	Reviewing	Hypothesizing	Commenting	Inferential Thinking	Associating	Identifying Problem	Fix-up
1	+	-	+	+	+	+	+	+
2	+	+	+	+	+	+	+	+
3	+	-	+	+	+	+	+	+
4	+	-	+	+	+	+	+	+
5	+	+	+	+	+	+	+	+
6	+	-	+	+	+	+	+	+
7	+	-	+	-	+	+	+	+
8	+	-	+	+	+	+	+	+
9	+	-	+	+	+	+	+	+
10	+	+	+	+	+	+	+	+
11	+	+	+	+	+	+	+	+
12	+	+	+	+	+	+	+	+
13	+	+	+	+	+	+	+	+
14	+	-	+	+	+	+	+	+
15	+	-	+	+	+	+	+	+
16	+	+	+	+	+	+	+	+
17	+	-	+	-	+	+	+	+
18	+	+	+	+	+	+	+	+
19	+	-	-	-	+	+	+	+
20	+	-	+	+	+	+	+	+
21	+	+	+	+	+	+	+	+
22	+	-	+	+	+	+	+	+
23	+	-	+	-	+	+	+	+
24	+	-	+	+	+	+	+	+
25	+	+	+	+	+	+	+	+
26	+	-	+	+	+	+	+	+
27	+	+	+	+	+	+	+	+
28	+	+	+	+	+	+	+	+
29	+	-	+	+	+	+	+	+
30	+	+	+	+	+	+	+	+

APPENDIX C

DIRECTIONS FOR THE THINKING-ALOUD TASK

Thinking-aloud task refers to the cognitive activities conducted by a reader to verbalize whatever occurs in his or her mind during the reading period, such as comprehension, failure to comprehend, thoughts inspired by the reading, etc. Please perform the task by following these steps:

1. You are going to read an English text. Please read it in a way you normally do your English reading.
2. When you finish reading a sentence, please stop reading and think aloud about:
 - [1]. whatever you have comprehended or whatever you feel you have failed to comprehend about the sentence.
 - [2]. whatever was on your mind when you either understood or failed to understand the sentence.
3. Repeat Step 2 until you finish the whole passage.
4. Just verbalize and report whatever occurred in your mind. There is nothing either wrong or right about what you verbalize.
5. You can talk in either Chinese or English, or in a Chinese-English mixture as long as you feel comfortable to express yourself.
6. You can refer to any portion of the passage during reading, whenever you feel it necessary.
7. Your think-aloud protocols are audio-taped for later analysis by the researcher.

APPENDIX D

THE SELECTED TEXT

Retail trade, commerce, services, and small-scale industry have experienced the most radical reform, nearly comparable to decentralization in agriculture, but major industrial enterprises have seen the least changes. Qualified free enterprises with free choice of products, supplies, and clients has been permitted in many commercial, retail, and service areas, resulting in great increases in activities. The chief restriction is on size, generally a formal maximum of about two employees but in practice considerably more. For retail and services, scale economies are generally unimportant, since a heavy spatial concentration of tiny enterprises is a good substitute for a few large shops. Large free markets in some cities have generated much regional trade, interregional trade as well, but transportation scarcity very likely restrains larger spatial realignment (Yingzhong, 1986).

A considerable part of these activities has been performed by peasants permitted to move, some permanently but many more temporarily, from rural to urban areas. Such permitted migration is a significant departure from the previous strict exclusion. It is due partly to unwillingness of urban factory workers to shift to riskier, lower-status service jobs and to the reform-induced redundancy of farm worker. The substantial incomes now earned in agriculture also create capital for urban investment. Moves are encouraged in small- and middle-sized cities, but less so in large cities (Yingzhong, 1986).

The spatial impact may be even stronger with free enterprise in commerce. Individuals have been encouraged to act as middlemen, dealers, and agents connecting producing units in different parts of the country (Yingzhong, 1986). For retail goods, the spatial realignments may not be greatly affected, but links between producing units created by dealers may lay the groundwork for creation of significant horizontal networks. Information about transportation, has been in extremely short supply. These dealer units gradually may develop the cumulative information necessary to create permanent inter-enterprise links on a scale far beyond their own capacity. Attainment of this important potential would be facilitated by the development of wholesaling functions, which has not occurred yet (Henderson, 1986).

APPENDIX E

A TRANSCRIPT OF A THINKING-ALOUD SESSION

(The subject's reviewing behavior was observed). 1*

After skimming through the article, it seems to me
that this article is about reform in China. I spotted
words like Canton, Yingzhong. Reform in China has
achieved great success in every area except in the major
enterprises. I guess an enterprise had to meet some 3
requirements to be qualified for a free enterprise,
since a free enterprise enjoys some privileges. An
enterprise cannot hire as many workers as it wants to.
The maximum number of employees is two. But these
enterprises actually hire many more workers. I think 4
it is stupid for the government to limit an
enterprise's employment activity. In this sentence, 2/7/8
I don't know the meaning of "scale economies". But
according to the context, it may refer to businesses
or economies related to employee size. Is a heavy 5
concentration of tiny enterprises necessarily a good
substitute for a large shop? I don't agree, because a
large shop has something unique to a bunch of small
ones. This sentence confirms my first assumption that 6
this article is about reform in China. Over the past
ten years, interregional trade has been booming. The 4
author is quite right in pointing out that poor
transportation facilities affect greater development
in interregional trade. I guess this paragraph will 3
talk about the farmers' role in the urban reform.
Farmers go to work in the urban areas. Until now, 5

the farmers were not allowed to go to work in urban areas because in China the government was very reluctant to see farmers become part of the urban population. Now the policy has changed a little bit. At least, farmers are allowed to work in the urban areas. I think the author explained very well why such change took place. The two reasons are very true. Increase in the farmers' income also benefits urban development because the farmers like to put their earned money in bank. I think the author is right. Large cities like Shanghai and Beijing are already crowded with people, so it is natural that they don't welcome farmers to work there as smaller cities do. I guess this sentence is about how free commercial businesses are affected by spatial factor. New professionals like middlemen, dealers etc. come to being. This reminds me of auto dealers in Stillwater. Until I came to the U.S., I had a very negative opinion about dealers, because in China words like "dealer", "middleman" usually have negative connotation. I am glad to see that reform has brought forth these new professions. In retailing business, spatial impact is not so big. But dealers contribute a great deal to the establishment of links among enterprises. This is a very important sentence. It is absolutely true that in China information access and availability are very limited, even worse than that of transportation.

Such a situation affects economic development. The dealer's joint efforts would result in cumulative information which is indispensable to establish permanent interenterprise relationships. Wait a minute. I'm not sure of the meaning of this sentence. "Attainment of this important potential"? Let me re-read the previous sentence. Oh, it refers to the information accumulation for the establishment of permanent interenterprise relationship. To achieve this depends very much on developing wholesaling business. Unfortunately, wholesaling business has not been developed well enough. 2/7/8

* Notes: the numerals stand for specified strategies as follows:

- 1 = previewing
- 2 = awareness
- 3 = hypothesizing
- 4 = commenting
- 5 = inferential thinking
- 6 = associating
- 7 = identifying problems
- 8 = fixing-up

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