Metacognition in Reading

——What are you thinking about what you are reading?——

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Abstract

This paper reports on a qualitative study on second language learners' metacognition in reading, based on the Grounded Theory Approach analysis of their margin notes data. Metacognition is defined as "thinking about thinking" (Anderson, 2002) and reading comprehension is affected by metacognition. Margin note strategies include note taking, underlining, highlighting, and marking in the text. Qualitative data was collected from 44 Japanese L2 learners of English at the university level. The participants' margin notes and the marks were analyzed by coding and categorizing the meaningful elements of the data. Group comparisons are displayed as well.

1. Introduction

Research has revealed that both first language (L1) readers and second language (L2) readers employ remarkably similar patterns of strategy awareness in their reported use when reading academic text in English (Mokhtari & Reichard, 2002). It is also reported that certain strategies are more often used by L2 readers. To date, a series of significant research has been conducted based on the quantitative data. They give us general ideas of what our students in L2 environment do. However, except for some think-aloud studies, there has not been much research based on the qualitative data to understand what the readers are thinking while reading, and what they are doing to help themselves reach the reading goal. Qualitative research can be conducted when an issue needs to be *explored*, and this exploration is needed to identify variables that are not easily numerically

measured (Creswell, 2013). Creswell further argues that qualitative study is useful for gaining a detailed and complex understanding of the issue (ibid). Feeling the need of understanding the L2 readers' way of "thinking about their reading," the writer conducted a qualitative study on metacognition in reading based on the data collected from Japanese L2 readers of English at the university level.

2. Prior Studies

2.1. Metacognitive Reading Strategies

Metacognition is defined as "thinking about thinking" (Anderson, 2002) and, thereby, metacognition in reading can be defined as "thinking about reading." Readers' comprehension is affected by metacognition (Ceylan & Harputlu, 2015), and so the interaction with the text, the reader's mental picture in head, plus metacognitive strategies will constitute their "actual reading."

The effect of the metacognitive strategies on the readers' actual reading is particularly significant not only for the first language (L1) readers but for the second language (L2) readers when they read academic text. As to the L2 readers' strategy use, Sheorey & Mokhtari (2001) and Mokhtari & Sheorey (2002) have conducted significant quantitative research about the identification of metacognitive reading strategies of L2 readers. They have invented an instrument called the Survey of Reading Strategies (SORS) to measure the L2 readers' metacognitive awareness of the strategies they use when they read academic text in English. Their research findings indicated that English as a Second Language (ESL) students used a greater number of *SUPPORT* strategies than L1 readers and that those who have higher reading abilities used strategies more frequently in general. The *SUPPORT* reading strategies, in their definition, include the use of resources such as a dictionary, and the use of comprehension aids such as note taking, underlining, and marking in the text.

Having defined metacognition as thinking about thinking, Anderson (2002) further categorized it into five components: *preparing* and *planning*, *knowing* when to use particular strategies, *monitoring*, *orchestrating*, and *evaluating* the strategies (Anderson 2003). Since the strategy use is not isolated from the use of others, the interaction of those five components is also metacognition. In addition, Anderson (1999) had emphasized that strategic reading requires the ability to *orchestrate* the

use of one particular strategy with that of other strategies.

Another quantitative investigation also pointed out that the "planned, analytical reading" was a key factor according to the principal component analysis of the L2 readers' reported use of reading strategies (Shikano, 2014). Of the subcomponents, "note taking" was particularly important. It was reported that the *SUPPORT* strategies were the most frequently used strategies while a *PROBLEM-SOLVING* strategy of "visualizing information" was also frequently used. Based on such findings, it would be meaningful to collect qualitative data from the readers' note-taking techniques to understand what the readers actually do when reading.

2.2. Qualitative Research

Qualitative research methodologies have developed and become widely used particularly in the areas of medicine and nursing, as a way to elucidate the nature of social phenomena which are not easily measured by experiments or statistical analyses. Qualitative research can be used for forming the hypotheses, abstracting the ideas in the text, constructing the model that explains the phenomena, and finding variations that are often missed out from the hypothesis-testing oriented generalization. (Saiki, 2008; Terashita, n.d.).

The qualitative data may include oral data (narratives and interviews), visual data (photos, images, and observation), and written text data (literature, written materials, and questionnaire responses) (Flick, 2002). Accordingly, not only textual data of the readers' notes but also visual data of marks, symbols, underlines, highlights, arrows, flow charts, or even pictures they draw can become an object for the qualitative analysis.

Among many qualitative research methodologies, the most popular ones are the Grounded Theory Approach (GTA) (Glaser & Strauss, 1967 in Saiki, 2008; Strauss & Cobin, 1998) and its modified version, M-GTA (Kinoshita, 2007a). The original GTA was created as a counter approach to the "theory-testing oriented" quantitative research in 1960s and, consequently, its nature is "theory-production" oriented. Saiki (2008) argues that the value of GTA lies not only in the practical aspect of the methodology but also in the underlying research philosophy. M-GTA is its modified version whose basic principles are "the analysis grounded on the data" and "prioritization of the generated concepts over raw data"

(Kinoshita, 2007b). Alternatively, for a small size of textual data samples, a Step Coding And Theorization (SCAT) approach has also been used as an "easy, startable" and yet "effective" method (Otani, 2008). In this study, however, due to the shortness of data slices and symbolic nature of the margin notes data, more simplified procedures of GTA were used. The detailed procedures of the analysis will be explained in section 3.3.

3. The Present Study

3.1. Research Questions

The present study is aimed at understanding what L2 readers do to think about their reading while reading, based on the data of their margin notes and the marks drawn on the reading page along with the text. The research questions are: 1) what are the second language readers actually doing while reading an academic text in English, as observed in their margin notes? 2) Are there differences in its quality in the use of margin notes strategies between more efficient readers and less efficient readers?

3.2. Methods

3.2.1. Participants

Forty-four Japanese participants at the university level participated in the data collection. They were freshman students majoring in social sciences and taking English courses as a required subject. At the time of data collection in January 2015, the participants were given an explanation that their anonymous data will be used for the reading research and also for the betterment of classroom methodologies and designs. Upon their agreement, they completed the task.

3.2.2. Materials

The margin notes data and summary-making quiz scores were collected from the participants. They were asked to read a seven-paragraph passage about the topic of The Moon from the TOEFL practice book (Gallagher, 2011; p. 432) and to answer the summary-making quiz. The quiz consisted of multiple key information sentences from which they selected three to complete the summary. The task was completed in 15 minutes. Another task they were asked to do while

reading was to write notes in the margin either in English or Japanese, and/or mark the text by highlighting, underlining, annotating, or any form of marks they generally use to help them understand the text effectively and efficiently.

3.3 Analysis Methods

In the data analysis, the writer focused on a *process* of reading to be found in the participants' margin notes. The process consists of going back and forth within

Table 1 Codes Applied to Margin Notes Categories

Codes	Definition	Variations
Headline	A phrase of several words that expresses the topic of the paragraph; reference to the topic.	（#8）distance and move （#5）月面の呼ばれ方
Paragraph topic sentence	A phrase/sentence extracted from the text; paraphrasing phrase/ sentence about what the main idea of the paragraph is.	（#10）moon is natural satellite （#43）月は自ら光を出さず，太陽の光を反射
Annotation	A memo about key information; additional/supporting information to the main idea.	（#38）形をかえるようにみえる （#6）sidereal month 18% ↑ expose
Statistics	Numbers and data	（#49）one revolution 27.3 days （#49）max 406,685 km, min 356,419 km
Technical term/name	A technical or special term; a proper noun (often with definitions)	
Question	A question to check if the reader's understanding is correct (usually with a? mark).	（#7）月の成分？
Vocabulary meaning	Meaning from a dictionary; the reader's guessing about the meaning (often with a? mark when the reader is not sure if it is correct)	（#30）elliptical 長円 （#49）intensity 明るさ？
Graphic organizer	Mind-maps; illustrations; flow charts.	（#43）㊊→㊅→㊐

（# ＝ the participant number）

Table 2 Codes Applied to Marks in the Text

Codes	Definitions
Underlining the topic sentence	Underlining the paragraph topic sentence; underlining main points.
Underlining important information	Underlining key information; underlining supports to the main idea; additional information.
Circling vocabulary	Underlining or circling the academic terminologies; highlighting key words; highlighting unknown vocabulary items (with or without the Japanese meaning by the side).
Highlighting discourse/ logical markers	Circling (or triangle) the discourse markers, such as "however", "but", "so", "despite" among others; circling the words identifying the logical flow, such as "the first phase", "first", or "next".
Chunking	Chunking or dividing a sentence into phrases by slashes.
Modification arrows	Putting arrows to show the modification relations between the words/phrases/clauses.

and around the text to comprehend the text. The two major points of the focus were the linguistically meaningful elements found in the margin notes and the marks they drew along the lines in the text.

The data was first transferred into the worksheet and divided into segments (or slices) corresponding to the linguistically meaningful element as a memo. Most often used types of notes were the following major eight categories, along which the data was coded: 1) headlines; 2) paragraph topic sentences; 3) annotations; 4) statistics; 5) technical terms or names; 6) questions; 7) vocabulary meaning with or without a question mark; 8) graphic organizers. These coding rules and definitions are shown in the Table 1.

The tables 1 and 2 show the coding rules with each code and its definition. For Table 1, there is also a section where notes samples corresponding to the defined category are shown as variations. The first category of 'headlines' is a title of the paragraph, just as newspaper headlines, that expresses the main idea of the paragraph, or several key words introducing the topic, which the reader writes in

their own words either in English or in Japanese. The second category of the 'paragraph topic sentence' is the extraction of all or part of the main idea sentence (e.g., moon is natural satellite) or its paraphrase in Japanese. Main ideas are the central ideas that the writer would like to inform the readers, which is usually explicitly and directly stated. The third category of 'annotations' is the notes confirming the information (e.g., reflects the light of the sun) and the reader's understanding and applying what he knows. The fourth category of 'statistics' is the memos of all the numbers and statistical information. Interestingly, many of the participants wrote out the numbers and percentages to clarify their relations to the objects (e.g., one revolution 27.3 days). The fifth category of 'technical terms/ names' is a technical word, special terminology, or proper noun, which seems to be important in scientific articles (e.g., Harvest Moon). The sixth category of 'questions' is asking the readers themselves questions: the memos reflect their uncertainty or less confidence about comprehension (e.g., 月の成分？; the phase –月の満ち欠け?). The seventh category of 'vocabulary meaning' is the dictionary meaning of a word; the reader's guessing of the meaning, with a question mark when they are not sure about their understanding (e.g., elliptical だ円？; Harvest Moon 月食？). This is also a question. Lastly, the eighth category of 'graphic organizers' included flow charts, illustrations, or drawings. Among them, flow charts may be more advanced notes to take than simple pictures separately drawn.

Next, the marks written by the participants along each line in the text paper were transferred into the worksheet. Table 2 above shows the main categories of the mark types. The following six types were the focus of the analysis, and coded as follows: 1) underlining the topic sentence; 2) underlining important (support) information; 3) circling a vocabulary item (There were two purposes in circling: circling a key word and circling an unknown word with a Japanese meaning written.); 4) marking on discourse markers; 5) chunking or dividing long sentences into short meaningful units by inserting slashes (/); 6) modification arrows showing the modifying relations between the words, phrases, and clauses.

4. Results and Discussion

4.1. Reading Strategies and Orchestration

Strategies the students use will depend on the text type and tasks. As they become more skilled to use certain strategies, they will be able to "strategically select strategies" (LeMaster, 2014) and orchestrate them. The text used for this study was a test-driven passage of academic science context, which may generally include terminologies and their definitions, characteristics, descriptions, explanations, analogies, reasons, cause and effect, categorization, concepts, and theories. Then, what do they write in the margins?

According to the general observation during the data collection, some students employed this margin notes strategy from the start on their first-time reading, whereas others wrote them during the purposeful re-reading. Some were able to use this technique independently and naturally, while others did not show the skillful use of a wide variety of strategies.

The purpose of reading is 'to understand what the author says,' firstly of all. Among the effective reading strategies often suggested by course books, asking questions, finding main ideas, making inferences, paraphrasing, predicting, previewing, reading for specific information, taking notes in a chart, taking notes in margin, and using context may be the popular ones (Blanton & Lee, 1995). By taking a closer look at the general use of the strategies by the participants of this study, it was found that they tended to use more bottom-up, local strategies than global reading strategies, such as making a flowchart, understanding organizations, or making a short summary.

Unlike other qualitative data such as narratives or interviews, written notes are normally short but each element can certainly be conceptualized. To take an example, underlining marks were very often found in the data. Underlining with a pen while reading can mean many things. The reader may be 'reading the sentence carefully' or 'trying to remember key information.' Or, he is not quite sure yet so he is re-reading by moving a pen. The frequent use of the underlining marks in this study supports the writer's previous study based on quantitative data. The strategy item "I underline or circle information in the text to help me remember it." was very often used by both more-efficient readers and less-efficient readers (M=4.30 out of 5) (Shikano, 2014). On the other hand, taking notes was one of

the least popular strategies in the quantitative study: "I take notes while reading to help me understand what I read." (*M*=2.90 out of 5). For that reason too, it is meaningful that one investigates this least-used strategy of 'notes.' In this qualitative study, writing in the margin was their task and the participants had to make an attempt. However, without comprehending the content, it was not an easy task to write notes or paraphrase some of the parts. That may be one of the reasons that more bottom-up reading types of marks and chucking were used than notes in the margins.

Figure 1 shows the relations between the concepts and how they can be orchestrated. Readers orchestrated a variety of strategies and it turned out that the variety and number of strategies and the degree of orchestration varied. However, the richness in varieties and the amount of writing did not co-vary with the summary quiz scores.

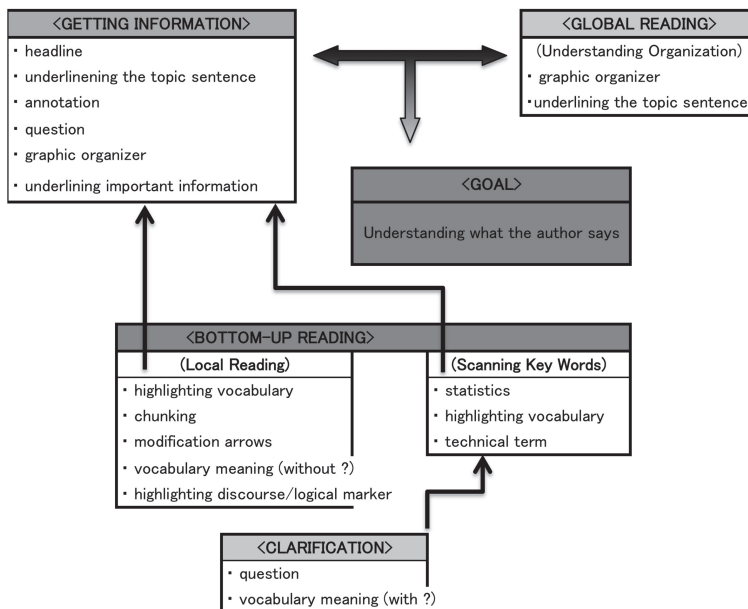The goal of reading is to understand what the author says (Figure 1). The

Figure 1 Orchestration of Strategies

reader's eyes will follow the word, phrase, and sentence to get information. To do that, the reader may mark the vocabulary item as he reads along. It can be a new unknown word, or key word that he wants to highlight. When he doesn't know the word, it will be marked with either a dictionary meaning or his guessing plus a question mark (?) in that case. Modifiers in a sentence are also important for getting information and so the reader adds arrows that show modification and reference relations. When the syntactic complexity of the text is high for the reader, he may use a strategy of dividing the sentence into smaller units of phrases and clauses by putting in slashes (/), which they may believe lowers down the readability. These concepts all support <Bottom-up Reading>. This was a scientific article and included a number of statistics about the moon: 27.3 days of one revolution, distances, 12 degrees, among others. These were easily marked.

The readers also add questions about what a certain sentence may mean and what a certain word may mean in the context. This is more likely to be "asking questions to himself" and "communicating with the text back and forth", in order to assure himself that the meaning he is getting from the text is correct. This concept can be labeled as <Clarification> strategies. These support the reader's local reading.

Typical marking in the text that supports local reading included a paragraph number, circling key words and statistics, circling (or triangle) discourse markers and logical connectors, and slashes. Underlining the important information relevant to the topic and claims was a very typical one.

The upper layer of the reading process, higher than bottom-up reading, was the strategies for <Getting Information>. The reader writes a headline of brief phrase for each paragraph in the margins. The topic sentence of each paragraph is also underlined. This strategy seems to be an advanced strategy in that not so many of the participants were able to identify the topic sentence. The reader writes annotations by extracting ideas and academic terminologies and definitions, or applying what he knows already. Then, based on the discourse markers and logical flow indicators, the text can be charted. If not charted, other diagrams of graphic organizers were drawn. This was another frequently used strategy among readers. To be able to chart the text or visualize the logic, the reader should have understood how ideas are connected and relevant to each other. The strategies of <Getting Information> and <Global Reading> interact to help the reader reach

the goal of understanding about "The Moon".

4.2. Reading Efficiency Differences and Margin Notes

To supplement the above argument, a group comparison was attempted between the more efficient readers and less efficient readers. There were fifteen participants who scored 1/3 in the summary quiz (less efficient readers), while ten others scored 3/3 and were considered to be efficient readers.

Of the coded categories, the following five were examined: 1) annotations in the margins, 2) underlining important information, 3) highlighting vocabulary, 4) chunking, and 5) marking discourse markers, because they were particularly indicative of the differences. The comparison is shown in Figure 2. The number indicates the frequency per person. To illustrate the difference, less efficient readers used the chunking strategy more often (12 times per person) whereas the more efficient readers did not seem to use such local processing. Another difference was the difference in finding important sentences. Getting to the focus of the paragraph and finding important information seemed to require more skills. (See the comparison in Figure 2.)

As the writer mentioned earlier, the most skilled readers may not need to write so many memos and graphic organizers to understand the text. One paper just had a simple but precise flow chart that showed coherent connections of the information about the moon and scored three on the quiz.
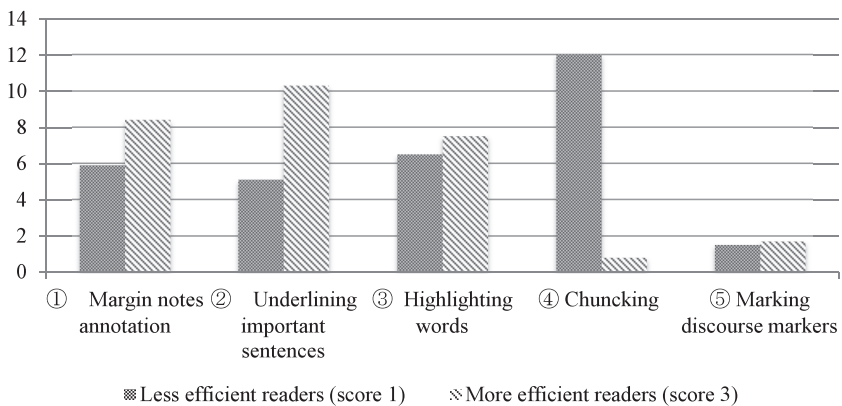

Figure 2 Group Differences

Example of charting the text:
[Moon closest single orbit → Earth; 1969 NASA landed on the moon;
new moon → waxing crescent moon → half moon → waxing gibbous moon →
full moon → waning gibbous moon → waning half moon → crescent moon →
もどる]

5. Conclusion

 Margin notes and marks were collected to understand what the L2 readers
are thinking about what they are reading. From this qualitative study, it has been
shown that L2 readers use different types of reading strategies in "writing in the
margins": a headline, the paragraph topic sentence, annotations, numbers and data,
technical terms and names, questions, vocabulary, and graphic organizers including
small illustrations. The readers, particularly less efficient readers who need more
comprehension aids, marked more frequently in the text to help with their bottom-
up reading: underlining, highlighting, circling, chunking (dividing), and showing
modification by writing arrows. Margin notes may be seen as the written version
of think-aloud protocols. They show us the more real and actual picture of the
readers' reading process, and it revealed that the Japanese L2 readers of this study
tended to rely more on local reading marks, such as chunking or highlighting, and
have not shown comprehensive control of margin note strategies yet. It may be
due to the length of time given for the task. Or it may be due to the academic
type of reading, for which they did not have other options to choose.
 Having found the validity and usefulness of qualitative data, for future research,
it would be useful to design a mixed methods study by analyzing both quantitative
data about metacognitive awareness of L2 reading strategies and qualitative data
of their actual strategy use.

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