

英文閱讀過程的追溯研究

中文摘要

一般相信『閱讀理解』包含視覺與非視覺兩方面的學識；而且『閱讀過程』極為複雜亦為眾所熟知的。研究『閱讀過程』與『閱讀理解』同樣繁雜，導致一個人或許必須窮其畢生時光從事鑽研文學及其相關學科。倘若有人能摘錄這些學科所完成的研究將有助於要繼續研究同樣學科愛好者節省一些時光與精力，這才不失為一個完美的設想。

閱讀過程能從各種角度來研討。例如：YORIO(1971)曾經在『閱讀過程』中分析幾個因素。包括1).語言的知識 2).預測正確答案的能力 3).對前文提示的記憶力 4).可在不同的訊息間做需要的聯接能力。根據他的論點，閱讀並非一種單純的行為。閱讀過程中的重點心得。筆者試著表達不同的觀點。亦即閱讀要從各種不同的角度來觀察，就如：1).心理學方面，從理解的研究到意識的研究。2).語言學方面，涉及閱讀過程的攸關的語言因素。3).心理語言學方面，含閱讀理解理論和整合前述語言學與心理學研究心得。4).教授方面，建設改進閱讀理解的妙法。

在這篇研究中第一節自生理學，認知心理學，字形與音素的關係，語音學等各方面的學習為觀點；闡述四項主要閱讀模式。分別為歸納，演繹，交互作用及資訊處理等模式。討論這些理論假說和閱讀模式之後，下一節則討論這些理論假說的隱意，又如『概要理論』，『原文理論』，『閱歷文法理論』等，謹此獻給閱讀教學者參考。那就是說，在組織上這篇研究將理論的與實際的兩方面閱讀理解研究列入考慮的範圍。

這篇研究的實際價值將可幫助開始樂於閱讀者了解閱讀理解過程之研究。借此研究期望能作為未來的研究建立一個有用的踏腳石，甚至閱讀理解過程之更另人滿意理論模式或當作在臺灣教導外語的實用方針。至少，一位閱讀教導者，特別是非母語之目標語言，由他們教學的觀點來說閱讀這篇文獻將會很有裨益。

戴志法寫於 1995年 3月

A Retrospective Study of Reading Process

Abstract

It is generally believed that both visual and nonvisual information are involved in reading comprehension. Also it is known that reading process is an extremely complicated. Research on reading process as well as on reading comprehension is so voluminous that one may have to spend whole life reading the research literature in the field and in the relevant field. It will be an ideal project if someone can summarize what has been done in the field so that the interested readers can save some time and energy if they want to continue doing research in the same field. A retrospective study of the reading research on reading process that has been done in the past decades is so written to meet this need.

Reading process can be investigated from various kinds of perspectives. For instance, Yorio (1971) once isolated the factors that are involved in the reading process. They are: (1) knowledge of the language; (2) Ability to predict or guess in order to make correct choices; (3) Ability to remember the previous cues; (4) Ability to make the necessary associations between the different cues selected. What his statements suggest is that reading is really not a simple behavior. This study is not aimed at constructing any theoretical model to account for such a complicated process. Instead, it is aimed at reviewing and summarizing the important findings in the research literature of reading process. At the first stage, the writer tried to present different researchers' views of reading act. That is, reading is viewed from different perspectives such as (1)

the psychological perspective including a progression from the study of perception to the study of cognition; (2) the linguistic perspective dealing with linguistic factors that are related to reading process; (3) the psycholinguistic perspective including theories of reading comprehension and integrating the previous linguistic and psychological research findings, and (4) the instructional perspective suggesting strategies for improving reading comprehension. In other words, this retrospective study focuses on the introduction and review of theoretical hypotheses and models of reading comprehension processes on one hand, and on the discussion of the implications from prominent reading theories that have impacts on reading instruction in EFL classroom on the other hand. Therefore, this study is to be viewed mainly as a review of theoretical models of reading comprehension process in the field of reading research that has been achieved in the past decades.

In this study, the first section discusses reading research in terms of physiology, cognitive psychology, graphemic-phonemic relations (phonology), and learning, respectively. The second section introduces and describes four major reading models. They are: the bottom-up model, the topdown model, the interactive model, and the information processing model. After the discussion of these theoretical hypotheses and reading models, the following section is the discussion of the implications that these theoretical hypotheses such as the schema theory, the text theory, the story grammar theory may provide to reading teachers. That is to say, this study in its organization takes both the theoretical and the practical aspect of reading comprehension research into consideration.

The practical value of this study will be to help beginning readers who are interested in understanding the research of reading comprehension process. It is hoped that this study can function

as a useful stepping stone for any future research in constructing an even more satisfactory theoretical model of reading comprehension process or as practical guidelines for teaching reading English as a foreign language in Taiwan. At least, a reading teacher, especially a non-native speaker of the target language, will be well benefited from reading this documentary study in terms of their teaching competency. At any rate, the reading teacher will understand what he or she is doing in class when he or she is teaching reading.

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A Retrospective Study of Reading Comprehension Process

0. Introduction

Since Javal (1879) initiated the scientific study of reading a century ago, we have found a multitude of scholars, researchers, and language teachers who have created and developed voluminous studies of reading theories, research and pedagogical strategies. Generally speaking, over the past decades, reading research can be briefly divided into three major perspectives: (1) the perspective of psychological processes including a progression from the study of perception to the study of cognition; (2) the linguistic perspective dealing with linguistic factors that are related to reading process; (3) the psycholinguistic perspective of theories of reading comprehension integrating the previous linguistic and psychological research findings, and instructional strategies for improving reading comprehension.

This retrospective survey focuses on the introduction and review of theoretical hypotheses and models of reading comprehension processes on one hand, and on the discussion of the implications from prominent reading theories that have impacts on reading instruction in EFL classroom. Therefore, this study is to be viewed mainly as a summarized review of theoretical models of reading comprehension process in the field of reading research that has been achieved in the past decades.

In this study, the first section discusses reading research in terms of physiology, cognitive psychology, graphemic-phonemic relations (phonology), and learning, respectively. The second section introduces and describes four major reading models. They are: the bottom-up model, the topdown model, the interactive model, and the information processing model. After the discussion of these

theoretical hypotheses and reading models, the following section is the discussion of the implications that these theoretical hypotheses such as the schema theory, the text theory, the story grammar theory may provide to reading teachers. That is to say, this study in its organization takes both the theoretical and the practical aspect of reading comprehension research into consideration. Although this study is not aimed to be considered as a comprehensive investigation and analysis of reading comprehension research, the writer intends to make it as an introductory documentary study for the readers who are first interested in understanding the research of reading comprehension process. Because my main concern in this study is to explore the potential approaches to teaching Chinese students in middle/high schools to read English as a foreign language, the discussion of the implications from theoretical research becomes indispensable in this study. To help beginning readers who are interested in understanding the research of reading comprehension process, obviously, an understanding of theoretical hypotheses and reading models is necessary. It is hoped that this study can function as a useful stepping stone for any future research in teaching reading English as a foreign language in Taiwan.

I. Components of Reading Processes

Reading is an abstract mental activity that involves complex, interactive processes. There are many factors involved in this complex process. In this section, it is hypothesized that reading components can be analyzed from the aspect of physiology, psychology, phonology, meaning derivation and learning strategies.

1.1. Reading viewed in terms of physiology

Physiology is the first component of reading processes. The physiology component refers to the actual physical processes that

occur in the eye and the brain during reading. As we know, it is very difficult to describe this physiological component in great details because the internal eye-brain interaction is not fully understood, and can not be clearly observed. Because of this weakness in research, we can not assume that any claims in this area should be considered absolutely and definitely accurate. However, we still can suppose that this component of reading is the first stage in the whole reading process.

Javal (1879) showed that in reading, the eyes move across the printed page in jumps, which he called "saccades." These saccades are very rapid, ballistic-like movements that last about 20 milliseconds and bring the print into the visual area of greatest discriminating power, the fovea centralis. Then, the eyes fixate on the print for 240 milliseconds. At the end of each line, a sweep movement, lasting about 40 milliseconds, returns the eye to the next line. In each second of reading, with about four fixations per second, a reader's eyes are in motion only 6% of the time, and the rest of the time is devoted to fixation pauses.

From Javal's study, we realize that Javal's study was mainly concentrated on the speed of reading. He was concerned with the eyes movement during the reading period. His study implied that speed reading was related to the reduction of the amount of fixation time. His study also suggested that comprehension was related to the fixation time of eye-movement. As a matter of fact, latter studies confirm that low-proficiency readers make more and longer pauses at the text lines. That is, these readers need longer time to rest their eyes on the chunks of the line of the text so as to process the information contained in the chunks.

Gilbert (1953) found that functional oculomotor control of the eyes reached maturity around the 9th grade. He pointed out that development of oculomotor control best comes about indirectly from instruction and practice in reading. Only when the eye is fixed can

readers perceive print. Only about 30 milliseconds of the fixation pauses is necessary for seeing print. The rest is devoted to stabilization and processing.

Both studies of Javal and Gilbert suggest that the speed of reading is determined more by processing time, getting information from the retina into long-term memory. And processing time involves an interaction between the reader's knowledge and data in the text as recent researchers point out. So, we find that reading research has jumped from the study of perception to the study of the cognitive structure of the reader's mind.

Another study related to this component is Cattell's analysis (1886). Cattell proposed that the speed of reading is related to the size of the unit of perception. He indicated that adult readers could perceive a whole word faster than its individual letters. Cattell's study was quickly used by the opponents of the phonics approach to justify that the whole word method was better than the phonics method.

Similar to Cattell's study is Huey's study (1908). Huey showed that as readers mature they shift to even longer units of perception. More recently, Bransford and Franks (1974) demonstrated that readers perceive verbal relationships across sentences. They proposed that readers perceived by "chunks" rather than by the whole word. They also claimed that although syntactic structures were necessary for loading meaning into memory, these structures were then mostly lost to memory. It is intergrated meaning that remains in long-term memory.

Buswell (1922) demonstrated that while beginning readers take two fixations to perceive each word, as they mature in reading, the number and duration of their fixations and regressions decrease. Their span of perception increases and consequently, their reading becomes more rapid and rhythmical. However, Adams and Collins (1977) found that adults could perceive whole words because

they had formed associations among the letters in a word and developed schemata or expectations that enabled them to fill in missing letters. They gave an example. Given "th__t," adults can fill in the slot for the missing "a" more rapidly and unconsciously than children.

McConkie and Raynor (1976) also explored this area by examining the eye's limit and span in reading. They found that the eye can fixate on 4-6 letters on either side of the fixation point, and up to 2-3 letters vertically. They offer three possible elements that are involved with guiding the reader's reading activity.

These three elements are: (1) a constant pattern explanation-- a rhythmic eye movement pattern; (2) stimulus control -- feature of the text, and (3) internal control -- sources within the mind. McConkie and Raynor did not explicitly indicate what the internal control sources were, but they recognized the presence of some un-observable process which occurred within the brain during the initial reading phase. Therefore, they suggested that the peripheral vision should be the element that provides for guessing and predicting words in the reading act.

To summarize what has been reviewed, the physiological aspect of the reading process should be viewed as a tentative explanation of reading process. The main reason is that the research on the interactions between the eyes and the brain is still ambiguous. Nevertheless, the studies and hypotheses mentioned above simply suggest some input to the investigation of this initial stage of reading act.

1.2. Reading viewed in terms of cognitive psychology

The second component of reading process is related to the cognitive structure in cognitive psychology. The cognitive psychological component refers to cognitive development, cognitive styles and their relationships with reading behavior. Ample studies of

beginning reading in reading research have shown that children's cognitive development is closely related to their achievement. Similarly, numerous studies have been done in children's literacy. Most educators believe that children learn to read and write prior to formal schooling. That is to say, most children have built all kinds of conceptualizations about the written language system before schooling takes place. Many research results also indicate that the trouble that most primary school children have with reading and writing in schools has something to do with children's cognitive knowledge about the written language system. Therefore, reading processes involved with these troubles can be investigated in terms of cognitive development.

One of the most common areas that has been studied is the relationship between performance on Piagetian conservation tasks, achievement test scores, and reading skills. The Piagetian conservation tasks serve to indicate children's progress from pre-operational to concrete operational thought, a period during which children are normally introduced to beginning reading instruction at school. Edward Haupt and T. Herman-Sissons (1981) explored the relation between Piagetian conservation tasks, IQ scores, and reading test scores by analyzing data on 516 students in grades four through nine. They found that a combination of IQ and conservation achievement scores was the best predictor in 8 out of 24 multiple regression equations, while IQ was the sole predictor in 12 out of 24 multiple regression equations.

In contrast with Edward Haupt and T. Herman-Sissons' research, Carol P. Robeck (1981) found a very minimal and inconsistent relationship between five Piagetian tasks and three measures of reading achievement in 101 first, second, and third grade children. Robeck said, "At all grade levels, many children who were not concrete operational in their performance on the Piagetian tasks were reading as well or better than those who were concrete

operational in their performance. Based on the results of this study, the practice of making a prediction concerning reading achievement using concrete operational performance on Piagetian tasks would be unsound" (1981:7). From Robeck's study we realize that there is an argument presented by researchers. For Robeck, the statement that the child who has reached the concrete operational stage is more prepared for reading instruction than is the child who is in the pre-operational stage is challengeable.

According to Y. Goodman's address at the Claremont Reading Conference (1983), there are seven different areas of investigation of children's literacy before schooling. The first area is ethnographic investigations. Researchers study home environments, watch parents interacting with their children's homework, and so forth. Doake (1981) investigated how children respond to story telling at home. Brice-Heath (1983) spent eight years looking at literacy development in working class communities in the South. The second area is a group of studies looking at how children respond to print awareness in their environment. These studies focus on how children respond to signs, names, and symbols of all kinds (Harste, Burke, Woodward, 1982; Goodman and Altwerger, 1981; Clay, 1979).

Ribovich, J.K. (1978) said that a learning environment could encourage a continuance of children's cognitive development. Ribovich claimed that children would act on stimulating materials and participate in challenging experiences, forming and testing hypotheses naturally. According to the studies in this area, a literacy environment would expose children to a variety of reading experiences with varying materials. For instance, children encountering print on the chalkboard, in written notes, and so forth, will naturally ask questions about what it means. Their spontaneous queries would be encouraged and responded to freely in a naturalistic reading environment. In short, literacy environments help

children develop their knowledge about the system of the written language.

Applebee (1978) and Gardner (1972) examined how children responded to narratives. Eleanor Kirkland (1978:20) found that "language which represents the language systems of children is more comprehensible to them than syntactic patterns that are unlike children's language. For the first stages of reading, this means that stories children dictate from their own experiences will provide the best written materials for reading instruction." This is the third area of children's literacy research. This can be viewed as an empirical support to the schema theory.

The fourth area is done on children's writing production, especially in the development of spelling (Read, 1971; Graves, 1983). The fourth area is more relevant to the literacy development in writing than to the development of reading literacy. The fifth area, according to Y. Goodman, is the studies focusing on what happened to children who had learned to read before they came to school (Durkin, 1966; Clark, 1978). It was reported that school children who had pre-schooling instruction usually had a better reading performance at the beginning stage. But the situation may not remained like this as time went by. That is, other factors involved with reading development may intervene and change its advantageous status of pre-schooling.

Downing (1981) explored the child's metalinguistic awareness. His study provides insights into what knowledge about written language children have. And the last area of children's literacy research is focused on how children respond to written language as an object (Ferreiro and Teberosky, 1979). Ferreiro and Teberosky (1979) found that by the time children are three or four, the following seems to be happening: first, children know written language is not just marks on paper; rather, written language represents something external to the graphic system. They know written

language says something. For instance, a child's question, "What does this mean?" This is evidence demonstrating their awareness of written language. Second, to these young children both pictures and print represent ideas, but pictures and print are different kinds of representations. Children initially believe that print represent ideas, not alphabetic writing. However, they do know that written language says something.

On the other hand, in the reading research literature we also can find much support for a relationship between cognitive style and reading achievement (Cohn, 1968; Higgins and Gage, 1968; Nadien Schaeffer and Schmeidler, 1969; Stone, 1976; Wineman, 1971). All these studies found low but significant correlations between cognitive style and reading achievement.

The study by Stone (1976) included fifth grade children as well as second grade children. Stone found that the contribution of cognitive style was greater for second grade than for fifth grade children. Stone suggested that his findings supported the hypothesis that cognitive style might be a mediating or process variable which had its greatest impact when a person was first learning a series of patterns of skills.

Stone's results were supported by Watson's study (1970). Watson (1970) found that scores from the Reading Subtest and the CEEF of first, second, and third grade children were significantly correlated at the .01 level.

Vernon (1971) noted that in learning to read, the child was required to construct actively first, word structures, then syntactic and semantic sequences in the form of phrases and sentences. Downing (1970, 1971, 1972), Francis (1973), Holden and MacGinite (1972), Huttenloehner (1964), and Reid (1966:13) supported the conclusion that children did not understand the concept of a word as defined by the printer's space and such notions as words were "made of letters". "letters and numbers are different and serve

different purposes", "books contain words" or "stories are in books".

Mickish (1974) also supported the notion that the concept of word boundaries developed not only with increased exposure to a reading situation, but with success in learning how to read. What it means is that reading itself is not simply a matter of visual reflection of printed words. The perception of printed words defined by word boundaries or letters can be treated as a starting stimulus to the reader who needs other mental operations to process the information contained in the words.

Logan (1983) suggested that children learning to read needed a cognitive style that would enable them to reason, think, and solve the problems they encounter in their daily reading instruction as well as in their independent reading. As mentioned in the previous section, reading is not simply a matter of visual reflection of printed words. Reading is a complicated act which bring many factors into interaction. These factors could be linguistic as well as non-linguistic, could be psychological as well as physiological, could be verbal as well as non-verbal, could be mental as well as social.

To sum up, studies of the relationships between cognitive development and reading achievement, the relationships between cognitive style and reading performance have clearly shown to us that it is too easy to say that reading is a complex process that involves a set of complex thought processes. However, it would be more realistic for us to say that reading involves a number of complex processes that require a number of complex sets of thought processes. And it is even more difficult to point out succinctly what factors are really involved with reading act. In addition, we also find that reading and writing development have nothing to do with readiness, as some studies pointed out. We don't need to wait for children or bilingual children to demonstrate fluent oral reading before starting to teach them to read and write. To put it in another way, children's readiness for learning

reading can not be simply judged from its physical growth or any behavioral indications. The children's literacy research shows that children are indeed actively involved in learning reading and writing before they come to school. What we, language teachers, can do to help them is to set up language learning environments where children are comfortable, where they are familiar with the written language, where they are interacting with each other, where they have personal and social reasons to communicate through reading and writing.

1.3. Reading viewed in terms of graphemic-phonemic relations

The third component of reading is the phonological component which contains the grapheme-phoneme relationship. This component refers to the sounds of our language which the reader may decode into graphemes during reading. A phonological process is necessary in reading Chinese as well as in English. Usually, before a reader can engage in phonological processes and the subsequent components of reading, she/he attends to the task of reading. LaBerge and Samuels (1974) suggested that readers could attend to only one task at a time but that readers could alternate attention between two or more tasks and attend to a second task if the first one had been learned to automaticity. Hence, LaBerge and Samuels proposed an "automaticity" model in which the reader began the reading process by first attending to the physical attributes of graphemes. According to them, the reader has to make an association between the graphemes and phonemes. Once this process, the grapheme-phoneme association, becomes automatic the reader can be free to attend to other tasks.

Venesky's (1976) research also pertained to the phonological component of reading. Briefly speaking, Venesky defined reading as the translation process from spelling to sound. He advocated that our orthographic system was not as unusual or full of excep-

tions as one might think. Spelling rules, according to Venesky, should be based on functional spelling units and phonological units. According to Venesky, the task of the reader is simply to relate orthographic patterns to existing phonological habits. Venesky's model of reading process is developmental in nature and describes a relationship between spelling units and sound.

Gillooly (1973) studied the effects of transitional writing system versus traditional orthography on the reading abilities of initial and intermediate aged readers. By transitional writing system Gillooly means one grapheme to one phoneme correspondence. The results of his study indicated that although transitional writing system seemed beneficial to initial readers in word recognition, traditional orthography seemed to be optimal for learning to read. If we follow Gillooly's view and check it with the primary teaching of Chinese reading, we find in the primary school that the first graders are taught reading through transitional writing. For instance, some Chinese characters are too difficult for the young readers to write, the young readers, i.e., the first graders, are told to write in phonetic symbols so that the young reader can communicate with others. The reason why Chinese primary school teachers instruct the first graders more Chinese phonetic symbols than recognition of Chinese characters is that the teachers are trying to help the young readers establish the relationship between graphemes and phonemes. Another obvious evidence is the use of Guo-yu Ri-bao ("National Language Daily News"), which is an important reading materials to most young school readers. Most primary school children in Taiwan read this daily newspaper to develop their reading proficiency and their literacy as well. Therefore, the importance of relating the sounds to graphemes (or words, or characters in Chinese particularly) can not be neglected when we try to understand reading process.

In short, the reading process model of the grapheme-

phoneme correspondence appears to hold a role in the reading research. There is a need for further research in this area. For instance, Gillooly's research suggests that a perfect 1 to 1 grapheme-phoneme correspondence is not a viable way of improving reading proficiency in either reading rate or reading comprehension. Venesky poses some possible steps which a reader passes through when attempting to associate a phoneme to a grapheme using orthographic rules. So far, the reading research has not shown clearly how phonology contribute to reading comprehension, but it does indicate that phonology appears to be a prerequisite to decoding and them, to understanding. The writer would like to suggest that for future research one may try to make use Goodman's "miscue analysis" to investigate how phonological performance influences reading performance. Or, one may try to investigate if the un-pronounceable words interfere with reading comprehension. Anyway, this is an area worth exploring.

1.4. Reading viewed in terms of psycho-linguistics

From the description in the previous sections we learn that reading is related to physiological rubrics, cognitive development and style, and phonology. Now in this section reading is investigated from the psycho-linguistic point of view, which is the fourth component of reading process.

The psycholinguistic model of reading process is supported by such writers as Goodman (1967), Smith (1971), Samuels (1970) and Pearson (1976). The psycholinguistic model of reading process suggests that real reading occurs when syntactic information, semantically associated information and grapheme-phonemic information are all used in concert. Good readers usually maximize their reliance on syntactic and semantic information in order to minimize the amount of print- to-speech processing. The print -to -speech processing is generally referred to as decoding analysis. Poor

readers are so tied up with their search for phonic information to set up syntactic-semantic information that they have less time to attend to the content, the meaning of the text they are reading. On the contrary, during reading, good readers attend to the content rather than decoding words.

Pearson (1976) claimed that the whole psycholinguistic model was operated by the active role of the stored syntactic-semantic information already existing in readers' knowledge. Pearson's study clarifies some of our confusions about differences in reading performance. In other words, the psycho-linguistic model clearly explains the differences between skilled readers and novice readers. To novice readers, the primary target of attention is the identification of phonological information, while to skilled readers, the primary target of attention is the interpretation of meaning through syntactic information.

According to this psycholinguistic component of reading, semantic-associational information includes the readers' knowledge of what words refer to in the real world and how words are hierarchically related to one another. Semantic-associational information can be viewed as the readers' knowledge of semantic-mapping through which the readers try to associate the meaning of words with their own experience, judgment, and expectations. To ESL/EFL students, this is a difficult process that usually causes reading difficulties and failures. Syntactic information refers to the structural relationships among words in sentences. Native language readers by the age of six supposedly have sufficient syntactic competence gained through their speech experience. However, readers of a non-primary language do not have any such privileges. Therefore, native language (L1) readers do not have too many problems in syntactic analysis during reading while foreign language or second language (FL/L2) readers may have various kinds of problems. During reading, L1 readers probably rely more

heavily on semantic-associational information than on syntactic information. On the contrary, FL/L2 readers need to rely on both semantic-associational information and syntactic information. This explains the differences between the native language reading performance and the second language reading performance.

Phonic information includes the readers's knowledge, explicit or implicit, of phonic generalizations, silent letters and letter-sound correspondence. No matter whether in the situation of silent reading or oral reading, the readers, at least FL/L2 readers, need some phonological information to process the meaning represented in print. Phonic information in the psycholinguistic component of reading is necessary. Perhaps, to native speakers of English, phonics may not sound too necessary or important. However, to a second language reader such as a Chinese reader whose language is not a spelling language, phonic symbols play an important role in identifying words and interpreting the meaning of words. If we give an informal survey to Chinese readers, it is very likely to find that if readers can not pronounce the Chinese characters, they do not understand the meanings of these characters. Again, the significance of using phonics approach to teaching reading may be language specific. To some researchers, phonics approach is not an appropriate way of teaching English to English native speakers. Nevertheless, phonics approach may seem to be a useful and practical way of helping L2 readers such as Chinese readers recognize English words, pronounce English words and then facilitate their reading performance.

Anyhow, the psycholinguistic model of reading process emphasizes the active role of the readers' semantic/syntactic knowledge in the whole reading processes. Perhaps, we could hypothesize that reading process brings a reader's phonological, syntactic and semantic knowledge in concert. These compartmental knowledge function complementary in reading.

K.S. Goodman (1967), a well-known reading researcher, claimed that reading was a psycho-linguistic game. His concept of reading stresses the reader's active role in interpreting a set of highly structured cues of different kinds, graphic, phonemic, syntactic and semantic. These sets of cues are made to interact with the reader on the basis of his existing knowledge of them. Sometimes, we find difference between the author's meaning and the reader's interpretation. Such discrepancy is caused by the reader's utilization of the set of textual cues, or different interpretations of the set of cues. These differential uses of cues are manifested in the errors or miscues (Goodman, 1965). Goodman said that readers had ability to spontaneously correct errors which arose when anticipations turned out to be inaccurate. Goodman (1967, 1969) emphasized the importance of readers' hypothesis-formation and perceptual sampling strategies in the process of reading.

Frank Smith (1971:50) proposed that "reading is an aspect of language, only superficially different from the comprehension of speech....." He said that the reader predicted information when he read. According to Smith, this prediction is the reader's pre-conscious use of prior information. Such prediction may function like hypothesis testing. To him, comprehension is a continuing, developmental state, a continuum, the opposite of confusion. Reading comprehension is a matter of making sense of text, of relating written language to what we know already and to what we want to know. Thus, reading comprehension is relative to the individual such as IQ, reading skills, the prior knowledge and the text structure.

Both Goodman and Smith agree that reading is a constructive search for meaning in which the reader's language competence enables himself or herself to create a grammatical and semantic prediction of the meaning of the passage. Goodman (1971) pointed out that a child depending on mediated word identification (letter

by letter sounding) or mediated meaning identification (word by word reading) overtaxed the short term memory. According to Goodman, when a reader depends on these tactics, it is almost impossible to read a passage for meaning the first time since "processing" is not immediate. Smith's statement helps to account for the reason why FL/L2 readers can not compete with L1 readers. A child should be instructed in ways to determine the pronunciation of printed words using sound-symbol associations. This implication supports the writer's assumption that reading process brings a reader's phonological, syntactic, and semantic knowledge in concert.

Tovey (1982) reported that when children learned to make efficient use of all three cue systems (phonic, syntactic and semantic), they were ready to play the "Psycholinguistic Guessing Game." To Tovey, reading is not a process of preceiving all letters and words on the printed page. Rather, it is a process in which the reader uses as little visual information as possible and yet comprehends the ideas being communicated by the author. That is to say, visual information functions as a trigger and initiates the complicated psycholinguistic guessing games. One characteristic of this finding is that no one single linguistic factor takes charge of the whole reading comprehension process.

Since reading is considered as a psycholinguistic guessing game, how do researchers account for the differences in reading performance between a novice reader and a skilled reader. Samuels (1970, 1976) pointed out that the difference between a skilled reader and a beginner was that the skilled reader has "automaticity" which might be gained from overlearning. He said,

At the beginning stage of learning to read, the student's attention is focused on the decoding aspects of the task. Since processing

information for meaning also requires attention, so long as the reader's attention is on decoding, what has been read can not be comprehended." (Samuel, 1976:44).

Samuel's concept of "automaticity" emphasizes the characteristic role of the brain function in the process of comprehension. Samuel's explanation is that the brain's function is limited and the brain can function as a single processor at a time. Therefore, automaticity of decoding will free attention for comprehension of meaning.

Criticizing Goodman's theory of psycholinguistic guessing game, G.M. Ryan (1982) on the basis of his experimental results indicated that Goodman's theory did not provide an entirely valid characterization of the information-processing strategies of slower readers as compared with average 12-year-old readers. Ryan pointed out that the processing strategies of slower and average readers manifested differences which were not predicted by a generalized model of the psycholinguistic operations involved in reading for meaning. Ryan's results showed that Goodman's theory overestimated the extent to which young readers' usage of contextual cues might facilitate their adoption of a perceptual strategy for selectively sampling the graphic display. That is, slower readers are considerably more dependent of the use of graphemic cues for word-recognition than average readers, and average readers made use of selective sampling strategies to a somewhat stable extent only when they were under the conditions that involved levels of syntactic redundancy and semantic context that were far greater than those operative in more normal reading tasks.

So, there is a contradictory point between Goodman and Ryan in view of reading comprehension process. On one hand, Goodman's theory suggests that skilled reading processes involve the construction of miscue responses that retain the grammatical features

of the graphic display. On the other hand, Ryan's results show that readers, slower and average, actively transformed the grammatical structure of textual words, and attempt to integrate word meanings into higher-order semantic structures. But these integrative processes do not necessarily involve the reader's precise processing of the grammatical information encoded in the textual words. Anyway, speaking from Ryan's point of view, Goodman and Burk's (1972) reading miscue inventory does not provide adequate attention to the existence of such constructive strategies in the reader's processing of passages. Unfortunately, up to now, the reading research has not paid enough attention to this controversial issue of reading comprehension process. Perhaps this is an area which deserves researchers to spend more time and wisdom solving and clarifying the confusion.

In short, with the emphasis on the active role of pre-existing syntactic and semantic knowledge in the reader's schema, the psycholinguistic component of reading comprehension process explains why good readers read faster and comprehend better than poor readers. It also helps to account for the reasons why FL/L2 readers are slower than L1 readers in reading speed and in reading comprehension. The research in this aspect tries to move away from the "phonics equals reading" concept. For example, Koler (1968) pointed out that the teaching of reading should move away from the purely visual and purely geometric even from the symbol-sound relations and emphasize the clue-search and information-extracting characteristics of reading.

1.5. Reading viewed in terms of linguistic processing

The earliest statements in the introduction about reading and reading instruction in terms of linguistic principles are made by Bloomfield (1925). Bloomfield felt that students should be taught to discriminate in a left-to-right direction, to name letters of alphabet

without error, to form concepts of regular correspondences between symbols and sounds. Bloomfield's ideas on reading are based on the belief that a good knowledge of the important surface phonological contrasts in English is necessary and important in reading. His concept of reading is a simple phonological decoding process of printed words. Obviously, Bloomfield's concept is based on the structuralism in linguistics. Nowadays, it is very difficult for researchers to accept his concept of reading without raising any doubts. Nevertheless, his concept contributes the significance of linguistic elements in justifying the vague reading process.

C. C. Fries (1945) said that when learning to read, students had to associate visual responses automatically with previously discriminated auditory process. Both Bloomfield and Fries regarded comprehension as a basically passive activity highly dependent on oral language skills. To Fries, the reading process is a kind of high-speed visual recognition of meanings that are already familiar to the reader. Because the development of linguistic science has tremendously made a big jump, it is hard for us to accept both Bloomfield's and Fries' idea of reading act. It is not our main purpose to criticize the weakness of their points of view regarding reading activity. On the contrary, it is valuable to point out that at their time researchers or linguists have already noticed the significance and importance of linguistic elements in accounting for the complicated reading process.

Because reading is relative to word recognition, syntax, semantics and comprehension, it is inevitable that many linguistic studies have something to do with reading research. In the following, we will focus our discussion on the relationships between linguistic research and word recognition, oral reading and meaning \ understanding. As for the role of syntax and semantics in accounting for reading process will be discussed after this section.

Regarding reading comprehension instruction, most linguists

agree that the so-called "synthetic phonics" teaching method, namely, the method of blending together individual phonemes, is a questionable way of teaching reading. Most linguists think that parts of words should not be isolated. Bloomfield and Fries think that "words" are the smallest unit of reading instruction. Lefevre (1964) showed that the basic unit for teaching reading was the sentence rather than the phoneme or word. Lefevre maintained that having children focus on single words led them to pronounce individual words as if they were whole sentences. If doing so, the natural flow of speech was lost and comprehension difficulties ensued. For oral reading, Lefevre suggested that attention to intonation was necessary for sensitivity for the nuance of language, appreciation of dialects, access to poetry, and responsiveness to forms of literature. According to Lefevre, poor oral reading results in comprehension problems. He also suggested that word by word reading was highly related to poor comprehension. Lefevre has tried to account for reading failures in terms of synthetic phonics approach.

A review of the literature in the field of linguistic research, we find that linguists have also pointed out the importance of the complexity of the sentences as an important determiner of comprehension. There appears to be a general agreement that material written in syntactic form which matches the syntactic form of the reader's background knowledge is the easiest to understand. This statement explains why FL/L2 readers can not comprehend as well as L1 readers. Frank Smith (1971) suggested that attempting to simplify the syntax of materials to be read by older, linguistically more mature students could actually adversely affect their comprehension. Surprisingly, a great number of local English teachers in most Taiwan EFL classrooms prefer using the simplified readers to the unabridged original readers when teaching reading comprehension. If Smith's statement is scientifically and definitely accu-

rate, then the EFL students in Taiwan must have been wrongly or improperly taught. Anyway, it is a good thing to know that simplified readers may not necessarily facilitate EFL/ESL reading comprehension.

Shafer (1974) points out that in reading, the reader had to go through a whole process of relationships involving movement between surface and deep structures to get from a sentence, "See Jane run," for instance, and then to an understanding of what meaning is involved. Generally speaking, much of the work from linguistics helps to stress that understanding, not word production, is the goal for reading. Some linguists also claim that deriving meaning does not involve the precise translation of individual words into meaning which is built into understanding of sentences, and so forth. For instance, M. Hall (1972) listed seven linguistic principles which called for using a language experience approach to instruct beginning readers. J. Downing (1970) also listed some linguistic support for initial reading instruction.

On the other hand, because dialects are related to reading instruction, linguistic research also provides a healthier and reasonable understanding of the language to account for the various types of differences in children's reading performance, especially the differences made by the children who speak a dialect. Linguistic studies have pointed out that the term "dialect" is descriptive but not evaluative. This idea is very important. Dialects are as regular and as functional as standard forms of English. In light of this, dialectal differences may contribute some interferences in the whole process of reading. To put in other words, reading comprehension process is also involved with dialectal or social variables.

To conclude, there is a growing disenchantment with the topics of linguistics and reading because we still have many reading problems unsolved and the linguistic research still cannot help us

to clarify them. Promisingly speaking, it is hoped that linguistics and psycholinguistics combined with psychology, neurology, sociology, and pedagogy, can take us further toward the goal of understanding the complex process of reading in the future.

1.6. Reading viewed in terms of meaning-deriving

The component of reading comprehension in view of meaning derivation refers to a reader's deriving meaning of the text by means of managing language elements. For example, if a reader understands the language elements of a reading text, s/he then has to try to derive the meaning out of the text. To derive the meaning, a reader may have to rely on either linguistic elements, or para-linguistic elements, or both. The act of understanding language used in the reading text can be analyzed in terms of three main sub-components: (1) semantics-- the information or message represented by the lexicons as well as by the particular physical structure and order of the written language; (2) syntax--the knowledge of sentence structure in relation to thought patterns; (3) experience -- the prior knowledge that a reader possesses which serves as reservoir or bank to draw upon when interpreting the reading text. These sub-components are discussed below.

A. Semantics

There are many interesting models of reading which describe the way in which meaning is derived from the graphic representation of a word. According to LaBerger and Samuels' (1974) assumptions, the semantic meaning of a word can be obtained directly from phonological word processing. In fact, in LaBerger and Samuels' ideas, once a word is recorded phonologically, a child makes a connection to his/her oral language, thereby determining the semantic component of a given word. Likewise, Frank Smith (1971:17) in his idea of "immediate word recognition" suggests that

the word meaning can be directly obtained from the distinctive feature of a word.

In his model Gough (1972) proposed a hypothetical character named "Merlin" who was responsible for the syntactic and the semantic rules of our language. Gough based his model on the assumption that letter-by-letter processing occurred in the primary memory and that the reader had to process the information very quickly in order to progress from serial processing to parallel processing. According to Gough, if it takes too long to read a given word, the content of the preceding words will get lost from the primary memory. Thus, comprehension will not occur. For this reason, Gough suggests that beginning readers should learn to read faster. That is why speed reading sometimes is necessary.

As stated earlier, Smith (1971) and K. Goodman (1967) advocated a prediction and hypothesis formation strategy of reading. They perceived reading as an act in which the reader was constantly formulating hypotheses, then through the rejection or confirmation of these hypotheses, the reader obtained meaning. Gough, in contrast, stated that readers should not engage in guessing. He argued, "The good readers need not guess; the bad should not." (Goodman 1971:32).

McConkie and Raynor, Gough, and LaBerge and Samuels regard reading as a word-by-word, letter-by-letter, and text-driven process. To them, the reader is like a plodder who guesses only because he/she does not decode the word rapidly enough to get the correct word. On the contrary, Smith and Goodman view reading as a holistic, concept-driven process. As far as deriving meaning from reading the written text is concerned, there are two opposite models; that is, the text-driven model, which is also known as the bottom-up model, and the top-down model, which is not text-driven

Their process of deriving meaning of a text is like a black box.

Individual researcher touches perhaps only one simple face of the main subject matter. None is able to capture the whole picture of the total reading process. For instance, Pearson and Studt (1975) in their study emphasized the importance of context and word frequency in the semantic component of reading. In their study the term context may refer both textual and non-textual context, or both linguistic clues or non-linguistic clues. Similarly, Chomsky (1972) suggested that there might be a developmental sequence in the acquisition of certain syntactical structures. In this respect Chomsky emphasizes the importance of syntactic role in deriving meaning from the written text. In the writer's personal point of view, any particular way that a child uses to interpret any given syntactic structure will indeed affect his/her semantic understanding of the syntactic structure, and vice versa. To put in another way, deriving meaning from the written text can not simply rely on one single phase of linguistic element of the reading text.

So far, in this section we have accounted for how meaning is derived, and we assume that the derived meaning is stored in the reader's memory. We also understand that our understanding of models of text comprehension will be benefitted from attention to the way in which changes in linguistic theory have influenced to attention to the way in which changes in linguistic theory have influenced perceptions of text, which is known as the linguistic product. For instance, Chomsky's most significant insight--that sentence-length texts can be analyzed in terms of levels of structure, including the surface level form in which they are spoken and the deep structure level which characterizes their essential syntactic relations has survived much about the relation between syntax and semantics and about the level at which meaning is determined.

Let's elaborate Chomsky's view to a further extent. At what level is meaning derivation assigned? According to standard the-

ory of transformational syntax (Chomsky, 1965; Katz and Postal, 1964), the answer is that the semantic component operates on the base component of a sentence, which is a deep structure representation. That is, meaning derivation is assigned at a pre-transformational level in sentence production. Transformation may not introduce meaning--they only operate on the base component, transforming it from its deep structure form, to its surface form. After a sentence's base component is determined, "projection rules" come into play. They solve the "projection problem" by mapping the meanings provided by the dictionary onto the syntactic structure given by the grammar. This theory is usually referred to as interpretive semantics.

Another school of semantics, generative semantics (Lakoff, 1963; Postal, 1971), provides another syntactic solution to the problem of where to fit the semantic component in a theory of language. It suggested that the base component itself ought to be the semantic interpretation of a sentence. Therefore, here is a "deeper" deep structure than the one proposed by the interpretive semantics group. According to the generative semantics, the elements of this new base component may differ from the lexical items of surface structure and the transformations, which act on it, do the meaning mapping that was performed by Katz and Fodor's projection rules (Katz and Fodor, 1963).

In addition, regarding the assignment of meaning of a sentence, Fillmore (1968:88) proposed his case grammar to support generative semantics by stating that Chomsky's deep structure is "an artificial intermediate level between the empirically discoverable 'semantic deep structure' and the observational accessible surface structure." Fillmore's model claims that a sentence consists of a verb and one or more noun phrases, each associated with it in a particular case relationship. His case grammar is employed to describe the representation of comprehension in the schema theory

which will be discussed in Section III. 3.

The meaning of a written text is not only related to the structure of individual sentences in the text, but also related to the over-all structure of the text. That is, meaning is also associated with the coherence and unity of the written text. In dealing with the meaning of a written text, Hason (1976) explored the concept of cohesion, which makes an essential difference between a text and a sentence. He said, "A text is a unit of language in use. It is not a grammatical unit, like a clause or a sentence.... A text is best regarded as a semantic unit: A unit not of form but of meaning" (1976:1-2). To him, the pragmatic (language in use) and semantic (unit of meaning) aspects of text are evident from the fact that cohesion is a matter of presupposition. That is, cohesion happens when some element of discourse depends for its interpretation on another.

For analyzing coherence of a text, Halliday and Hason (1976) gave detailed attention to five semantic relations that establish the cohesion which is necessary to text. They are: reference, substitution, ellipsis, conjunction, and lexical cohesion. All these devices more or less play some significant role in deriving the textual meaning.

To illustrate this, let us quote Levy's study (1979) which emphasizes the role in providing cohesion of the mental processes brought to bear on text by both the speaker/writer and the listener/reader. Another evidence is Chafe's study (1979) which describes principles of coherence within both sentences and larger units of narrative. Chafe claimed, "Paragraphs... emerge from spontaneous spoken language" (1979:162) and "as one moves from focus to focus or from thought to thought, there are at certain points significant breaks in the coherence of space, time, characters, events, and worlds. Such breaks lead to conspicuous hesitations and are identified as paragraph boundaries in written lan-

guage" (1979:180). Nevertheless, regarding the deriving meaning from a written text, Spiro (1980) has another point of view. He said,

Meaning does not reside in words, sentences, paragraphs, or even entire passages considered in isolation. It will be argued that if connected discourse is analyzed at each of those levels (words, phrases, sentences, paragraphs) taken out of context, the result is an incomplete understanding of that level's meaning in use. What language provides is a skeleton, a blueprint for the creation of meaning. Such skeletal representations must then be enriched and embellished so that they conform with the understander's preexisting world views and the operative purposes of understanding at a given time. This process of knowledge-based, conceptually influenced, and purposeful enrichment in comprehending language is what is referred to as construction.

According to Spiro, constructed meaning is the interactive product of text and context of various kinds, including linguistic, prior knowledge, situational, attitudinal, and task contexts, among others.

In conclusion, although the various semantic models of reading differ from one another, we find one consistent factor – semantics is a major contributor to the understanding aspect of the reading process. Where semantics end and syntax begins is difficult to say because the two are so tightly bound. This is again another area worthy of further exploration in the future.

B. Syntax

Syntax plays a crucial role in reading process. Syntactic complexity is related to reading comprehension. Pearson (1974-1975) examined the syntactical structures of sentences and found that students prefer longer, more complex sentences and cue-present sentences to shorter ones with no cue. When asked to answer a question, students nearly always answered with a cue present. As for recalling the text, Pearson stated, "In order to store a causal relation the subject virtually cannot help but to store it in a unified subordinated chunk." (1975:187). Pearson's results provide us evidence for the "chunk" model in reading in which primacy is given to semantic chunks rather than syntactic chunks. In other words, reduction of the number of subordinating constructs and the length of a sentence will not necessarily result in better understanding because complex sentences may carry more semantic information.

Guthrie and Tyler (1976) also examined effects of semantic and syntactic structures on the ability of good and poor readers to recall sentences. Their results indicate that meaningful sentences are easier to recall than anomalous ones which, in turn, are easier to recall than random strings of words. Guthrie and Tyler conclude that low comprehension is due to incomplete decoding during silent reading. The difficulty in recalling randomized strings of words is an obvious evidence showing how syntax may interfere with reading comprehension.

In addition to Guthrie and Tyler's study, Isakson and Miller (1976) also explored the effects of syntax on reading. They conclude that high-comprehenders are more sensitive to syntactic and semantic constraints than are low-comprehenders. In their findings we learn that once words are recognized, the use of language structures may determine comprehension. Why are the high achieving readers more sensitive to syntactic structures than the low achieving readers? The answer is that the low achieving

readers rely more on interpreting individual words in sentences while the high achieving readers rely more on the organization of the text and the structure of sentences. In other words, the low achieving readers use more bottom-up reading process, and the high achieving readers use more top-down reading process.

More supports to show the effects of syntax on reading comprehension can also be found in the studies by Distefano and Valencia (1980). They studied the effects of syntactic maturity on comprehension of graded reading passages. They found that increasing syntactic complexity within a given grade level adversely influenced reading comprehension.

As we know that oral language and written language differ from each other. How about their respective effects on reading? Ruddell (1965) studied the effects of the similarity of oral and written patterns of language structure on reading comprehension. He found that comprehension was impeded when syntactic patterns of the text did not match those of children. Sachs (1967) and Franks (1971) explored the recognition and memory of syntax and semantics in connected discourse. They pointed out that comprehension occurred by analyzing a sentence into its basic constituents. Sach's study showed that memory for any aspects of sentence structure faded quite rapidly, while memory for the semantic "gist" of a sentence was remarkable stable. Bransford and Franks (1980) also found that comprehension was better characterized by synthesizing constituents into some semantically intergrated chunk.

In conclusion, each of the aforementioned studies indicate that both syntax and semantics contribute to the understanding of reading. And both are closely related to one another if not in fact intertwined. Whether it may be called "Merlin" as Gough proposed or "automaticity" as Samuels proposed, some function in our brain utilize syntax and semantics as a cue to learning during the read-

ing process. The linguistic research of reading comprehension has progressed from word-by-word comprehension, to sentence comprehension and finally to text comprehension. For instance, Miller (1962); Miller and Isard, 1963; Gough, 1965; Slobin, 1966) conducted studies of sentence comprehension and concluded that "the transformational distance between the underlying meaning of a sentence (its deep structure) and its surface structure) was an accurate predictor of the speed or difficulty subjects experience in processing the sentence. In other words, performance could be predicted by variation in the grammar itself. "In opposition to Venesky, Bever (1968) points out that reading should begin with the higher-order syntactic constituents rather than letter-sound correspondence. Bever suggests that meaning is more accessible in longer segments than it is in shorter ones.

C. Experience

Another component in the understanding of reading is the experience component. This component is made up of prior knowledge, attitudes, and feelings. This component is usually referred to as one's schema.

Matthewson (1976) proposed an affective model for reading which incorporated interest, attitude, attention, comprehension, and motivation. Matthewson's model suggested that attitude could affect comprehension, attention, and the acceptance/rejection process. Matthewson presented four possible ways to change attitudes: (1) praise, (2) individualization, (3) achievement motivation, and (4) anxiety. in L2 or FL situation, the affective models significantly influences the success or failure of reading. During reading ,the attitude or the motivation may intervene the result of reading, which is comprehension, at any stage.

Like Mathewson, McDermott's study (1977) further emphasized the importance of attitudes and experience on school learning.

Rather than attempting to describe a model of attitudes as did Matthewson, McDermott attempted to find out why pariahs have the attitudes they do. His basic conclusion is that status is learned, and that a pariah child achieves his/her status by school failure. To put it in another way, a pariah child may learn how not to read, thereby using reading failure as a means of social achievement in his/her group.

In contrast to Matthewson's study, Swanson (1982) investigated the relationship between attitude toward reading and reading achievement. Swanson found that "results show the low degree of correspondences between reading attitude and reading achievement

"In the book *Psychology of Reading* (1982), Downing and Leong presented affective bases of reading with arguments from an admixture of sources. The authors suggested that reading was impaired by inattention, stress, fear, and that low reading achievement led to negative self-concept and "learned helplessness." They also suggested that reading might be improved by extrinsic motivation, curiosity, achievement motivation, and interestes.

One final element within the experience framework of the understanding component is individual reader's differences. Each of us has difference experiences in our background knowledge including linguistic knowledge and IQ, and these differences give each one of us a unique reservoir of prior knowledge from which to draw meanings and associations. Wanat (1977) found that individual differences were probably important factors when considering comprehension. We will discuss this point when we discuss the interactive model of reading processes.

In short, the experience sub-component of understanding in reading includes several factors which can affect what each reader brings to the reading act. These encompass such diverse experiences as attitudes, feelings, prior knowledge, and individual preferences. Exactly how important these aspects are to the reading

process is still unknown, but they surely affect comprehension and interact in many indefinable ways.

1.7. Reading viewed in terms of learning strategies.

The last component of the reading process is the learning phase. Researchers appear to have studied the learning of reading in three ways: (1) to observe the proficient readers, (2) to observe the deficient readers, and (3) to compare the results of proficient readers to those of deficient readers.

Several researchers have made comparisons between the performance of good and poor readers (Pearson and Studt, 1975; Guthrie and Tyler, 1976; Isakson and Miller, 1976, Olshavsky, 1976, and Goodman, 1973, 1975, 1976). A myriad of conclusions have resulted from this research. Pearson and Studt, for example, found that the use of context increases with age and that the use of context probably helps rather than hinders beginning readers. Guthrie and Tyler's results (1976) (mentioned earlier in this chapter) indicate that poor readers are incomplete decoders and thus their comprehension is low. Isakson and Miller's results (1976) say that high comprehenders are more sensitive to semantic and syntactic cues than are low comprehenders and that the use of "language structure" by the reader may determine comprehension. Olshavsky (1976) found that good and poor readers use similar strategies but that good readers use the strategies more often. Goodman found that readers who can make use of their pre-existing knowledge will understand better than readers who can not make use of their pre-existing knowledge.

Monroe (1932) once formulated the hypothesis that general reading ability consisted of a multiplicity of factors; success or failure in reading depended on whether a student's strengths in these factors outweighed his/her weaknesses. Holmes (1953, 1965) found that two students could be equally successful in reading by

using different combinations of abilities. The generalization that we can obtain from these two studies is that other than the factors that we have mentioned so far in the previous sections, a reader's success or failure in reading is closely related to the strategies that they use when they read. That is, reading strategies should be taken into consideration when talking about the factors that affect reading comprehension process.

In general, in some cases the learning or comprehension in reading may be purely developmental as Chomsky and Pearson suggested; in other cases changes in the written text may also facilitate comprehension as Pearson pointed out earlier, and in yet another case, overlearning and automaticity may be needed for instructional purposes as suggested by Fries, LaBerge and Samuels, and Gough.

Whether meaning is obtained from the text or brought to the text by the reader is another issue relevant to the learning aspect of reading. Rumelhart (1976) proposed a formulation of the interactional concept of reading. Adams and Collins' (1977) gave a lucid explanation that focused on comprehension as the results of an interaction between readers' resources and text data. This interactional concept of reading is often referred to as the interactive model of reading.

Like Adams and Collins, Rystrom (1977) also lucidly described the question whether meaning was obtained from the text or brought to the text by the reader. Regarding this controversial issue, one contingent believes that text dictates the meaning to the readers; on the contrary, the other contingent believes that the text means what the reader thinks it means and that it is the reader who more or less dictates his/her own meaning. In Rystrom's "matrix" model, the reader combines information in the text with that of his/her own experiences and other stored information. If there is a match, the reader adds new information to his/her

"grid" and continues to revamp the matrix. Realizing the difficulty in resolving the debatable issue, the writer does not intend to argue over any side of the issue in this study. What concerns the writer is to introduce the issue to readers and leave the issue to the readers who are interested in this particular area.

Just as attitude is relevant to reading so is knowledge important to reading. To what extent does a reader's background knowledge relate to reading? Winograd (1972) said that readers allocated attention among their knowledge resources, and went back and forth from their knowledge to the data base of the text. Furthermore, Winograd further pointed out one resource that a reader had to bring to a text was world knowledge. From Winograd's study we face the controversial issue again: Do readers bring world knowledge to interpret the text being read? Or do readers associate the meaning of the text being read with their own background world knowledge? As the writer continues thinking about this issue, the writer can not but recalling another controversial issue in language testing. The issue in language testing is: Is linguistic ability divisible or indivisible? Do testees use language proficiency to perform on a language test? or do testees use the so-called "general ability" (cf. John Oller's g-factor hypothesis) to perform on a language test? The writer leaves the question open here.

However, more studies can be cited to discuss the role of knowledge in reading process. Schank and Abelson (1977) said that a particular type of world knowledge that readers bring to a text was the sequence of events in everyday situations, such as procedures in a restaurant or supermarket. Schank and Abelson called this type of knowledge "Script." On the other hand, Anderson and Pichert (1977) demonstrate that the same story could be interpreted as "house buyers" or as "burglars." They concluded that a reader mobilized a script or set of schemata for assimilating and recalling

information. We will discuss this topic in the section dealing with the text theory.

To conclude, whether meaning is obtained primarily from the text or from the reader, it is obvious that both are absolute necessities and play a significant part in the reading process. Besides, we know that readers vary in how their knowledge is structured and in their perspectives for interpreting stories. This issue can not be easily solved by the current reading research.

II. models of Reading Process

In Section I, we have discussed reading processes in terms of physiology, cognitive psychology, grapheme-phoneme relation, phonology, psycho-linguistics, linguistics, meaning deriving and learning strategies. The reason why the reading process is divided into the aforementioned categories is that a reader's reading activity involves many disciplinary studies. It can be simply accounted for by one single point of view. In this section we are going to investigate reading processes from different points of view. In general, reading processes are accounted for by four major reading models according to the reading research literature. They are: the bottom-up model, the top-down model, the interactive model, and the information processing model.

II.1. The Bottom-up Model

If reading is initiated by visual stimuli or print, requiring little input from the reader, the reading processing is referred to as "bottom-up" process.

In the bottom-up model of reading process, it is claimed that readers identify the letters of the text first, and simultaneously set up expectations about the identities of the words to which they belong. As the words are identified, they prime the most probable syntactic and semantic structures. The linguistic demands of the

test in this model are more important than cognitive structure variables or the background knowledge of the reader.

To support the bottom-up model, the writer would like to use Bormuth's study as the first evidence. Bormuth (1966) showed that text characteristics influence reading comprehension. Other evidence can be found in Pearson (1974, 1975), Bormuth, Manning, Carr and Pearson (1970), and Lesgold (1974). They believe that reading is a matter of decoding the letters of written words into the sounds of speech, that is basically a mechanical process, and that teaching children to read must involve drilling them in the recognition and blending of the sounds of letters.

Venesky (1968) claimed that reading was translation from written symbols to a form of language to which the person already could attach meaning. Carroll (1964:62) says that "reading is the activity of reconstructing ...a reasonable spoken message from a printed text, and making meaning responses to the reconstructed message that would parallel those that would be made to the spoken language". Allen and Corder (1974) say that reading is to obtain meaning from print, that it is connected with speaking.

Gough's paper "One Second of Reading" (1971) is generally regarded as a representative work of the bottom-up mode. Gough tries to describe the sequence of events that transpire in one second of reading. He wrote,

Reading begins with an eye fixation. The reader's eyes focus on slightly indented from the beginning of the line, and they remain in fixation for some 250 msec. Then they will sweep 1-4 degrees of visual angles (say 10-12 letters spaces) to the right, in a saccadic movement consuming 10-23 msec, and a new fixation will begin. Barring regressions, and ignoring return sweeps (which take 40-45 msec

), this sequence will be repeated as long as reading continues (up to at least six hours according to Carmichael and Dearborn (1947). When the initial fixation is achieved, a visual pattern is reflected onto the retina. This sets in motion an intricate sequence of activity in the visual system, culminating in the formation of an icon. (Gough, 1972 in Language by Ear and by Eye, pp. 313)

According to Gough, the reading process involves: (1) iconic representation, (2) letter identification, (3) mapping procedures, (4) lexical search, (5) primary memory. For Gough, the parallel process converts letter features directly into letters which are stored in the short-term character register. An abstract phonemic counterpart is then attached to the letter representation and stored on a phonemic tape. The phonemic representations are subsequently acted on by a word-recognition process and stored in what Gough calls primary or working memory.

Following Gough's model, Stanovich (1982) studied individual differences in word decoding. He concluded that individual differences in reading comprehension can be accounted for by different skills in word decoding. He pointed out that " a large portion of the variance in word decoding ability is accounted for by phonological processes, and that little variance is explained by differences in visual processes." (1982:15). Another two studies done in this model framework are Jorm and Share (1983) and Goldsmith (1981). Jorm and Share investigated the relationship between phonological decoding and reading acquisition. They found that " phonological decoding is commonly viewed as a back-back mechanism when word identification via the visual pathway fails. A second more important role for phonological decoding is a self-teaching mechanism by which the child learns to identify words

visually." (1983:13). Goldsmith (1981) explored the importance of decoding skills in reading. He argued that word perception played a larger role in reading. According to the studies done by Jorm and Share, Goldsmith, Gough, and others, it seems to us that reading process is like a rolling snow ball. Readers begin with decoding letters, then words, then phrases, then sentences, and comprehension of the text is accumulated by means of identifying and justifying the text. Such a reading process is really text-driven. The reader himself/herself functions just like a reading machine processing the incoming textual input.

To sum up, Gough's theory provides a millisecond by millisecond account of what is going on in the mind of the reader. Gough's serial processing theory has developed an inflow model with letter by letter processing at the lower levels and has rigorously separated this stage from the higher-order linguistic processing. However, his linear inflow cannot account for the interaction between the higher linguistic processing and the control of eye fixations. Aderman and Smith (1971), Krueger (1970), Reicher (1969), Smith (1969) and Wheeler (1970) have shown a fact that forced-choice letter recognition is better and letter search times are faster for words than for no-words.

However, Brewer (1972) in his article, "Is Reading a Letter by Letter Process?" pointed out that Gough's theory has neglected the possibility of higher-order processes interacting with lower-order processes. Brewer criticized Gough's assumptions that the meanings of individual words are retrieved word by word, from left to right. Brewer pointed out that Gough's saying that the order of lexical search was not affected by previously processed information was an "intriguing assumption." Brewer said that "it is certainly the case that the particular reading given to a word is determined by previous information." (1972:7)

Finally, We may conclude this section by showing some other supporting evidence that reveals high correlations between vocabulary knowledge and reading comprehension. First of all,

factor analysis studies like those done by Davis (1968) and the substrata factor analysis by Holmes and his students (1953) and many others all proved that a high correlation exists between vocabulary knowledge and reading comprehension.

II. 2. The-down Model

If reading is initiated by reader-generated hypothesis, requiring fewer visual cues, this type of processing is referred to as a "top-down" process. Goodman's theory (1970) is regarded as the representative of this model. In Goodman's theory, the original perceptual image of graphemic cues is formed and stored in short-term memory until a search in long-term memory fields related phonological, syntactic, and semantic cues. These latter cues are transferred to short-term memory for comparison with the perceptual image.

The top-down model claims that a reader uses existing knowledge structure to interpret and organize the text. The top-down processing is knowledge-based and readers' word identification can proceed without requiring detailed conscious attention to each letter. The reader's knowledge and experience of the world play an important role in the reading process. Goodman (1970) says that a reader has to bring expectations about the content of the text that he is reading. The reader has to go through hypothesis testing processing so as to achieve comprehension. In short, Goodman's theory stresses the reader's active role in interpreting a set of highly structured cues of different kinds, graphic, phonemic, syntactic and semantic. These sets of cues are made to interact by the reader on the basis of his/her existing knowledge of them. That is why Goodman (1972:11) says that "reading is a complex process by which the reader reconstructs, to some degree, a message encoded in graphic language."

Frank Smith (1971) proposed that the reader predicted infor-

mation when he read, Such prediction may function like hypothesis testing. Smith said that comprehension was a state, a condition where no uncertainty exists. To him, reading comprehension is a matter of making sense of text, of relating written language to what we know already and to what we want to know. Therefore, reading comprehension is related to the individual's IQ, reading skills and prior knowledge as well as text structure. Both Goodman and Smith agree that reading is a constructive search for meaning in which the reader's language competence enables him to create a grammatical and semantic prediction in which he needs only sample from the print to reach meaning. Their research depends on two facts:(1)observations of skilled fluent readers rather than beginners; (2) their evidences showing that school beginners are fully mature and motivated to plunge into reading. But, Samuels (1976) showed that the reading process of beginners were quite different from advanced readers. At least, beginners do not have automaticity in the reading process. And both Goodman's and Smith's observations may be just anecdotal.

Thorndike (1917) claimed that" reading is reasoning." He pointed out that comprehending a passage is analogous to solving a problem in mathematics. According to him, readers have to recognize that passages may fit into a formula, such as problem-solution or question-answer device during reading. LaBerge and Samuels (1976) theorized that a fast reading pace in which readers can identify words automatically enables the readers to comprehend better because almost all of their attention is focused on meaning rather than form. Winograd (1972) also suggested that readers' resources were related to reading comprehension. He pointed out that readers could allocate attention among their prior knowledge resources, and wert back and forth from their knowledge to the text during reading.

Woods (1970), Winograd (1972), Riesbeck (1975) and Macrcus

(1975) tried to explore the elements of reading comprehension. They pointed out three important things that were closely related to reading comprehension. First, semantic features are considerably more important than syntax. Second, context is of overwhelming importance in the interpretation of text. Third, implicit real-world knowledge is often applied by the understanders; and the appropriate ingredients for extracting the meaning of a sentence are often nowhere to be found within the sentence.

To sum up, the central issue of the top-down model is its emphasis on the importance of the reader's hypothesis-formation, knowledge and experience of the world, and perceptual sampling strategies in the process of reading of semantically related sentences.

II. 3. The Interactive Model

If reading requires both bottom-up process and top-down process, the reading model is then referred to as interactive. Rumelhart's article "Toward an Interactive Model of Reading" (1975) is considered as a representative of this model. Actually, the interactive model may be represented by three different reading theories, namely, the schema theory, the text theory, and the story grammar theory. These three theories are discussed below.

A. The Schema Theory

According to cognitive psychologist's view, learning is the perception, acquisition, organization, and storage of knowledge in such a way that it becomes an active part of the individual's cognitive structure. Following such an idea, we understand that reading process is just the same as learning process. It is involved with visual perception, linguistic acquisition, mental organization, and furthermore, memory as well as the stored knowledge (or the so-called background knowledge). Apecifically speaking, the cognitive

psycho- logists have pointed out the importance of meaningfulness and organization of background knowledge in the whole reading comprehension process. That is why some reading specialists claim that reading is an active mental process. For the reading material to be meaningful, reading itself must be clearly relatable to existing knowledge the reader has already possessed. Meanwhile, this existing knowledge base must be organized in such a way the new information gained from incoming reading process is easily assimilated, or added to the reader's cognitive structure.

Especially, in the foreign/second reading comprehension process, three types of background knowledge are potentially activated. First, linguistic information, or the reader's linguistic competence is activated to process the text. Second, knowledge of the world, including one's store of concepts and expectations based on prior experience, or the so-called communicative and socio-cultural competence is activated. Third, knowledge of discourse structure, or the so-called pragmatic competence is generally activated. Such a view is supported by the research done by Goodman (1972) and Smith (1971). For instance, Goodman claimed that reading is like a "guessing game" which involves the interaction between thought and the written language. Goodman (1972:16) pointed out that "the ability to anticipate that which has not been seen ...is vital in reading, just as the ability to anticipate what has not yet been heard is vital in listening." Smith also describes reading as a sampling process in which readers predict structures, test them against the semantic context build up from the ongoing discourse, and then confirm or reject their hypotheses as they process further written text.

In addition to Goodman's and Smith's support to the importance of background knowledge in the reading comprehension process, Kolers (1973) also maintains that reading is only incidentally visual. More information is contributed by the reader than by the

print on the page. Readers understand what they do because they are able to take the stimulus beyond its graphic representation and assign it membership to an appropriate group of concepts already stored in their memories. This view is congruent with the schema theory.

In reading classes, we often find that comprehension failure occurs not because the student does not understand the structure of sentences, or does not understand the meaning of each word in the sentences, but because the student is lacking in the relevant knowledge or "schemata" needed for constructing meaning from the text. Because the student does not have the requisite cognitive contributions to the text, s/he cannot understand the text. According to the schema theory, there are three reasons to account for such kind of comprehension failure. First, the reader may not have the appropriate schemata. Second, the reader may have the appropriate schemata, but the clues provided by the author may be insufficient to suggest them. Third, the reader may find a consistent interpretation of the text, but may not be able to find the one intended by the author. In the last situation, the reader will understand the text, but will misunderstand the intention of the author (Guthrie, 1981).

What is a schema? A schema is a building block of cognition. Schemata are employed in the process of interpreting sensory data (both linguistic and non-linguistic), in retrieving information from memory, in organizing actions, in determining goals and sub-goals, in allocating resources and generally in guiding the flow of processing in the system.

Rumelhart (1977) defines a schema as an abstract representation of a generic concept for an object, event, or situation. For instance, each reader may have an abstract representation for the concept of 'building', which may be altered considerably depending upon whether one adds adjectives such as 'huge' or 'old' as opposed

to 'elegant' or 'leaky'. Such abstract representation may alter because of cultural differences. According to Rumelhart, 'misunderstanding' of a text may happen when a reader has found the wrong scheme for a given concept or event. Again, according to Rumelhart (1975, 1977), a schema contains the net work of interrelations that normally holds among the constituents of the concept in question. The internal structure of a schema must correspond to the script of a play. The control function of schemata is in the process of comprehension, interpreting an event, object, situation, etc. The control structures of schemata can be classified into two kinds: (1) conceptually-driven processing; (2) data-driven processing. Whenever already activated sub-schemata of a schema activate and cause variations in this schema, which in turn activate other schema, from the bottom-up, this is called data-driven processing. Conceptually-driven processing is called when a schema is activated and it, in turn, activates its sub-schemata. Conceptually-driven activations go from whole to part while data-driven processing goes from part to whole.

Rumelart and Norman (1975) and Guthrie (1982) have defined the characteristics of schemata as below:

- 1) Schemata have variables.
- 2) Schemata can be embedded, one within another.
- 3) Schemata represent knowledge at all levels of abstraction.
- 4) Schemata represent knowledge rather than definitions.
- 5) Schemata are active processes.
- 6) Schemata are recognition devices whose processing is aimed at the evaluation of their goodness of fit to the data being processed.

Other studies that emphasize the crucial role of schema in reading process can be easily found. For instance, Anderson (1997) emphasized the dynamic, constructive nature of schema use and described the role of schemata in learning. Schank and Abelson

(1977) made a similar point about the usefulness of "scripts" in communication. When a schema represents a whole situation such as going to a supermarket, repairing a broken chair, etc., a chair of stereotypic events or features are called up in an individual's mind in association with that situation. Schank and Abelson explain this phenomenon using the term 'script', defined as a structure that describes in a predetermined, stereotypic fashion appropriate sequences of events in a particular context. A commonly used script for the situation is going to a restaurant' for which an individual may have some association with getting in the car, arriving at the restaurant, sitting at a table, ordering from the menu, answering waitress' questions, eating the meal, asking for the check, paying the cashier, and then leaving. Anyway, what Schank and Abelson meant by a script is an event schema, "a predetermined, stereotyped sequence of actions that defines a well-known situation" (1977:41). This script schema may vary from person to person, and from language to language.

Minsky (1982; also in Omaggio:101) uses the term 'frame' to describe memory structures that represent stereotypic situations in much the same way as Schank and Abelson use the term 'script'. Minsky claims that there are several types of information which is attached to each mental frame: some of the information is about how to use the frame, some about what can be expected to happen in the chain of events, and some about what to do if those expectations are not met. According to Minsky, the frame has its own structure. The higher level frame has more fixed structure representing things that are always true about the situation, and the lower level frame has more flexible nature that may fit in specific instances of situation.

Furthermore, Schallert (in press) describes schema theory as a list of propositions about the structure of schemata and the role they play in processing information. He well- documented proposi-

tions of the schemata structure which can be summarized as follows.

1. A schema is a specific configuration of variables, some obligatory and some not.
2. Schemata can be embedded within each other, forming hierarchies.
3. The configuration of one's total set of interconnected and cross-referenced schemata may change from moment to moment.
4. Schemata become more elaborate and more specific with experience.

According to Schallert, meaning is neither in the message itself, nor in the comprehender's schemata in their abstract, or in the pre-instantiated state, but rather is a result of a process that combines the two.

Similar to the schema theory, Frederiksen (1975) presented a "network model" to describe the structure responsible for the generation of speech or written passages at the discourse level. It includes a semantic structure and a logical structure. In Frederiksen's theory, the act of reading is described as follows:

The reader approaches a text segment, finds the propositions, and assigns them to classes.

There follows a first stage of inferences that resolves questions of reference such as pronouns, substitutions and ambiguity.

Then, more elaborate inferences are made such as pronouns, substitutions and ambiguity. Then, more elaborate inferences

are made in three basic categories : (1) connective inferences relate a current proposition to propositions derived from the prior text; (2) extensive inferences extend

current propositions by generating new positions based on prior knowledge and discourse context; (3) structural inferences segment and organize a text, building a coherent model of the text as a whole. (1975:7)

He describes understanding as below:

A process whereby a listener or a reader attempts to infer the knowledge of speaker of writer by using the available linguistic message, contextual information, and his own from which the inference is to be made. (1975, :371)

The "networks" in Frederiksen's theory (1975) are built from specifically defined concepts and relations. He describes the main elements of the model -- objects and actions, and case and non-case relations -- then defines in detail the relations within the two structures, namely, semantic and logical. Logical structure includes "logical and causal relations, and algebraic (order and proximity) relations which are used to represent relative or comparative information. In short, Frederiksen says that the study of comprehension process is to assess precisely what semantic information a subject has acquired from a text and to specify what relationship obtains between semantic information acquired from a text and the semantic information from which the text was derived.

Another interactive model of the reading process is represented by Kintsch's theory. Kintsch (1974) developed a formal system for representing the meaning of texts, which depends upon the identification of all the propositions contained in a text and achievement of referential coherence among those propositions.

Unlike Frederick's theory, propositions in Kintsch's theory are related not by logic, but by repetition. Kintsch uses Fillmore's case grammar (1968) to indicate the relations within a predicate propo-

sition. To Kintsch's, the result of comprehension is behavior, to Smith, the result of comprehension is state, the opposite of confusion. Kintsch's ideas of propositions are similar to Schank's conceptualizations except that Kintsch's propositions are more closely related to syntax and to actual words. Kintsch says, "words are organized into sentences and phrases on the basis of a psychological grammar (which appears to be a set of strategies rather than the algorithmic rule system the linguists talk about)....; and coding the text into a set of propositions or conceptual structures that represents the meaning of the text...is done in a non-arbitrary, codified, but non-algorithmic manner (1977:4-5).

Kintsch's characterization of comprehension as a strategy-based process is central to his theory. He puts the notion of schema and constructive memory to use in his theory. In his theory, "chunking" is considered as one particularly important strategy.

Kintsch and Van Dijk (1978) described a theoretical mode of comprehension that is not limited to narrative texts. Their study implies processing cycles with a memory buffer and macro-operators that relate and connect new propositions to old propositions held in short- and long-term memory. If this fails, an inference is required. To them, comprehension is a constructive process, resulting from both the stimulus characteristics of the text and two important schemata held by the reader: knowledge of the text's superstructure and knowledge of his or her purpose.

Different voices about the interactive model can be heard from the studies made by Tierney and Lazansky (1980) and Tierney and Spiro (1979). They claim that to believe the interaction theory of reading, one must take reader variation into account when one assesses comprehension because readers vary in their knowledge

structures and in interpreting strategies. Related to their point of view are the studies made by Heays (1979) and Marshall and Gloc (1979-89). Heays demonstrated that analogies embedded in text helped students extend their knowledge structures so that they can use them to comprehend new information. Marshall and Gloc (1978-79) studied the relations between the reader's schemata and text. They suggested that good readers have more well established schemata that can be used to interpret and store the meaning of discourse whereas poorer readers have less complete structure and therefore, must depend to a greater extent on information explicitly encoded in the surface structure of text.

Mavrogenes (1983) in his article "Teaching Implications of the Schemata Theory of Comprehension" discussed the notion of schema in theories of reading comprehension. He explained what schemata are, and illustrated how they might enter into comprehension. According to Mavrogenes, sometimes we find that students often hold incongruous beliefs. The knowledge structures of students are frequently not the structures the authors of the text and reading teachers assume students to have. To illustrate how schemata may enter into students' reading comprehension, Mavrogenes pointed out that readers's views of the world and meanings for words are not isolated ideas but conceptual structures by which the readers make sense of their readings. therefore, the more teachers know about and appreciate the cognitive structures of their students, the more they will be able to provide learning opportunities for modifying the structures, and then the easier the readers achieve their comprehension.

In summary, the role played by background knowledge in reading comprehension can be explained and formalized in a theoretical model. This model is generally known as schema Theory. one of the basic tenets of the theory is that any given text does not carry meaning in and of itself. on the contrary, the text

provides direction for readers so that readers can construct meaning from their own cognitive structure, i.e., their previously acquired or background knowledge. And the previously acquired knowledge structures which can be accessed in the reading comprehension process are known as "schemata". Synonymous terms for "schemata" in the reading research literature scripts', plans, goals, frames, expectations, and event chains'. For these readers may refer to Carrell and Eistenhold, 1983:556; Bartlett, 1932; Minsky, 1982. In this section different schema theories of reading comprehension have been discussed. of course, others may still be found in the relevant literature. In this section, we have mentioned some prominent works in the field. schan's theory analyzes a text in terms of units of meaning not smaller than word; it is independent of syntax; and it involves prediction based on structured, schema-like knowledge of both linguistic and situational contexts. Frederiksen's theory describes a double networ -- a semantic structure and a logical structure -- designed to account for the information content of non-linguistic as well as linguistic messages, both as they are formed by the writer and comprehended by the reader. Kintsch characterizes comprehension as a strategy-based process, one in which propositions, which are part of the representation of a text's meaning, must survive passage through several layers of processing in order to figure in the final abstract of the text's message.

In general, in the process of reading comprehension, a reader's knowledge is not static. Rather, it is continuously in a process of re-organization. That is, the reading comprehension and memory of any input from the reading text cannot be adequately predicted or accounted for based on mere dictionary knowledge of the words are being read. The store of knowledge about the world and the reader's analysis of the context of the text are both heavily involved in the process of fitting meaning to existing

schemata. Any one individual's interpretation of a given text will be influenced by his or her own background and interpretation. So, when considering the tasks involved in reading comprehension, schema theorists posit two separate but inter-related modes of information processing: bottom-up processing and top-down processing. In bottom-up processing, the incoming data enter the reader's system through the bottom-most, best-fitting schemata. It goes from the specific bottom to the most abstract on the top, while in top-down processing, the reader makes general predictions about the input based on higher-level, more abstract schemata. The input is then searched for information that will verify these higher-order concepts. As we know, bottom-up and top-down processing occur simultaneously in the reading comprehension process. Bottom-up processing assures that the reader can be sensitive to information that does not fit an ongoing hypothesis about the content and structure of the message; top-down processing helps the reader to resolve ambiguities and select among alternative interpretations of the ongoing and incoming input. If the reader has on schemata as a guide in this process of interpretation, the reader will have difficulty making hypotheses about the ongoing messages and may fail to comprehend the incoming input. If the reader does use the appropriate schemata, activating proper background knowledge to understand and interpret the input, the comprehension takes place.

To conclude, the role played by background knowledge in reading comprehension process is explained and formalized in a theoretical model known as Schema Theory. The main characteristic of the theory is that it claims that any given text does not carry meaning in and of itself. Rather, it provides direction for readers so that they can construct meaning from their own cognitive structure, or the so-called background knowledge. Such previously acquired knowledge structures accessed in the comprehension process are called schemata. Rumelhart (1977) defines a schema as an

abstract representation of a generic concept for an object, event, or situation. It is suggested that cultural differences may also alter the abstract representation for a given concept.

Similar in concept but different in term, Minsky uses the term "frame" to describe memory structures that represent stereotypic situations. Minsky theorizes that there are several types of information attached to each frame: some of the information is about how to use the frame, some about what can be expected to happen in the chain of events, and some about what to do if those expectations are not confirmed.

Hudson (1982) refers to the selection of a particular representation of the more generic concept as "instantiation." According to Hudson, if one were thinking of a fast food restaurant when the situation "going to a restaurant" was mentioned, the fast-food schema would be instantiated. According to both Minsky's and Hudson's ideas, comprehending a text entails drawing information from both the text itself and from the reader's internal schemata that seem to fit the situation. When both sources of information match sufficiently, the text is said to be understood. Thus, in the process of reading comprehension, the reader's knowledge is not static. On the contrary, it is continuously in a process of reorganization. That is, the comprehension and memory of any input cannot be adequately predicted or accounted for based on mere dictionary knowledge of words that are read. Actually, the store of knowledge about the world that an individual reader possesses as well as his or her own analysis of the context are both heavily involved in the process of fitting to existing schemata. Any one reader's interpretation of a given text will therefore be influenced by his or her background and interests. For second language learners, especially, distortions in comprehension may arise not only from misinterpretation of linguistic elements of the message, but also from misinterpretation of the script or schema, activated due

due to cultural differences.

B.The Text Theory

The text theory describes the processes occurring in text comprehension. This theory involves three sets of operations:

(1)the meaning elements of text become organized into a coherent whole; (2) the full meaning of text will be condensed into its essences or cores; (3)the first two operations will be complemented by the third one which generates new texts from the memorial consequences of the comprehension processes.

A text is "any passage, spoken or written or whatever length, that does form a unified whole" (Halliday and Hasan, 1972:1-2). A text is "a linguistic unit completed according to the intentions of the sender and receiver following rules of grammar" (Dressler, 1973:1). Generally speaking, text is a part of linguistic communicative interaction having an information structure that consists of a hierarchy of speech acts and the illocutionary roles that are embedded in a text according to the function of the text (Schmidt, 1973; Sanding, 1973; Brewer, 1974; Sinclaiier and Coulthard, 1975).

There are two kinds of text structures involved in reading comprehension. One is the structure the mind unconsciously imposes on the events that are being narrated. This structure will influence the interpretation of what the events are. Another structure is called "plan structure" which helps readers judge whether the author has completed a sub-goal and begun another or not (Spiro, et al., 1980).

The characteristics of text structure are : (1) text structure has connectedness. Psychological research has shown that connected discourse is better recalled and comprehended than scrambled discourses. Text is easier to learn and better remembered than lists of words or sentences. (2) connected discourse permits the con-

struction of a lightly integrated or interconnected representation in memory that is both easier to construct and more efficient to retrieval (Anderson and Bower, 1973; Kintsch, 1972, 1974; Rumelart, Lindsay and Norman, 1972). (3) Connected discourse can be remembered better because it is processed more deeply (White and Gagne, 1976; Thorndyke, 1977). (4) When text is minimally related to the reader's existing knowledge, the text will be difficult to learn, remember, and understand. (5) people remember connected discourse better because their prior knowledge and expectations permit them to form a highly interconnected representation, a process that requires deep semantic process.

Kintsch and Van Dijk (1978) suggested that the total comprehension process in the text theory could be separated into three components. The first one is semantic structures. The surface structure of a discourse is interpreted as a set of propositions. This set of propositions is ordered by various semantic relations among the propositions. And the semantic structure of a discourse has two levels: (1) microstructure level and (2) macro-structural level. The former is the local level of the discourse, while the latter is the global level of the discourse. The second component is full discourse grammar which includes a parser. The parser is necessary both for the interpretation of input sentences and for the production of output sentences. The third component is the use of Knowledge and the inference process. The reader's background knowledge will influence this comprehension process.

on the other hand, the actual discourse can be categorized into two text bases, namely, an implicit text base and an explicit text base. The explicit text base is a theoretical construct featuring propositions necessary to establish formal coherence. The implicit text base refers to the meaning and reference relative to the interpretation of other sentences and subject to contextual interpretation. similarly, text structure can be analyzed by two approaches

. First, Meaning-in-the-text approach. The importance of an element of text is determined by the position of that element in the structure of the text. Second, constructive approach. In this approach, the emphasis shifts from the structure of text as an independent, immutable entity to structure and meaning as imposed on the text by the reader. It is assumed that although text constrains the possible meanings, readers with different knowledge, interests and perspectives, or the same reader in different contexts, may construct quite different interpretations.

Frederiksen (1975) and Kintsch (1974) proposed that readers used a case grammar or a propositional schema to identify relations within and between sentences. The entire text is analyzed into a hierarchical structure. The height in the hierarchy will predict or explain the comprehensibility or memorability of particular text segments. Surface structures that violate canonical structure will hinder comprehension and recall.

McGee (1982) did an experiment to examine whether good and poor readers in elementary schools are aware of text structure, and whether an awareness of text structure influences recall. His results indicate that 5th grade good readers are more aware of text structures than 5th grade poor readers. His results also pointed out that some young readers were aware of structures and this awareness was correlated with recall of important textual information.

In order to illustrate that the text structure of expositions is related to reading comprehension, Meyer (1975) and Meyer and Freedle (1979) based on Grimes's "connection discourses" idea and Fillmore's case grammar and used both children and adults as subjects in their study. Meyer (1975) concluded that the height in the hierarchy predicts how well propositions will be comprehended and recalled. Meyer and Freedle (1979) found that differences in the type of structure used to organize textual information signifi-

cantly affected the amount of information. They found that adversative and covariance organizations enhanced recall over attribution and response organizations.

Regarding the meaning of text, Spiro (1980) proposed his particular viewpoint and said that meaning is not in the text. According to Spiro, readers actively construct meaning in order to understand and remember during reading. Rumelhart and Ortony (1977) also stated that readers' schemata represented knowledge of objects, situations, events, and actions. They claimed that when reading, the reader chose conceptual schemata to account for the text to be understood.

Another variable that may affect comprehension and learning from text is memory. Memory research helps us understand reading comprehension of text better. Not only are schemata useful for encoding information from text, they also play a major role in retrieving or remembering information. Rumelhart (1980) explains two processes by which schemata affect memory. Schemata determine the form in which interpretations are stored, and they are used to reinterpret stored data. Bransford and Franks (1971) did an experiment and showed that their subjects remembered the meaning of the sentence but their memory of the syntax was poor. They said that readers integrated the meaning into their memory structure.

A second insight from memory research alludes to the limitation of our short-term memories. Tarpay and Mayer (1978) pointed out that short-term memories were our conscious memories and were limited in capacity. Long-term memories have an infinite capacity but information must be organized to get into long-term memory. The research shows that in order for information to be learned, ideas must be organized and have a meaningful framework for the reader to recall information. The research suggests that readers use three strategies to learn the information

from texts. These strategies are: webbing, pyramiding, and thin sheeting. Cheek & Cheek (1983) studied the effects of organizational patterns upon reading comprehension. They found that students who understood the organization of a material remember more information for longer periods of time than those who used no organizational scheme. Weaver (1979) also examined the effects of sentence organization instruction on reading comprehension. His research supports the contention that sentence organization skills are an important aspect of reading comprehension and suggests the value of instruction explicitly designed to improve reading comprehension. By sentence organization skills Weaver means the skills that enable readers to process sentence information in units larger than the single word.

Familiarity of text is also related to recall. Marr and Gormley (1982) examined the relationship between comprehension ability and prior knowledge (familiarity of text) in children's recall. They found that general prior knowledge of the topic was the strongest predictor of students' ability to draw inferences.

In the article "Organizational strategies to Increase Comprehension," Clewell and Haidemos (1983) reviewed schema theory and memory research and showed that the organization of text could affect comprehension. They also pointed out that three reading strategies, webbing, pyramiding and think sheeting, could aid in improving students' understanding of content area material.

The text analysis methodology developed by Frederiksen (1975), Kintsch (1974), Kintsch and van Dijk (1978). Meyer (1975) and Rumelhart (1975), has permitted us objective descriptions of passages and a thorough description of logical relationships in discourse, and a complete description of the representation of information and recall and memory of information.

C. The story Grammar Theory

The study of story grammar also belongs to the interactive model of reading comprehension. Story grammar (Rumelhart, 1975) is used to represent readers' presumed knowledge and expectations about the structure of simple stories. Stein and Glenn (1978) proposed three assumptions for story grammar: (1) stories have internal structure; (2) this internal structure can be depicted as a hierarchical network of units of information serving different functions in the story structure and the logical relations existing among these units; (3) the hierarchical structure corresponds to some extent to the way people comprehend and store information in stories. Stein and Glenn's model is considered the most popular model of story grammar. Stein and Glenn (1977) claimed that a story consisted of two parts: (A) the setting and (B) episodes which could be only one or more. The setting introduces the main characters and relates the time, place, and context in which the event occurs. The episode includes five categories: (1) the initiating event, (2) the internal response, (3) the attempt, (4) the consequence, (5) the reaction. This concept of story grammar is very similar to Rumelhart's "episode" schema. Rumelhart (1977) says that an episode schema consists of CAUSE, DESIRE and TRY schemata, each in turn consists of its own sub-schemata. The TRY schemata, for instance, has at least four variables: the protagonist, the method to be employed, the goal and the consequence of the attempt. In Stein and Glenn's model (197), the episode consists of an initiating event, internal response, attempt, consequence, and reaction. Such schemata are thought to guide encoding, organization, representation, and retrieval of information (see Stein and Trabasso, 1981).

Kintsch (1977) described story comprehension in terms of processing stages, including stages for syntactic analysis to determine linguistic structure, via grammar; semantic analysis to determine conceptual-propositional content, via semantic memory and world

knowledge; pragmatic analysis to determine the topic of discourse, via extra-linguistic context expectations and functional analysis to determine the use of language, via one's goals. Kintsch's model for story comprehension (1977) can be outlined as follows.

1. Readers first determine the macro-structure of a story via a chunking strategy whereby a story schema is instantiated.
2. This is accomplished on a probabilistic basis, using graphic and morphological cues, macroconnectors such as therefore, however, and especially discontinuities (e.g., the complication frame is recognized when the exposition frame must be discarded because of discontinuities in the plot).

Goldman and Varnhagen (1933) studied the relationship between stories with/without obstacle ending and reading comprehension. Their results found that processing characteristics of a task as well as prior knowledge of problem solving behavior affected story understanding. Widomske (1983) pointed out that story schema and story grammar that aided discourse processing presented alternative views about conventional instructional strategies. He suggests that strategies that rely on both the reader's and story's schemata not only assure present reading experience success but also build success as a foundation for future discourse processing.

Bruce (1979) claimed that what existing story grammars failed to capture were characters' interactive plans and beliefs and the social setting in which they occurred. He also stressed that since something like a character's intentions might have to be inferred, the correct and developed schemata are essential if a story would be correctly interpreted.

The study of story grammar tells us that some children do well because they have a schema for "story", i.e., an internal representation of story, that facilitates the encoding, storage, and re-

king or is poorly developed, comprehension suffers. According to this framework, then, we may say that comprehension problems may stem from flaws in an author's writing as well as from limitations in a reader's reading ability.

D. The Information Processing Model

The information processing model is derived from the science of artificial intelligence. Roger C. Schank has devoted his professional life to teaching computers to read. The basic assumption of his work is that "since it is true that people can understand natural language, it should be possible to state those processes explicitly" (Schank, 1974:187). A secondary assumption is that it is possible to state those processes as "a detailed step-by-step procedure... that pinpoints every single thing that must be done by a reader" (Schank, 1982:2).

According to Schank, attempting to read is attempting to understand, and understanding is a three-part process with several sub-processes, all governed and driven by memory, a storage place for beliefs, facts, episodes, etc. This is Schank's three-part outline of reading:

- (1) Analysis (by which a reader perceives meaning)
 - a. Lexical look-up (assignment of meanings to individual words by use of a mental dictionary of concepts)
 - b. Event identification ("fitting the concepts that have been obtained through lexical look-up into an event of state description"(1982:9).
- (2) Inference-making (guessing what the speaker-writer must have meant)
 - a. Filling in the blanks (presuming probable unstated events)
 - b. Goal identification (figuring out why)

- (3) Event-connection (fitting new input with prior beliefs of understandings in order to connect or explain new information)

Another similar reading research done in the framework of the information processing model is W. Woods' studies. Actually, the computer model of understanding is developed by Bolt, Bera-neck, and Newman under the supervision of William Woods. The Woods group recognizes that the augmented transition network is superior to the dominant transformational model for parsing English syntax. They generate a format for all the subsystems of language understanding in parallel: one for acoustic phonetic recognition, one for lexical retrieval including word recognition, one for syntax, one for semantics, and one for subsequent discourse tracking (Woods, 1978). Each subsystem should be able to consult the findings of the others about on-going structures, and thus, to drastically reduce the number of alternatives to be considered.

Influenced by the concepts in computer science, Brachman described the computer's reading processes as below:

A user types English sentences into the computer to be syntactically analyzed with a parser. This parser works through the pre-modifiers in a noun phrase or verb phrase until the head is found. The results are then sent to the semantic stage in the reverse order. Then any post-modifiers are picked up until the phrase is completed. Finally, specifications are sent along: determiner and number for a noun, or tense, aspect, and number for a noun, or tense, aspect, and negation of a verb. All the word classes are identified with the help of syntactic taxon-

omy. By consulting the semantic stage early during syntactic processing, the understander avoids setting up syntactically acceptable, but semantically anomalous readings. (1979:39)

Following the same line of thought in the theory of artificial intelligence science, Baugrande's theory of the reading process is concerned with text and text processing. Baugrande and Dressler (1980) tried to develop an integrative design. To them, reading is seen as a correlation of processing types sharing the processor's cognitive resources in varying distributions. Thus, the phases of reading are: (1) parsing which identifies the grammatical dependencies of the surface text; (2) concept recovery which associates language expression with cognitive content; 3) idea recovery which builds the central conceptual configuration that organizes content; (4) plan recovery which identifies the plans and goals the text is intended to pursue (Baugrande and Dressler, 1980).

Baugrande pointed out that connectivity in the whole discourse search was important in reading processes. Given any textual occurrence, be it a word, phrase, clause, sentence, concept, discourse action or whatever, how does this textual occurrence relate to other occurrences in that subsystems or in other subsystems? At this point, the reader's motivation and demands will play a role. That is, the duration, intensity, and thoroughness of the connectivity search will depend on the reader's affective factors as well as the relevance of the text to current tasks and goals. Critically speaking, Baugrande's theory is more concerned with the relations between text structure and comprehension than the computer model of reading comprehension process.

In a review of research literature, not too many experiments have been found using the framework of this model, while several criticisms have been found. In the following are the criticisms

about this model that can be found in the research literatures. They are summarized as follows.

First, there are technological differences between what computers can do and human beings can do. The particular difference is the physical difference between brains and the internal working of computers. Therefore, there is nothing about human intelligence that a computer cannot simulate in kind. Of course, computers can do many things which resemble the results of human activity, but that in no way implies that the processes by which the results are achieved are similar.

Second, the means by which human beings read or learn to read are formally explicable, even if such explication is necessary to teach computers. It is in principle and practice impossible to specify what each and every person must do to read any written text. Moreover, there is no good reason to assume that what any two readers do to read something is the same thing, or that one reader would or could read the same thing twice in the same way.

Third, the assumption that reading is definable as a set of discrete skills for computer processing is questionable. And the specification of component skills of reading is not a result of investigation of reading behavior.

Fourth, the assumption in Schank's theory of information processing model is somewhat not empirical.

Fifth, there are many things that machines can do, but they can not read. Let's imagine that a computer can compose a poem, but the computer cannot read a poem, or interpret a poem.

Sixth, the superficiality of the reading behavior of computers brings up on more important similarity between the skills workbook model and the artificial intelligence model of reading -- their inherent similarity to a behaviorist view of reading. Every reading program built on a behaviorist model assumes reading can be re-

duced to discrete behaviors learnable outside the context of meaningful reading. But the truth is not like that.

III. Implications of Reading Process Research

If reading research cannot provide any practical and pedagogical implications to reading teachers to help overcome teaching difficulties or to guide their teaching, such research will be considered useless and meaningless. A review of reading research literature has shown us many educational implications. In this section, we are going to briefly discuss the implications of the schema theory, the implications of the text theory, and the implications of the story grammar theory, and some others.

A. Implications of the Schema theory

After learning the content of the schema theory of reading comprehension, reading teachers may have such questions as: What is the role of prior knowledge in reading comprehension? How much inferential comprehension should be expected of a reader? How to help students to improve their schemata?

We as language teachers know that it is easier for students to comprehend a passage whose subject matter is familiar to them. Good teachers should provide background information before assigning reading of unfamiliar subjects. Schabk's (1972) theory accounts for this by connecting its conceptual structures to an underlying memory structure. Frederiksen's (1975) network model assigns roles to contextual information and the reader's own store of knowledge. Frederiksen (1977) has demonstrated how prior knowledge obtained from earlier segments of text influences comprehension of later segments. Kintsch's (1977) story processing stages make use of word knowledge for semantic analysis and contextual information for pragmatic analysis. Kintsch's (1979) model of comprehension depends more upon characteristics of the text -- such as

the amount of coherence among its propositions -- than on what the reader brings to it.

From the schema theory we also learn that inferencemaking also plays a crucial role in reading comprehension. Literal comprehension is only a first step. Sometimes, F1/L2 readers have difficulties in literal comprehension. This is mainly because of poor knowledge of vocabulary. The predictions that play a role in understanding as stated in Schank's theory are inferences, for they are based on situational as well as linguistic information.

Furthermore, why do foreign/second language readers in general have weaker or less satisfactory performance on a reading comprehension test? The disadvantageous reasons could be: (1) When reading, rather than recalling cues with which the foreign/second language readers are familiar, they are forced to recall cues that they either do not know at all or know imperfectly. Because of this, these readers will forget those cues much faster than they would cues in their first (native) language. (2) These readers must simultaneously predict future cues and make associations with past cues, a slow and painful process in the second language for many inexperienced learners. Yorio (1971) attributes such kinds of difficulties in reading to the reader's need of concentrating on a triple process: (a) storage of past cues, (b) prediction of future cues, and (c) associations between the two. Yorio's explanations are "If they try to predict what is coming, they forget the past cues; if they try to concentrate on the past cues, prediction is impaired." (1971:16).

Recalling Goodman's and Smith's suggestions mentioned earlier, we believe that reading processes are indeed hypothesis testing processes in which the reader selects cues and makes predictions about the ongoing discourse on the basis of these selections, it would seem to be reasonable for us to suggest that the provision of supplementary contextual cues drawn from extra-lin-

guistic sources would aid comprehenders in their task in the foreign/second language. If such types of supplementary cues can provide a conceptual basis to the reader for organizing the comprehensible input, the the FL/L2 comprehension process should be facilitated. Therefore, it is important for us to bear in mind that the effective use of contextual cues may need to be taught overtly to FSL/EFL learners, especially if the learner's prior experience with language study has not exploited such cues to the fullest extent.

As far as this point is concerned, Coady (1979) proposed a special model of second language reading, which states that comprehension involves three important factors: (1) conceptual abilities, (2) background knowledge, and (3) process strategies. According to Coady, the more abstract processes are used more by the proficient readers, and the less abstract, more concrete lower-level processes dominate the reading strategies of the less proficient readers. He said, "Gradually, the student learns to take advantage of the more abstract process strategies such as context and syntax" (1979:8). From his statements, we realize the need to provide less proficient readers with passages in which background knowledge could be used to compensate for weaknesses in some of the process strategies and linguistic proficiency. Moreover, thinking over the statements they made, we understand that providing explicit instruction in the use of contextual cues and relevant background knowledge would help novice and intermediate readers to extract more information from the text, thereby increasing their comprehension.

In short, the schema theory tells us that readers' background knowledge plays an important role in the reading process. As a reading teacher, we must be aware that some reading materials are culturally biased and it is our responsibility to help students overcome cultural biases.

B. Implications of the Text Theory

In the text theory of reading comprehension, a more general way of representing text is through proposition analysis. Kintsch (1974), Meyer (1975) and Frederiksen (1975) all argued that text information is stored in memory in the form of propositions. But other studies show that the properties of text are important elements in reading comprehension. These important features are: (1) cohesion, a means of tying sentences together, for example, through the use of pronouns; (2) staging, a way of featuring information in text; (3) content analyses, separation of content into events (participants and episodes) and non-events (setting, background, collateral information, and evaluation). Clements (1975) said that information which is staged or made prominent in a text tends to be remembered better.

The implications of the text theory can be summarized as follows:

- (1) In order to improve students' comprehension and maintain their interests in reading, reading teachers should select tests that are well organized and precisely elaborated with causal explanations and use devices such as analogies for bridging prior and new knowledge.
- (2) It is useful and helpful to teach students to recognize and use the text's organizational features and content categories in processing and recalling information.
- (3) Individual differences in abilities and background can be provided for through the directed reading activity.
- (4) Because the location of questions can affect comprehension, we may use questioning strategies to improve students' comprehension.
- (5) Readers are aided by context clues and repetitions of words and concepts. Teach students how to make use of contextual clues to improve comprehension.

- (6) The research has shown us that reducing the number of words and subordination constructs do not necessarily make sentences easier to understand.

In teaching reading comprehension, especially in teaching reading English as a foreign/second language, language teachers need to design comprehension activities that correspond to the learners' reading purposes and processes in reading. That is, for any given assignment, we should vary reading activities according to the type of text with which students are working and the purpose for which they are reading it. If we follow Munby's Communicative Syllabus Design (1978:4-5), reading should involve:

1. Recognizing the script of the language;
2. deducing the meaning and use of unfamiliar vocabulary;
3. Understanding information that is stated explicitly;
4. Understanding implications not explicitly stated
5. Understanding relationships within sentences;
6. Understanding relationships between the parts of a text through cohesive devices both grammatical and lexical;
7. Identifying the main point or the most important information;
8. Distinguishing the main idea from the supporting detail;
10. Understanding the communicative value and function of the text.

To facilitate reading comprehension, language teachers may specify comprehension questions that are related either to discourse structure or the context of the passage. For instance, questions should be skillfully designed to clarify the passage's function, its general argumentative organization, its rhetorical structure, the use of cohesive devices, and the understanding of inter-sentential relationships. In doing this, language teachers can help learners to clarify the discourse structure.

C. Implications of the Story Grammar Theory

Story grammar deals with the way stories are put together, just as sentence grammar deals with the way sentences are constructed. Stout grammar describes higher order structures that readers use to comprehend and recall information found in narratives.

The implications of the story grammar suggest that language teachers should arrange their instruction so as to improve and reinforce students' knowledge of story structure. Teachers may try to provide as many opportunities as possible for children to deal with stories. To improve students' comprehension, teachers have to base their comprehension on story categories and have children complete stories with omitted categories (Whaley, 1981; Sadow, 1982). or teachers may explain story grammar categories either before or after reading activity.

One other thing that EFL/ESL teachers may do is to have students read the stories translated from the students' own native language into English. because students are already familiar with the contents of the stories in their own native language, they can understand the translated stories better and faster. Doing this way, we help students improve their reading speed as well as their comprehension.

IV. Conclusion

Generally speaking, reading involves use of grammar which is related to grammatical competence. Grammatical competence includes knowledge of lexicon or vocabulary, which is also essential to the reading process. reading, in addition, also demands mastery of mechanics of language. However, this is not sufficient. Three more types of competence are also involved. first, sociolinguistic competence which helps the reader get into the mindset of the author of the reading passage to figure out the author's purpose,

genre, register, topic, and so on. A degree of sociolinguistic maturity is demanded of any reader in a new language. Very often, sociolinguistic competence is a strong demand of a second language reader and it becomes a strong tool in quest of meaning of the text. Second, discourse competence is needed in addition to other types of competence in reading. Readers of a second language, especially, need it to be able to read passages of long discourse. They need it to identify instances in which the writer of the passage has used cohesive devices, such as reference, ellipsis, and conjunction. Readers need to know how and why these devices are used if they are to comprehend the meaning of the reading text. Readers also need it to recognize markers indicating coherence in the development, balance, continuity, and completeness of a piece of writing. Finally, strategic competence is needed for interpreting missing knowledge. Readers need to employ strategic competence to process all kinds of contextual or textual clues such as the clues from the linguistic context of the sentence or the paragraph, from the reader's background knowledge, from the content, from what has been said earlier or what will be said later in the text, or from any other source the reader can find.

A review of reading research that has been done in the past decades reveals that there are many shifts in research focus and methodology. We can summarize four main factors that cause shifts:

- (1) The issue of decoding and early reading used to be dominant in the past seems to have lost attraction and attention.
- (2) Practitioners have found out that decoding skills have been well taught in the primary grades, but the job of teaching comprehension thereafter is not satisfactorily achieved.
- (3) Psycho-linguistics and cognitive psychology enable re-

searchers to investigate reading comprehension by means of the issues of memory, inference, and some other advanced disciplines. While researchers in the 1920's up to the 1950's working under the framework of behavioristic psychology, could not investigate the complexity of reading comprehension.

- (4) New technology allows present researchers to investigate the complexities of the structure of text, the structure of knowledge in human memory and so forth. Behaviorism only allowed researchers to deal with associations between concepts represented by words. But now, the psycholinguistics allows us to deal with the microstructure of text such as relations within sentences. Especially, cognitive psychology provides up tools to examine the macro-structure of text, such as inter-sentential relations, semantic networks, scripts, schemata, story grammar, etc. Furthermore, the technology of computer science also has contributed useful insights for research such as information processing theory.

However, contributions of research findings can also be separated into two different areas -- first language reading research and foreign/second language reading research. Summaries of first language reading research are as follows:

- (1) Students need to be taught to read extensively.
- (2) Teachers need to help learners skillfully integrate information in the text with what they have already known. Information from the text and the knowledge possessed by readers act together to produce meaning.
- (3) Reading should be kept flexible. How readers read depend on the complexity of the text, on their familiarity with the topic, and their purpose of reading.
- (4) Readers have to be motivated. Motivation is central to

learning to read. It takes a long time to learn to read well and the students' attention must somehow be sustained during the instructional period.

- (5) Teachers have to understand that successful reading instruction rely on different instructional skills interacting simultaneously. Good readers rely upon perceptual processing, phonemic processing, phonemic processing, and many types of internal recalls

Similarly, contributions of second language reading research are summarized below:

- (1) ESL/EFL students seldom do much reading within the confines of their ESL classroom. Instead, they spend most of their time completing exercises that test their reading skills.

- (2) Extensive reading also contributes to second language reading improvement just like in the first language reading.

- (3) Using authentic materials facilitates L2 reading development.

- (4) Schema Theory has clearly indicated to us the importance of the reader's background knowledge in the process of reading comprehension.

- (5) Schema-related difficulties such as memory harm language learning, especially, reading comprehension, in multiple ways.

- (6) Pre-reading activities can balance and harmonize the individual differences in background knowledge and other types of competence.

To sum up, my impression of reading-research and language-teaching research, after having read a great number of research papers, is listed below:

- (1) Mastery of reading and language, no matter whether it

is a native or a second/foreign language, is a lifetime work.

(2) A full understanding of reading must consider linguistic, cognitive, social/cultural, and psychological factors.

(3) Oral and written language can be analyzed in terms of any of a variety of units or levels of language.

(4) Reading, writing, speaking, and listening are highly interrelated though not identical. Learning to read, write, speak and listen a foreign/second language is much more difficult than we can imagine.

(5) Although many issues or assumptions in the reading research literature can be found, they all examine the reading process in terms of readers, text, task, teachers and, also in terms of the interaction of these factors.

(6) There are many styles and conventions of research and each can play a role in the total ecology of reading and language research.

(7) There is a need to study individual differences in mastery and use of written and oral language.

(8) There are some similarities in the acquisition of reading between the native-language learners and the second/foreign language learners. Of course, there are many differences between them, too. To me, the most important aspect of reading/language research should be the study of affective factors. Affective domain and cognitive domain are two banks of the same river. Either one plays important roles in language learning.

(9) For reading research and the goals of reading instruction, we must understand that reading-to-learn and reading-to-do are two different matters. Reading-to-learn reading tasks are cognitively more difficult than reading-to-do reading tasks. Usually, schools stress reading-

to-learn reading tasks which are essentially more difficult than the reading-to-do tasks involved in much job literacy. For EFL/ESL reading instruction, we may use either task depending on the purposes and interests of students.

Finally, no matter what research findings say, the most key element in the whole reading process should be the reader himself or herself. That is, practically speaking, incentives to read should not be ignored. If students will read more willingly, any difficulties they encounter during reading will be overcome. Students will read more willingly if language teachers can show them visible signs of their own progress. How can we give visible signs to students to show their progress in reading? One simple way is to show how much they have read. For instance, moving from one reading level to the next is an obvious sign that students themselves can be aware of. Therefore, finishing a book is itself one of the best incentives that teachers can help students be aware of.

This implies that reading teachers should start off with short easy books, so that students can quickly experience the satisfaction of this achievement. Their feeling of success will motivate them to start another book, and success will build on success.

Other incentives apart from this basic satisfaction can also be provided by reading teachers. For instance, one may display a chart showing the number of books each student has read. However, it should also be kept in mind that charts of this kind may be counterproductive as far as weak students are concerned. This is because it is nice to see your name climbing steadily upwards, but it is depressing to see your name stay at the bottom of the chart. Anyway, reading teachers need to remember that incentives for reading are very crucial in the whole process of reading instruction.

Related to the issue of reading incentive, many junior or se-

nior high school students in Taiwan may ask such a question: Why do I need to read English? This is a major problem the local English teachers in Taiwan often face. If students have no need to use the target language outside the classroom, then the only function of English for these students seem to be: just to learn it and study it for the test. In this case, the only reason for reading English is: to learn to read it. This is sterile and self-defeating and language teachers ought not to be surprised if student's motivation is so low. Regarding this, the writer's suggestion is that language teachers should select materials that are related to student's daily life and use them as learning materials. By so doing, we can motivate students to read the target language. It needs the teacher's experience and wisdom to decide what kind of materials are related to students' daily life, and what kind of materials can be meaningfully learned and can be applied to the situation outside the classroom. Since how to instruct reading in class is not the main concern of this study, the writer would leave it to the future study.

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