

How to Understand Written English?

----To Improve Metacognitive Knowledge through SQ3R----

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奥 田枝子
Taeko Oku

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How do we understand written English? Understanding is a constructive-process whereby incoming information is integrated in a meaning way into the reader's existing knowledge (schemata). This process is called the encoding process. In order to activate the encoding process effectively, selective attention is necessary. "Selective attention" is a very important factor in the constructive process of the human limited resource cognitive system. This attention is acquired through progressive practices. One effective practice is the use of SQ3R: Survey, Question, Read, Recite, and Review. Metacognitive knowledge controls attention, encoding, schema formation, and retrieval of information in the human cognitive system. Therefore, improvement of metacognitive knowledge entails improving reading comprehension. Each skill of SQ3R is related to the activation of metacognitive knowledge. The more often the reader uses SQ3R to accomplish his/her reading task, the more sophisticated his/her metacognitive knowledge becomes. Each use of SQ3R improves comprehension of written English.

Introduction

There are lots of psychological theories related to the concepts of learning and cognition. These theories are traditionally divided into the two major schools: behavioral learning theories, and traditional cognitive theories. The former flourished in America in the first half of 20th century, promoted by Thorndike (1898) and Skinner (1965). The latter was primarily advocated by the Gestalt psychologists in Europe so as to educate European middle-upper-classes after World War 1.

From the 1960's to the 1970's, however, American psychology moved from a behavioral stance to a cognitive information-processing stance. The Cognitive Information-processing (CIP) view is based on an integration of both behavioral and traditional cognitive theories. It also suggests that knowledge is represented as a mental structure in a hierarchically organized network of associations among cognitive structure (schemata).¹ Besides acquiring associations among schemata (singular, schema), learning also consists of the acquisition of new schemata. It states that learning and behavior emerge from an interaction of the environment, previous experience and knowledge of the learner. That is, the concept of Cognitive Information-processing is based on a metaphor that the brain is like a programmed computer.

The purpose of this paper is to introduce how to understand written English through the Cognitive Information-processing (CIP) view. This paper is divided into four sections. The first section attempts to present a major cognitive information-processing theory concerning learning; the theory of Atkinson and Shiffrin. The second section discusses how to understand written English. The third section discusses how to become a proficient reader. The last section is conclusion.

I . A Major Idea of the Cognitive Information-processing theory

Since 1960's, theories about memory have been divided into various groups. The basic structure of the mind suggested by Atkinson and Shiffrin is discussed here. Their model is called a Model of the Cognitive System, roughly depicted in Fig.1.² This still has an influence on many scholars. Their model consists of five basic components: sensory registers (input buffers), a short-term memory, a long-term memory, an executive routine, and output buffers. Thinking and learning are made up by the movement and processing of information through and among the components of this system.

The sensory registers (input buffers) are a part of the memory system related to the senses. Sensory registers are very short-term memory that work to retain incoming information for a very short time. Their operation is pretty much an automatic part of perception.

Short-term memory is considered to be the part of the memory system which contains information presently being thought about and processed. The optimal capacity of this system has been calculated to be from two to seven chunks of information at any one time. If a person is attentive to information, he/she places the information into his/her short-term memory and keeps it. Unless he/she keeps thinking about the read information, that

information is lost very rapidly from short-term memory. First, incoming information is automatically entered into short-term memory. Second, in retaining the information, a person's capacity to learn other information is diminished. If information is given too quickly, the system becomes overloaded and loss of information takes place. Therefore, through instruction practices, information should be presented no faster than it can be completely digested. A person must move information from short-term memory to long-term memory in order to keep the information for a long time.

Long-term memory is considered as a very large-capacity, randomly-accessible, and content-addressable memory. Calfee (1981) and Tulving (1972) suggested the idea of dividing long-term memory into two components: long-term episodic memory and long-term semantic memory. Episodic memory stores the memory of the events in our lives. Semantic memory keeps the generalizations we have drawn and acquired from experience, as well as our knowledge of concepts, rules, principles, generalizations, skills, and metacognitive skills. That is, long-term memory is thought to consist of a network of schemata. A person uses the schemata to get meanings from events, to comprehend language used, and to solve problems.

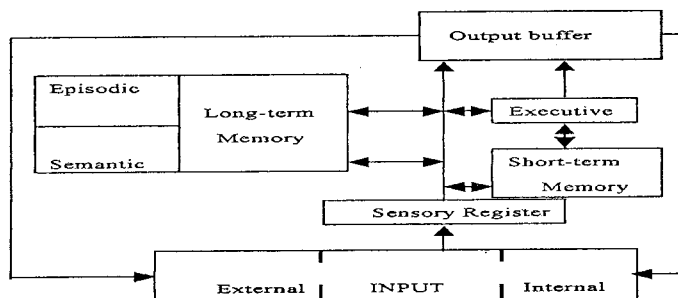


Fig1. A Model of the Cognitive System

The executive is one component of a person's memory system. The component keeps track of what information is being dealt with and controls the flow of information among the other components in this system. In short, the executive commands the other components just like an operating system in a computer system.

The output buffers is a clumsy component in this system. This clumsy component becomes the skillful one through reading practice. This skillful component can operate without much conscious attention. This operation is called automatication. The more the person practices reading, the better he/she operates his/her attention.

II. How to Understand Written English

Understanding is a constructive-process involving both prior knowledge and incoming information operating within the cognitive system. When incoming information has been integrated in a meaningful way into the reader's existing knowledge structure (schemata), understanding occurs. When the reader does not have any related knowledge that can be used to construct an interpretation of a message, retention may occur, but understanding will not.

The Cognitive Information-processing entails the function of encoding processing and schema structure, which have a great influence on the constructive-processing.

A definition of the encoding process refers to the act of how information is stored and remembered. Encoding is assumed to indicate the attempt to acquire target information (Raymond W. Kulhavy, Neil H. Schwartz, and Sarah Peterson, 1986).³

Schema are generally described as information-based structures that decide how a reader will view, approach and interpret the content of the readings.⁴ In general, schemata are constructed from a reader's existing experience and knowledge of the world. They represent the dynamic system that is constantly being created, added to, and expanded by new information as it becomes available to the reader. Lacking specific contextual direction, readers seem to activate particular schemata and devote their intrinsic interpretations to new information based on what they already know the most about. The more effectively the encoding process functions, the more incoming information integrates into the reader's schemata, and produces new schemata. The more related information to incoming information the reader has, the deeper his/her understanding is enhanced.

In order to understand materials deeply, the reader needs to activate the encoding process effectively. Stimuli elements in the encoding process are schema activators and attentive behaviors. They have major effects on the encoding process that the readers are searching for a way to place the new information in memory, and the activation of an appropriate knowledge schema greases the wheels of their processing mechanism. The attentive behaviors in an instructional environment are primary attention and processing attention. Acts of primary attention are relatively basic in nature, therefore not so important in the instructional area. Processing attention, however, plays very important role in learning and remembering. Stimuli act to direct and control the attending process, and are efficient determinations for readers' ability to allocate processing attention. In case of reading alone, the reader tends to focus his/her processing attention toward the material by his/her own judgment.

Britton, Piha, Davis, and Wehausen (1978) utilize their cognitive model to explain attention allocation during reading, and understand how attention operates within the total cognitive system.⁵ Their model of attention contains three stages: a perceptual stage, a comprehension stage, and an elaboration stage. The perceptual stage involves the recognition of information collected from the environment by the sensory receptors. The labeling of a visual form as an A would be an example. The comprehension stage produces the attachment of meaning to recognized input. Stored information, rules, and experiences are matched to the perceptual input to provide meaning. For instance, words or phrases are given meaning by accessing the internal lexicon, and when grammatical rules are applied to the words, sentences comprehension results. The elaborative stage indicates that the system has the capacity to go beyond the information provided by the environment. Problem solving, inferences, and activities such as memorization would exist at this stage. For instance, a student reading a text may realize his/her teacher often asks test questions about the meaning of technical terms and may make a special effort to retain the meaning of a new term just encountered.

In order to read effectively, the cognitive system must coordinate and execute many component processes within a limited period of time. If these component processes all require attention, the total capacity available will simply be exceeded, and the attempted task will meet with failure. Therefore, the reader makes every effort to input some type of information to carry out his/her reading. This process is a controlled process.⁶ A controlled process demands the attention of the learner, and works within short-term memory of which capacity is limited. Then, it entails the input of information from receptors or the retrieval of information from long-term memory store.

If input of information could only trigger information processing, it would be very convenient for the limited human resource information processing. Fortunately, information processing without attention exists in the cognitive system. That information processing is called automatic processing. The automatic process is situated in long-term memory store and is automatically activated according to input from outside the learner or from short-term memory store.

How can a reader acquire automatic processing in reading? The major factor is practice. Through progressive practice, the reader can automatically discriminate and select the more important contents from among many things in the reading materials. Such discriminating selection is called "selective attention".⁷ Selective attention is a very important factor for improving the Cognitive Information-processing.

What characterizes a reader as a proficient reader? A proficient reader begins to read

his/her reading material with an explicit purpose or task. During reading, the reader has boiled down all materials to the simplest principle. The more the encoding process relies on meaning, the greater the chance that the material will be remembered at some later time.

A proficient reader uses learning strategies to accomplish his/her reading under the control of metacognitive knowledge.

III. How to Become a Proficient Reader

In order to become a proficient reader, the reader must train metacognitive skills related to metacognitive knowledge. Metacognitive knowledge, which consists of facts and beliefs as well as procedures for functioning in specific situations, is essential for recognizing and structuring the conceptual information derived from the reading material (Ruendull and Speaker, 1985). Metacognitive knowledge controls and commands learning strategies which the reader should utilize for reading accomplishment. A learning strategy is a general plan the reader formulates for determining how to best achieve a set of academic objectives prior to dealing with the learning task itself (Snowman, 1986).⁸ Some common methods of setting up learning strategies are brainstorming, skimming, semantic mapping,⁹ prequestioning, and advance organizers of the reading material. Many of these methods are, however, taught through instructional techniques; students must rely on the teacher rather than gain them independently.

SQ3R can, however, be strongly supported by instructive methods (Neisser, 1967). The steps of SQ3R are designed to help the processing of incoming information so that the reader can deal with it effectively.¹⁰

The skills of SQ3R have been utilized for the following reasons: (1) it can be strongly supported by cognitive theory, (2) it is in almost every secondary and college level study skills workbook, (3) it is a popular skill that has been in use for over 40 years, and (4) it is highly structured and easy to learn. SQ3R involves 5 basic steps: Survey, Question, Read, Recite, and Review. The following describes the modified SQ3R along with theoretical support for each step.¹¹

(1) Survey

The survey step in SQ3R is an excellent way for readers to derive independently the macrostructure from the material as well as activate schemata related to it before reading it in its entirety. The survey step of SQ3R provides the reader with sufficient information to generate some purposes for reading the material.

To enhance the usefulness of this step for building macrostructure as well as for developing purposes for reading, the reader starts generating questions as soon as he/she reader reads the title and introduction. Such questions include:

- a) How much do I already know about this topic?
- b) How does this topic relate to what I read before in this textbook?
- c) How do I feel about this topic?
- d) Is this topic controversial for me?
- e) What may I learn from the author about the topic?
- f) What do I want to learn about the topic?¹²

Questions (a) and (b) help the reader to activate his/her own schemata related to the topic. Questions (c) and (d) make the material more meaningful and interesting to the reader on an affective level. Questions (e) and (f) not only allow the reader to predict the content, but also help him/her distinguish between the author's message and the reader's purpose. After reading the introduction or first paragraph, the reader reads the summary, or the last paragraph. Because a summary is a condensation of the key ideas in the selection, it can be an advance organizer. Advance organizers have a positive impact on reading comprehension (Ausubel,1960).

The reader reads the boldface headings, lists them, and uses outline formats. These outlines force his/her to attend to the hierarchical organization of the topics within the selection and may be used as a guide to note-taking later on.¹³ That upper level ideas are better recalled than lower level ideas (Rumelhart,1977), therefore the outline procedure facilitates recall of important ideas.

(2) Question

In step (2) of SQ3R, the reader turns subheadings into questions. The reader makes up questions which begin with these words; who, what, where, when, why, and how. These questions often focus on minute details and not on the relations among the ideas in the reading material. In order to link these ideas together, skimming is one of the most effective ways.

(3) Read

Before going on to the third step, which is to read the reading material, section by section, looking for answers to the questions generated in step (2), the reader predicts

possible answers to questions using his/her metacognitive knowledge and schemata. After making predictions, the reader reads the text to confirm his/her predictions. This approach is consistent with the idea that a proficient reader is constantly predicting content, selecting cues from the reading material, and confirming or rejecting hypotheses (Goodman, 1985).

After the reader reads each section of the reading material and prior step (4), the reader directly writes questions in the margins of his/her reading material or in his/her notebooks related to the “answers” or information presented in the reading material.

Through this activity, the reader not only learns the content of the material in an active manner, but also becomes aware of whether or not he/she comprehends it. This additional step makes certain that the reader concentrates his/her attention on all important factors in the reading material.

(4) Recite

The fourth step of SQ3R involves recitation of the answers to the questions the reader constructs. This step is applied to the Cognitive Information-processing. That incoming information is transferred from short-term memory to long-term memory through a rehearsal process (Lindsay and Norman, 1977). The reader rehearses his/her answers through speaking, writing and paraphrasing. Through writing the important ideas in his/her own words, however, the reader gains a better understanding of what he/she reads and improves his/her chances of retaining the information for a longer time.¹⁴ Additionally, the reader is generally more comfortable about writing than saying things aloud.

(5) Review

In the final step, the reader goes back to each heading and attempts to recall the questions and answers. In addition to this, the reader elaborates his/her written outline to write a summary of what he/she has read to tie all of the ideas together.

Summarizing the reading material is one of the best ways to reconstruct the main idea of the selection because the reader is required to realize the superordinate, or important, ideas in the reading material (Taylor, 1986). Additionally, summarizing involves classification of ideas into categories, thus reducing the amount of information to be stored in and retrieved from long-term memory.

Conclusion

The purpose of this paper was to introduce how to understand written English and how

to become a more proficient reader through the become a proficient reader through the Cognitive Information-processing. According to the Cognitive Information-processing (CIP) view, understanding is a constructive-process by which incoming information is integrated in a meaning way into the reader's schemata.

Metacognitive knowledge uses the reader's learning strategy to control his/her thought processes, through careful analysis of the task at hand as well as through monitoring comprehension as he/she reads.¹⁵

In order to acquire competent reading ability, the reader improves metacognitive knowledge in order to command effectively the flow of information in the cognitive system. Metacognitive knowledge is improved by the use of SQ3R: Survey, Question, Read, Recite, and Review. Because the processes of SQ3R are under the control of metacognitive knowledge in nature.

SQ3R highly efficiently stimulates processing attentions on each stage in the cognitive system. The cognitive system is roughly represented as a model of attention. This cognitive model of attention consists of the perceptual stage, the comprehension stage, and the elaborate stage. First, the perceptual stage indicates "survey" and "question" where the reader previews the reading material and establishes purposes for it. The both skills inspire the reader's metacognitive knowledge to activate his/her schemata related to the reading material, and stimulate selective attention towards his/her reading goal. That is, they trigger schema activators as well as attending behaviors. Second, the comprehension stage involves "read" and "recite" through which the reader monitors his/her comprehension. These skills encourage the reader's metacognitive knowledge to integrate incoming information into his/her schemata in a meaning way. The reader's selective attention is also very efficiently activated during the encoding process. According these processes, incoming information is transferred from short-term memory to long-term memory. Lastly, the elaboration stage equals "review" whereby the reader summarizes and reviews the content. In that process, the reader classifies the ideas of the reading material into categories, and reduces the amount of incoming information to several pieces as simple as possible. Through these processes, the reader's metacognitive knowledge operates more powerfully to connect incoming information to a hierarchically organized network of association among his/her schemata. As a result, the reader can store, retrieve, transform, and use his/her information as effectively as possible.

Each skill of SQ3R is related to the elaboration of metacognitive knowledge. The more often the reader uses SQ3R to accomplish his/her reading, the more sophisticated his/her metacognitive knowledge is elaborated. Each use of SQ3R sophisticates metacognitive

knowledge that controls attention, encoding, schema formation, and retrieval of information in human cognitive system.

Notes

¹Thomas Andre and Gary D Phye, "Cognition, Learning, and Education," in *Cognitive Classroom Learning: Understanding, Thinking, and Problem Solving*, (California: Academic Press, Inc., 1986), p.3.

²Andre and Phye, p.4.

³Raymond W. Kulhavy, et.al., "Working Memory: The Encoding Process," in *Cognitive Classroom Learning: Understanding, Thinking, and Problem Solving*, (California: Academic Press, Inc., 1986), p.115.

⁴Andre and Phye, p.5.

⁵Mark Grabe, "Attentional Processes in Education," in *Cognitive Classroom Learning*, ed. Andre and Phye, p.51.

⁶Phye, p.145.

⁷Grabe, p.56.

⁸Jack Snowman, "Learning Tactics and Strategies," in *Cognitive Classroom Learning*, ed. Andre and Phye, p.244.

⁹Mark Lee Peresich, et. al., "Content Area Cognitive Mapping and Writing Proficiency," in *Journal of Reading*, (Vol.33. No.5. 1990), p.425.

¹⁰Patricia E. Call, "SQ3R + What I Know Sheet = One Strong Strategy," in *Journal of Reading*, (Vol. 35. No.1. 1991), p.51.

¹¹Tina Jacobowitz, "Using Theory to Modify Practice: An Illustration with SQ3R," in *Journal of Reading*, (Vol. 32. No. 2. 1988), p.126.

¹²Jacobowitz, p.128

¹³Patricia L. Smith, et.al., "Structured Notetaking: A New Strategy for Content Area Readers," in *Journal of Reading*, (Vol.32. No.1. 1988), p.47.

¹⁴Smith, Frank. *Understanding Reading: A Psycholinguistic Analysis of Reading and Learning to Read*, (Hillsdale, New Jersey: Lawrence Erlbaum Associates, Inc., 1994), p.298.

¹⁵Nobuya Itagaki, et.al., "On the Development Trend and Elaboration Mechanism of Metacognitive Knowledge: Learners' Cognitive Confidence in World knowledge," in *ARELE*, (Vol.7 1996), p.59.

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