

Ivestigating the Reading Process

—A Survey of Research on Cognitive Processes in EFL/ESL Reading—

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What do people do when they read? If reading involves more than just decoding letters and words (so-called “bottom-up” processing), what cognitive processes do readers use to construct meaning from a text?

In addition to the normal demands of reading, second and foreign language learners may be struggling with an imperfect knowledge of the target language. What strategies do they use when reading in the second language to extract meaning and to get through words or through sections of the text that they do not fully understand? And are these strategies different from those that native-speaker readers use? Are good reading strategies mastered in a first language necessarily transferred to reading in the new language?

For researchers intrigued by the above questions, the challenge is how to attempt to reconstruct what goes on in the mind of a reader at work. No one as yet has devised any way of directly monitoring what goes on inside that complex mechanism called the human brain. For the most part, the reading process, and especially its cognitive aspects, remains invisible to us.

Traditionally, instruments such as multiple choice tests or cloze tests have been used to measure the products of reading: comprehension and memory. In recent years, various new process-oriented approaches have been tried in attempts to reconstruct what goes on in the mind of the reader. These approaches include miscue analysis, “think-aloud” protocols, retrospective reader interviews, and subjective questionnaires. This paper will review some of this research, which, though limited and imperfect, provides us with some useful insights into the working brain of a reader. For teachers, these insights may help in the development of more effective reading instruction or the prescription of constructive remedial work.

Differences in Strategy Use Among Readers

Paris and Myers studied the comprehension and memory skills of two groups of native English speaking children (“good” readers and “poor” readers) using three approaches: they monitored oral reading, asked the children to underline incomprehensible words in a text, and observed their study behaviors while reading.¹ Comprehension was tested using multiple choice questions and a free recall task.

In one experiment, the texts contained some meaningless or “nonsense” words. During oral reading, researchers monitored students’ pauses, hesitations, and whether they seemed to notice that the nonsense words or scrambled clauses (such as the examples below) did not fit in the story:

He saw a black wolf and a red fox in their *Kales*. (nonsense word)

Bob stopped to watch the other animals *the of out the park of the way*.
(scrambled)

The researchers then examined the differences in the responses of the two groups to the difficult or incomprehensible information in the reading passages. They found that the readers who had originally been identified as “poor” scored lower on comprehension and recall measures, as expected, and used fewer self-monitoring strategies to check on their own comprehension during reading. These “poor” readers seemed to use more “decoding” strategies rather than global comprehension (cognitive) strategies and did not seem to attempt to construct comprehensible overall meaning from the text. They seemed more concerned about being able to correctly pronounce whatever word was written, without necessarily considering meaning. When they came to difficult passages in the text, they did not accurately use remedial strategies such as checking the dictionary for an unknown word, or rereading the text. Although they did use monitoring strategies (as indicated by hesitations, repetitions, and self-correction during oral reading), they did not apply these selectively enough. However, both poor readers and good readers often did not seem to notice the nonsense words at all.

In a second experiment, reading and study strategies were observed and recorded by the experimenters during a reading task. Then, the children were asked to rate a list of 25 strategies as helpful, unhelpful, or neutral. A week later, the children were tested for their recall of the stories.

Good readers seemed to use more different strategies for reading and for resolving

comprehension problems while reading (for example, using the dictionary, asking questions about word meanings, etc.). The poorer readers again seemed to be more concerned with being able to say the words rather than understand their meaning. As shown by the questionnaire responses, these poor readers were also often unaware of the potential negative effect of some reading strategies on comprehension (for example, reading as fast as possible or looking up all the words in the dictionary).

Paris and Myers concluded that the group of children who had been identified as good readers may be more skillful because they have learned to use a variety of strategies to check their own comprehension, and they focus on meaning rather than just word decoding. Although this is a study of child L1 readers, the same problems may be occurring with adult EFL readers such as Japanese college students, whose education seems to have trained them to concentrate on what I will call “micro-reading”—accurate word-by-word decoding and translation of a text, rather than reading for overall meaning. This kind of reading may actually interfere with comprehension and recall.

As a follow-up to Paris and Myers’ work with native English speakers, Knight, Padron and Waxman interviewed both bilingual and monolingual children in an attempt to determine whether they favored different reading strategies.² The interviews were conducted while students read a graded passage, and stopped at pre-determined intervals. At these points, the readers attempted to explain what strategies they were using, and the reported strategies were tallied. Strategies cited included rereading, selective reading, *imaging, changing speed, assimilating with personal experiences, *concentrating on the reading, relating passage events with what happened previously in the story, *noting important details, *summarizing, *predicting, *self-generated questions, determining what the teacher will want to know, and rehearsing responses. Some of these strategies (noted with an asterisk*) coincided with the twenty-five surveyed by Paris and Myers.

“Concentrating” was the strategy preferred by the monolingual English students. They also used the strategies of “concentrating,” “noting details,” and “self-generated questions” more frequently than the ESL bilingual students. The bilingual ESL students most often cited “determining teacher’s expectations,” which no monolingual students chose. The ESL students did not cite the important and useful strategies of “imaging,” “noting details,” or “predicting outcomes” at all. Monolinguals seemed to be using about twice as many different strategies as the ESL students.

The researchers suggest that the ESL students may not have had a chance to become proficient readers in their first language (Spanish), or for some reason they have not transferred their L1 reading skills to English reading. Whatever the reason, the ESL students seem to focus on decoding rather than on cognitive strategies which improve overall comprehension of the text. In this way they resemble Paris and Myers' "poor reader" native English speaking children, at least superficially.

Developing Strategy Awareness in L2 Readers

In a further exploration of second language acquisition and cognitive strategies, Hosenfeld³ used the "think aloud" technique and reflective interviews of young second language learners to try to uncover what problem solving strategies they used when confronting difficulties. The "think aloud" technique is similar to that used by Knight and associates (above), except that records of responses were not limited to pre-determined categories of strategies. Detailed transcripts or "protocols" were made and then analyzed and categorized for trends.

In Hosenfeld's first study, after an initial practice session to develop the subjects' "think-aloud" skills, high and low scorers on a reading proficiency test were asked to self-report while reading the next passage from their foreign language text. High scorers (successful L2 readers) favored the following approaches: keeping the meaning of the passage in mind, reading in broad phrases (as opposed to word by word), skipping inessential words, and guessing unknown words from context. They also tended to identify grammatical categories of words, show sensitivity to different word order in the second language, look at illustrations in the text, read and make inferences from the title of the passage, use orthographic clues such as capitalization, refer to the side gloss in the text, use the glossary in the back of the book only as a last resort, look up words correctly, not give up if at first unsuccessful at decoding, recognize cognates (words similar in L1 and L2), use background knowledge, follow through, and evaluate guesses. They also had positive images of themselves as readers, whereas unsuccessful readers had poor self-concept. The unsuccessful readers often lost the meaning of sentences once decoded, read word by word, seldom skipped words, and turned to the glossary to check new words.

Hosenfeld then took the strategies favored by successful readers and attempted to teach them to two unsuccessful L2 readers in New York City, one a fourteen year old

American girl studying French and the other a male high school student studying Spanish. The first subject seemed to be using only one of the skills characteristic of successful readers. She was asked to compare her strategies with a list of those used by successful readers, with the object of developing her awareness of alternative and more productive approaches. She then practiced using these positive strategies. The results showed definite improvement as measured by the increased use of "positive" strategies, although she did not learn to use all of them.

With the second subject, the initial "think aloud" session was used to determine his approach to reading in the foreign language, which was to translate everything into English word for word. This may have been a result of the teaching techniques used in his classes, and the tasks required of students. For whatever reason, his reading was characterized by habitual and excessive dictionary dependence (behavior which I have found also to be common with Japanese students of English).

Using intensive one-to-one tutoring, the researcher attempted to retrain the subject and break him of his translation and dictionary dependence. He was successfully taught to use a number of word-guessing strategies, and in the short period of the experiment he did begin to keep a few simple phrases in Spanish rather than translating. Other new reading strategies were also used by the subject after the tutoring sessions.

Although this sort of individualized tutoring does not seem widely applicable practically in public education, Hosenfeld suggests that the same kind of approach can be adapted for use with large foreign language classes. Whatever the case, she has documented some interesting insights into individual learners' approaches to the process of reading in a foreign language, and she has shown that positive reading strategies are teachable at least to certain learners, which is a reassuring conclusion for teachers.

Hosenfeld's approach advocates an emphasis on improving L2 reading by changing strategies, as opposed to learning more language. However, another researcher found that lack of linguistic knowledge is, at least to some extent, what causes L2 readers to use these primitive strategies and to comprehend poorly.

**The Source of Second Language Reading Problems :
Lack of Linguistic Knowledge or Lack of Transfer of Cognitive Strategies
from First Language Reading?**

Clarke attempted to ascertain whether the psycholinguistic model of the reading process could explain the English reading performance of adult ESL learners who were proficient adult readers in their native language (Spanish).⁴ This led to the additional question of whether proficient L1 readers naturally transfer their skills to L2 reading.

Even intermediate and advanced ESL reading texts tend to focus on vocabulary and grammar exercises, emphasizing language instruction over reading instruction. But if reading is, according to the psycholinguistic view, largely a process of hypothesizing about the content of the text and sampling to confirm or reject those hypotheses, then reading and study skills can and perhaps should be taught independently of language skills (as Hosenfeld attempted).

In the first study, Clarke classed twenty-one native Spanish speakers as “good” or “poor” L1 readers based on a cloze test in Spanish. (The researchers assumed that an acceptable response on a cloze test was an indication of comprehension of the reading passage). Then the subjects were given another cloze test in the target language (English). The unacceptable cloze test responses of both the “good” and “poor” groups were then closely analyzed. These “unacceptable” responses can help us to deduce the processes used by the reader in responding to the problems presented by the incomplete text of the cloze. It was assumed that the differences between good and poor readers would be the same in both languages given that English proficiency was also the same.

The experimental results indicated that in their native language, Spanish, the good readers relied more on semantic cues than syntactic cues when trying to generate an acceptable cloze response. This agrees with Paris and Myers’ and Hosenfeld’s observations that good readers seem to read more for overall meaning and concentrate less on individual words. The poor readers in this study relied more on syntactic information.

However, on the English cloze test, both groups seemed to rely on syntactic cues to the same degree (36%), and the “good” readers scored only 4% higher on acceptable answers than the poor L1 readers. The difference in reading comprehension

between the good and poor readers, as measured by the cloze, narrowed considerably in the target language, and the good readers lost much of their advantage, apparently due to the difficulties of reading in a second language.

Miscue analysis was used in a second study by Clarke, which asked two subjects (one “good” and one “poor” reader) to read a passage orally and then retell the story. This was done for both the native and target languages. The analysis of “miscues” or mistakes in the oral reading for both subjects produced results similar to those for the cloze test in the previous study. The good reader produced fewer miscues in both languages, and those miscues were either more semantically acceptable (closer to the correct meaning) or were corrected by the reader. The good reader also remembered the story better. Again, however, the difference between the two readers was considerably less for the English reading than for the Spanish (L1) reading. The good reader seemed less able to focus on the meaning of the text in English, thus producing a smaller percentage of semantically acceptable miscues and having less of an advantage over the poor reader than with the Spanish reading.

Clarke concluded that these studies confirm the model of sampling behavior predicted by the psycholinguistic view of reading, but it is not clear whether proficient L1 readers transfer their skills to second language reading. He hypothesized an L2 “short circuit”—interference in reading efficiency caused by limited proficiency in the second language. The effect of language proficiency on reading may be greater than was previously assumed; lack of linguistic knowledge may cause even good readers to revert to poor reading behaviors. Clarke concludes with a similar prescription to Hosenfeld's—that good reading behaviors or strategies can and should be taught in the language classroom in addition to linguistic points. He emphasizes the importance of the following strategies : forming hypotheses before reading ; reading to confirm, reject, or revise those hypotheses ; de-emphasizing word-for-word accuracy in reading, and developing a tolerance for inexactness, and willingness to take risks and make mistakes. Second language reading instruction should foster the use of these strategies along with the teaching of linguistic knowledge.

Other Factors Affecting Strategy Use : Background Knowledge and Discourse Elements

The “short circuit” effect observed by Clarke could be caused or compounded not

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merely by linguistic problems, but also by lack of background knowledge about the content of a reading. Following up on Clarke's "short circuit" hypothesis, Hudson suggests that three components interact in reading comprehension to produce various degrees of successful comprehension.⁵ The first of these factors he calls "basal" elements, including letter and word recognition, spelling and phoneme correspondences, and the linguistic elements—lexical, syntactic, semantic and discourse features. Another group is cognitive—the reader's strategies, including many of those listed as essential by Clarke: hypothesis production and testing, guessing and identification of meaning, categorization of information, fitting new information with prior knowledge, reconciliation of assumptions with new possibilities of meaning, and the internalization of representations. The final area is affective factors influencing the reader (the purpose of reading, surroundings, personal interest, interaction with others, etc.), which were not tested in this study.

Hudson decided to look more closely at the transfer or non-transfer of reading behaviors to L2 at different levels of competence from elementary to advanced, using adult ESL students who were proficient readers in their own native languages. He hypothesized that poor comprehension could result from a "misfit" between the text and reader schema. The reader hypothesizes, then samples the text, but fails to correct his wrong hypothesis and for some reason doesn't notice linguistic cues that would be helpful. In other words, the reader may use potentially good reading strategies, but fall down in the area of comprehension monitoring or self-checking, perhaps due to lack of background knowledge.

Hudson used three approaches with his subjects. In one, learners were exposed to pre-reading exercises designed to stimulate schemata formation. In the second, they were provided with essential vocabulary items. The third technique was a self-study control group where students read, took a test, read again, and retook the same test. The three techniques were combined in different sequences with three different groups so that interrelationships could be examined. In addition, the study was repeated at three different levels of ESL proficiency (beginning, intermediate, and advanced), making nine groups in all.

The results showed that students at the beginning and intermediate levels benefited most from the "Pre-reading" technique. The "Vocabulary building" technique also had some effect on scores at the intermediate level. At the advanced level, no significant differences in the effectiveness of any of the treatments were apparent.

Hudson concluded that this occurs because advanced level ESL students are more skilled both in processing visual information from the text and in altering schemata as they read (self-reconciliation).

For lower level learners, the linguistic ceiling described by Clrake may be only one determinant of comprehension. The effectiveness of the "Pre-reading" treatment (induced schema) in improving comprehension scores at lower and intermediate levels is proof that schema formation is very important. These lower level readers did not benefit as much either from the vocabulary building approach (linguistic factor) or from the self-reconciliation approach. They may transfer reading skills fom L1 to L2, but may not be using them as efficiently in L2 when at low linguistic proficiency.

Cohen, Glasman, and associates used a small number of student informants in a series of four related reading and interview studies exploring the role of structural and discourse elements in the comprehension of technical reading passages by ESP students.⁶

The researchers had noticed that university level ESP students became very frustrated with specialized texts in their fields even when they had mastered the technical vocabulary in English. Therefore the source of trouble was hypothesized to be something other than vocabulary, such as structural cues or rhetorical devices. Their results showed that all students had similar problems across disciplines, including difficulty with heavy noun phrases, syntactic markers of cohesion, and non-technical vocabulary.

The four studies used from one to four ESP students who were considered to be good readers of English. Procedures for each study varied, but generally involved having the subjects read a fairly substantial technical English passage in their field (*genetics, biology, political science, or history*). In the first three studies, the task was to underline all vocabulary and phrases that they found difficult to understand. Then subjects were interviewed and questioned in detail about the areas they had found difficult, why they caused difficulty, and how much comprehension had been hindered. In the fourth study, the interviewers also asked questions about the overall meaning of the text as well as investigating problems with words and sentences. In this study, the subjects were also compared with a group of four native English speakers.

All subjects had difficulty with heavy noun phrases, long dense phrases acting as subjects or objects or objects, for example the sixteen word italicized section which functions as the subject of the subordinate clause in the sentence below :

“ Thus, it was conjectured that *such treatments as holding cells in buffer after irradiation before placing them on nutrient agar plates* might function by inhibiting normal growth processes while repair systems completed their task.”

The non-native English speaker subjects apparently had difficulty perceiving such groups of words as units, whereas native speakers were able to do so easily. In one exercise, subjects were asked to mark starting and ending points of noun and verb phrases in an attempt to help readers analyze the sentences.

Another area of common difficulty was with cohesive markers, including conjunctives as basic as “ however ” and “ thus,” and “ also ” and “ finally. ” Insensitivity to the significance of these important markers may prevent readers from inferring important relationships and following the writer’s organization of ideas. Non-native readers generally seemed to read more locally (at phrase or sentence level), and to treat all details equally, instead of skipping points they considered unimportant. This observed behavior reflects the same tendency noted in other studies above by Paris and Myers, Hosenfeld, and Clarke.

The researchers also found that subjects were unfamiliar with a surprising number of non-technical words including *giant, essential, required, maintain, decades, and perceive*. Students marked more non-technical than technical words as problems, and looked up more non-technical words in the dictionary. Yet these non-technical words may be carrying much of the text’s meaning.

These researchers concluded that writers of technical texts must be more aware of potentially confusing structures such as heavy noun phrases, and discourse elements such as cohesive markers. Although these are linguistic factors in reading, they also felt that interview protocols can reveal a lot about students’ reading strategies and problem solving techniques, and that more research in this direction is needed so that we can learn to teach strategies rather than mere vocabulary or grammatical forms.

Patterns of Strategy Use of Good and Poor Readers

In order to describe comprehension strategies, Block decided to investigate the reading processes of second language readers more directly than had been done before.⁷ She chose for her subjects nonproficient college readers who tested at a similar reading level. Three were native speakers of English and six were ESL students who were otherwise proficient in English. She assumed that the reading

strategies of non-proficient readers would be less automatic, and therefore more conscious and accessible to readers given a “think aloud” task. Also, it would be possible to gain more insights into the cognitive process if a reader is dealing with a problem.

The subjects were given two reading passages from a college psychology text to read silently. They had a chance to practice with the “think aloud” approach before working with the two research texts. After reading each sentence, they were to report their thoughts (without analysis) and their strategies for attempting to make sense of the text; if they were silent, the interviewer prompted with questions. To assess memory, subjects were asked to retell as much of the text as possible after additional rereading time. They were also given multiple choice comprehension tests.

The subject’s responses during the “think aloud” sessions were recorded and tallied according to pre-determined categories: by fifteen strategy types, and as either extensive mode (dealing with the writer’s message) or reflexive mode (relating to self). “General” strategies (some of which I believe should more accurately be called “behaviors”) which the researcher looked for included anticipating content, recognizing text structure, integrating information, questioning the information in the text, interpreting the text, using general knowledge, commenting on own behavior or processes, monitoring own comprehension, self-correction, and emotional reaction to the text. Classed as “local” strategies were paraphrasing, rereading, questioning meaning of a clause or sentence, questioning word meaning, and solving vocabulary problems. Obviously this list is not exhaustive and in some cases lumps together what might be a number of different strategies (the last, for example, includes guessing from context, from a part of the word that is known, or other strategies which may in fact be very different cognitively).

Block found no pattern of strategy use to distinguish readers according to their native languages (English, Spanish, or Chinese); their behaviors were highly individual. She concluded from this that reading strategy use is not tied to specific language features, and that transfer of reading strategies from one language to a second is at least partly possible. This supports Hudson’s belief that the use of cognitive strategies is not determined wholly by the learner’s language ability (countering Clarke’s “short circuit” hypothesis to some extent).

However, Block was able to divide all the subjects into two general types, “Integrators” who integrated text information, recognized text structure, and

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monitored their own comprehension effectively; and “Non-integrators” who seemed to rely on personal experience to interpret the text and fill in gaps in their understanding.

These two styles of strategy use seem to have some influence on the ability to learn in general. The “Non-integrators” focused more on details in their retellings but missed main ideas (“micro-reading”). They scored lower on the retellings, but often did as well as Integrators on the multiple choice tests. In later follow-ups, Integrators were found to improve their scores on a standardized language test, whereas Non-integrators showed little improvement over time. Integrators generally achieved better university grade point averages.

The individuality of the readers’ strategy-use patterns should remind teachers to look closely at each student before determining what and how to teach. But the most promising approach seems to lie in training techniques which increase student awareness of strategies, as advocated by Hosenfeld. Some students felt that the “think aloud” process itself had helped them to become aware of how to become better readers. Block suggests the use of discussion between paired reading partners, modeling of good reading behavior by teachers, and reading process journals as awareness-building activities applicable in the classroom. Although these approaches are very time consuming, making students aware of the reading process and the alternative strategies available to them may be the most effective prescription for reading problems.

Notes

- 1) Paris, Scott G., and Meyer Myers II, “Comprehension Monitoring, Memory, and Strategies of Good and Poor Readers,” *Journal of Reading Behavior*, Vol. XIII, No. 1, 1981, pp. 5-22.
- 2) Knight, Stephanie L., Yolanda N. Padron, and Hersholt C. Waxman, “The Cognitive Reading Strategies of ESL Students,” *TESOL Quarterly*, 1985; 19: 789-792.
- 3) Hosenfeld, Carol, “Case Studies of Ninth Grade Readers,” in *Reading in a Foreign Language*, J. Charles Alderson and A. H. Urquhart, Eds., Longman, Harlow, 1984, pp. 231-249.
- 4) Clarke, Mark L., “The Short Circuit Hypothesis of ESL Reading—or When Language Competence Interferes with Reading,” *Modern Language Journal*, 1980; 64: 203-209.
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- 7) Block, Ellen, " The Comprehension Strategies of Second Language Readers," *TESOL Quarterly*, 1986 ; 20 : 463-493.