日本の女子大学生におけるリーディングのメタ認知意識調査

Investigating Metacognitive Awareness in
L2 Reading Among Japanese Female University Students

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Abstract

This study focuses on the relationship between metacognitive awareness of reading strategies and English reading ability. The participants were 68 Japanese EFL university students who enrolled in an English intensive program before study abroad. Reading strategies that emphasized the importance of top-down processing were taught in the class through two semesters. First, the Metacognitive Awareness of Reading Strategies Inventory (MARSI) created by (Mokhtari and Reichard, 2002) was carried out to see how university students monitor their reading process while reading academic texts at the final class. After collecting the data, a factor analysis was performed with varimax rotation. As a result, it produced five factors: Top-Down Processing by Inference, Advanced Sentence Level Processing, Interactive Processing, Deep Comprehension Processing, and Basic Sentence Level Processing. The study showed that top-down processing by making inferences was the highest. Second, an independent samples t-test was performed to investigate the differences between factors of the MARSI and two groups divided by the TOEFL iBT Reading Score. The result clarified that there was a significant difference in Factor 1, Top-Down Processing by Inference. It indicates that higher-score readers tend to use inference strategies.

Key words: reading proficiency, metacognitive awareness, reading strategies

Introduction

Many researchers have emphasized the importance of metacognitive dimensions of read-

ing (Paris, Lipson, & Wixson, 1983; Sannomiya, 2008; Shikano, 2013). Metacognition is cognition about cognition, a way of thinking about one's thinking. Its conception in educational psychology appeared in the 1970s. Flavell (1979) defined metacognition as "deliberate, planned, intentional, goal-directed and future-oriented mental processing that can be used to accomplish cognitive tasks." Metacognition is a significant factor that affects many activities related to language use and involves the development of reading comprehension (Ceylan & Harputlu, 2015).

According to Sajna (2016), metacognitive awareness means being aware of how you think. Metacognitive reading awareness is an individual reader's awareness of using their thinking process to achieve reading comprehension. Therefore, metacognitive awareness is related to learning achievement in reading (Barnett, 1988; Salataci & Akyel, 2002).

The use of reading strategies has an influence on reading comprehension. Carrell (1989) claimed that there is a close connection between reading strategies and reading comprehension in first or second language acquisition. She found that good readers tend to use global strategies such as gaining the whole text meaning through inferences more frequently than poor readers. Aghaie and Zhang (2012) reported that reading comprehension and reading strategy use improved with strategy instruction. Reading strategies are one of essential factors to develop reading ability. In addition, metacognitive reading strategy awareness plays an important role in reading comprehension (Ahmadi, Ismail, & Abdullah, 2013; Zhang & Seepho, 2013). Metacognitive reading strategy awareness helps learners monitor or regulate cognitive strategies. These activities encourage them to manage their own learning. Therefore, metacognitive strategies in reading aim to increase learners' knowledge of awareness and control. As a result, learners can easily control their learning process and bolster their reading comprehension ability (Salataci & Akyel, 2002).

From these perspectives, it could be stated that metacognitive awareness and reading strategy use are key factors to bolster reading comprehension. In the present study, I use the inventory that measures metacognitive awareness of reading strategies and explore how university students who received the reading strategy instruction monitor their reading process at the final reading class. The aim of this paper is to reveal whether metacognitive awareness of reading strategies is related to English reading ability.

Background

Metacognition

Dunlosky and Metcalfe (2009) explained that metacognition has two components: knowledge about cognition and regulation of cognition. Metacognitive knowledge, the knowledge about cognition, involves awareness of one's thinking. It consists of knowledge about self, the task learners face, and the strategies learners employ. On the other hand, metacognitive regulation represents the regulation of cognition and the ability to manage one's own thinking process. It comprises of both metacognitive monitoring and control, which refer to cognitive activities such as planning, checking, evaluating, testing, and revising strategies. According to Vandergrift and Goh (2012), these processes do not necessarily work in a linear manner. When learners realize that there is a problem with the strategies, they can turn back to planning and modify them, then they continue to perform the learning task. The two aspects of metacognition are connected with each other and work in a cyclical process. Thus, metacognition plays an important role in learning.

Metacognition in Reading Comprehension

Reading comprehension is defined in Meneghetti, Carretti, and De Beni (2006, p. 291) as "a complex cognitive ability requiring the capacity to integrate text information with the knowledge of the reader and resulting in the elaboration of a mental representation." Grabe (2009) stated that reading is also an interaction between the reader and the writer. He explained that the reader also brings a wide range of background knowledge to reading, and he or she actively constructs the meaning of the text by comprehending what the writer intends and by interpreting it in terms of the background knowledge activated by the reader. This study defines reading comprehension as an interactive activity to combine text information with readers' background knowledge.

Reading comprehension is affected by metacognition (Ceylan & Harputlu, 2015). Successful readers demonstrate higher levels of metacognitive knowledge as well as control of their reading (Paris et al., 1983). In addition, successful readers monitor their reading and the state of their learning; they plan strategies, adjust effort appropriately, and evaluate the success of their ongoing efforts to understand (Baker & Brown, 1984; Barnett, 1988; Car-

rell, 1989). Sannomiya (2008) asserted that metacognitive regulation is important to deepen reading comprehension. Reflecting on one's own reading process is to encourage metacognition and plays an important role in their reading comprehension. Furthermore, she explained that metacognition is essential for critical thinking to enhance learning ability: it constitutes the learner's autonomy or self-control. Therefore, it is important to cultivate metacognition. Learners should operate both metacognitive knowledge and its regulation in reading.

Reading Strategies and Reading Skills in Reading Comprehension

According to Manoli and Papadopoulou (2012), the terms "strategies" and "skills" are integral part of the reading instruction and are constantly used in order to help learners comprehend the meaning of written texts. Strategies are defined as deliberate, conscious actions, which are used to achieve a goal. On the contrary, skills are regarded as automatic, unconscious abilities. Thus, skills are strategies that have become automatic through practice, whereas strategies are 'skills under consideration' (Paris et al., 1983, p. 295). This study defines strategies as deliberate, conscious actions. When a learner uses strategies automatically, the strategies have become skills. Therefore, learners should acquire reading skills, including reading strategies.

Takizawa and Yamagishi (2015) stressed that it is indispensable to acquire reading skills that infer the text information. In addition, Carrell (1989) stated that good learners tend to infer the meaning of written texts and stimulate background knowledge. Chikalanga (1991) showed that lack of background knowledge may adversely affect not only a reader's ability to deal with elaborative inferences but also the reader's ability to deal with text-constrained inferences. Therefore, good readers acquire global reading strategies that try to get the whole meaning of a text by utilizing background knowledge and inference ability. Making inferences and activating background knowledge are significant strategies in constructing the meaning of a text.

Researchers in the reading field have argued for many years about top-down and bottom-up reading strategies. These strategies encourage reading comprehension and help readers figure out contents of texts and solve their problems while reading. Bottom-up processing

shows that the reading process is supported by each word in the text and a learner decodes each word to understand the meaning. Learners begin reading by understanding words or letters. Top-down processing indicates that the reading process is supported mostly by learner's background knowledge and prior experience. It focuses on the whole reading process and emphasizes meanings or themes of a text (Eskey, 2005).

Interactive processing focuses on the reading process, which is supported by an interaction between the text information and the learner's background knowledge. It indicates that neither bottom-up nor top-down processing can by themselves describe the whole reading process. This processing is defined as a combination of both bottom-up and top-down processing, and it emphasizes the interrelationship between a reader and the text (Ahmadi et al., 2013; Eskey, 2005; Stanovich, 1980).

Carrell (1989) mentioned that L2 readers of more advanced proficiency levels use more "global" strategies or top-down processing. Less proficient readers use more "local" strategies or bottom-up processing. Similarly, less skilled readers tend to use less global strategies that help them use an effective and active schema (Shikano, 2013). Ishihara (1999) reported how readers developed their metacognitive awareness. He found that there are differences between good and poor readers concerning top-down style. Though learners consider the top-down style of reading to be important, they find it difficult to put this into practice. This is especially true of poor readers. Thus, good readers use both local and global reading strategies; however, poor readers cannot apply top-down processing to their own reading due to their lack of ability.

Suzuki and Morinaga (2010) stated that it is important to use interactive processing effectively. As mentioned above, interactive processing suggests that there is an interaction between bottom-up and top-down processing. Interactive processing compensates for each aspect in the reading process. For instance, when a learner lacks the appropriate content schemata for a certain text, he or she will rely on bottom-up processing to compensate for the necessary background information. When a learner lacks bottom-up skills necessary to comprehend a text, he or she will resort to higher level processes. This means that poor readers tend to resort to higher level processes and the use of top-down processing seems to compensate for the poor readers' limited ability of bottom-up processing (Eskey, 2005;

Stanovich, 1980). Both good and poor readers use interactive processing in a particular situation. It possibly works effectively on reading comprehension when poor readers use top-down processing. From the above, the three types of processing have different characteristics. Each reflects a different type of reading purpose. Accordingly, a teacher should teach students the most appropriate processing for each purpose of reading.

Metacognitive Awareness of Reading Strategies in Reading Comprehension

The use of metacognitive reading strategies has a strong correlation to reading comprehension (Zhang & Seepho, 2013). In fact, proficient learners have utilized various metacognitive reading strategies while reading (Barnett, 1988). Readers who enhance their awareness of the nature of reading and of their own reading strategies are better readers than those who do not. One important aspect of metacognition is controlling one's reading process through the reading strategy use (Baker & Brown, 1984). Reading comprehension involves understanding the surface and hidden meanings of the text using metacognitive reading strategies. The learning of metacognitive reading strategy skills is one solution to the problem of poor reading comprehension (Ahmadi et al., 2013).

To summarize the previous discussion, it is important that learners acquire reading skills such as global and local strategies in reading comprehension. Moreover, they should reflect on their reading process, employing metacognitive knowledge about reading strategies or the task in reading comprehension. Furthermore, they should raise metacognitive awareness that monitors or regulates their reading process appropriately.

Good Readers in L2

Good readers utilize not only top-down processing but also bottom-up processing when they read (Ono, Midorikawa, & Robson, 2001). It is, however, important to note that only top-down processing is not always effective in reading. Yamashita and Yokoyama (2004) indicated that unless learners have a sufficient knowledge of vocabulary and grammar at a certain level, it is difficult to anticipate effective strategy use. Adachi and Oishi (2017) noted that it is important to combine reading strategies with vocabulary learning and grammar instruction in reading comprehension. Furthermore, Grabe (2009) mentioned that vo-

cabulary growth leads to improved reading comprehension, and an increased amount of reading leads to vocabulary growth. Therefore, it should be pointed out that bottom-up processing is also necessary to confirm grammar or sentence structure in reading. A sizeable amount of vocabulary and grammar knowledge is involved in L2 reading comprehension.

Working Memory plays an important role in language comprehension. There are lower- and higher-level processes in reading. Lower-level processes include decoding, recognizing words in the text, and accessing lexical entries. They are highly automatic, so learners make few demands upon Working Memory. On the other hand, higher-level processes include applying background knowledge to the text, inferring meaning that is not explicitly stated in the text, interpreting the writer's intentions, and constructing a global meaning representation of the text. They make considerable demands upon Working Memory (Field, 2004). In other words, lower-level processes represent bottom-up processing; higher-level processes symbolize top-down processing. As stated before, reading integrates text information with the reader's background knowledge. It means that higher-level processes are necessary to construct the meaning of a text, and a greater amount of Working Memory would be activated for comprehension processing. However, Working Memory has limited storage. If Working Memory is greatly used for lower-level processes, readers would have little remaining capacity of higher-level processes. The proportion of lower-level processes would decide on the rest of the capacity for higher-level processes.

There are major differences in linguistic resources that support comprehension for L1 and L2 readers. According to Morishima (2013), L1 readers have automatized lower-level linguistic processes to a greater degree and are thus able to devote much of their resources to higher-level processes, such as discourse comprehension learning and thinking. On contrast, in L2 reading, a greater amount of cognitive resources are consumed by lower-level processes, and as a result, there are a relatively smaller amount of cognitive resources available for higher-level processes such as discourse comprehension, and thus these processes may not be performed or, even if they are, they may have to be performed with more effort. Therefore, the amount of lower-level processes for comprehension processing is different between L1 and L2 reading.

Inventories to Identify Metacognitive Awareness in Reading

There are some inventories of metacognitive reading strategies used in studies. Zhang and Seepho (2013) investigated the metacognitive strategies of English major students in academic reading at a Chinese university. They collected the data by means of a Metacognitive Strategy Questionnaire (MSQ), a semi-structured interview and a reading comprehension test. The MSQ was composed of three main sections asking about the metacognitive strategies that students actually used to plan, monitor, and evaluate their reading process. The results revealed that there was a significant correlation between metacognitive reading strategy use and English reading achievement. Ishihara (1999) used a questionnaire by Carrell (1989) to explore the metacognitive awareness of junior high and high school students. The items on the questionnaire had 35 statements about silent reading strategies that included four categories: confidence, repair, difficulty, and good reader. He reported that top-down styles of reading differed between good and poor readers. In particular, there appeared to be clear differences between successful and unsuccessful readers in the items concerning text gist. Poor readers cannot develop their metacognitive awareness of effective strategies such as "getting the overall meaning of a text" and "understanding the organization of a text" due to their lack of ability.

Dhanapala (2010) and Shikano (2013) used the instrument of Metacognitive Awareness of Reading Strategies Inventory (MARSI) designed by Mokhtari and Reichard (2002). The MARSI consists of 30 items, which measures students' metacognitive awareness and the perceived use of reading strategies while reading academic materials. The MARSI has three subscales or factors: global reading strategies, problem-solving reading strategies, and support reading strategies. Dhanapala (2010) investigated into the metacognitive reading processes of 168 Sri Lankan university students who were majoring in the faculties of humanities, social sciences, and management. The participants were divided into three reading proficiency levels with the use of a reading comprehension test. The study found that in general participants used problem-solving strategies the most frequently. In addition, students who have higher levels of text comprehension used global strategies more frequently, such as guessing and anticipating. Shikano (2013) examined the overall tendency and the group difference in her study. The participants were 60 Japanese university students who were not

majoring in English. They were divided into two groups by their self-rated English reading proficiency. In order to measure self-rated reading ability, the participants were asked to rate the perceived difficulty of a practice TOEFL reading passage. She revealed that the university students tended to use problem-solving reading strategies more often than global and support reading strategies. The results of the *t*-test showed that there were no significant differences between the two groups concerning each item. Next, the principal component analysis was performed and extracted the four components: deliberate and analytical strategies, self-monitoring and repair, meaning negotiation, and guessing strategies, including top-down processing. The group differences were found in the third component, meaning negotiation. Other components did not show strong relationships; there was not a significant difference in the fourth component, guessing strategies, including top-down processing.

As discussed above, reading comprehension is involved in reading strategies (Carrell, 1989). In addition, strategy instruction has an impact on the development of reading comprehension (Aghaie & Zhang, 2012). However, their previous studies did not explain whether the participants received strategy instruction in some ways. Furthermore, the way of grouping was different; Dhanapala (2010) used the scores of a reading comprehension test; on the other hand, Shikano (2013) divided groups by the participants' self-rated proficiency. Besides, the participants were not majoring in English at university. To the best of my knowledge, there is little research to investigate metacognitive awareness of reading strategies by questionnaires such as the MARSI for Japanese university students. Therefore, this study focuses on Japanese EFL university students who are majoring in English and received reading strategy instruction for two semesters. I explore the students' metacognitive awareness of reading strategies by using the MARSI. A factor analysis will be performed to find out distinctive factors produced by the students in the present study. Furthermore, the study clarifies whether there are differences in top-down processing between higher- and lower-score readers divided by reading scores of the TOEFL iBT.

Research Questions

From these kinds of statements that I have documented above, two research questions arise. My research questions are as follows:

1. What kind of metacognitive awareness of reading strategies do Japanese university students have, after they have received reading strategy instruction for two semesters?

2. Is metacognitive awareness of reading strategies related to English reading ability?

Method

Participants

The participants of this study were first-year students at a Japanese women's university in the Kansai area ($N=68$). Their ages ranged from 18 to 20. Their department required all students to study abroad in English-speaking universities from the beginning of the fall semester of the second year to the end of the spring semester of the third year. Hence, students had to enroll in an English intensive program before study abroad to improve English reading ability for admission to overseas universities. This study was conducted in the intensive reading class. The students were divided into two classes ($N=33$, $N=35$) according to their level of English ability based on the results of a placement test in April. Their average score of the TOEFL ITP was about 450 points.

The main aims of the intensive reading class were to acquire academic reading skills and get higher scores of the TOEFL iBT in the reading section of the test. The materials that were used featured academic reading contents. Through two semesters, a teacher gave input on reading strategies that are necessary to get the whole meaning of a text or the writer's intentions.

Instruments

For research question 1, the MARSI was employed in the study to see how university students monitor their reading process while reading academic texts. The questionnaire consists of 30 items, which are statements about what people do when they read academic texts. It is a self-report measure scored on a five-point Likert scale, ranging from five points (*strongly agree*) to one point (*strongly disagree*). The MARSI contains three strategy subscales or factors: global reading strategies (13 items), problem-solving reading strategies (8 items), and support reading strategies (9 items). The global factor reflects strategies related to the global analysis of text. The problem-solving factor includes repair strategies that

are used when text becomes difficult to read. The support factor reflects practical strategies like taking notes and consulting a dictionary. The MARSI was written in English, so I translated it from English into Japanese (see Appendix A).

For research question 2, I used reading scores of the TOEFL iBT. The participants took the TOEFL iBT by individual performance. They chose the day of the test: December, 2019, or January, 2020.

Procedures

The questionnaire was administered in my master's supervisor's class on January 21, 2020. I received his consent in advance. I visited the two classes ($N＝33$, $N＝35$) to obtain the participants' consent and to explain the procedure of the questionnaire (see Appendix B). It took about 15 minutes to complete it after the final test.

Data Analyses

For research question 1, I analyzed the data ($N＝68$) with SPSS 26.0. First, the reliability of the questionnaire was calculated. Second, a factor analysis was performed with a maximum likelihood method with varimax rotation.

For research question 2, five students did not take the test ($N＝63$). First, I divided the students into two groups based on reading scores of the TOEFL iBT. The score range is from 30 points to 0 point. Table 1 shows the distribution of the participants' reading scores. The maximum points were 24 and the minimum one was 1. The higher-score group consisted of students who got points more than 13 ($N＝34$) and the lower-score group consisted of those who got points less than 12 ($N＝29$). Then, in order to examine the differences between factor scores of the MARSI and English reading ability, I employed a *t*-test to examine if there is a difference between the two groups.

Table 1   Details of the Reading Score Distribution

| Higher-Score Group | | Lower-Score Group | |
Score Range	*n*	Score Range	*n*
30-24	1	12-9	19
23-18	9	8-4	8
17-13	24	3-0	2
Total	34	Total	29

Results

Research Question 1

Before the analysis, the reliability of the instrument was examined by using Cronbach's Alpha reliability analysis ($\alpha = .65$). This provides an acceptable coefficient. A major factor analysis with varimax rotation was employed to find out factors of the MARSI. I tried several analyses. As a result, it produced five factors with eigenvalues greater than 1.0 and factor loading ($>|.40|$). As shown in Table 2, the total accumulation of the five factors accounted for 39.3%.

Table 2   Explanatory Total Variance for a Major Factor Method

| F | I | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | | Cronbach's α |
		Total	Variance	Cumulative	Total	Variance	Cumulative	Total	Variance	Cumulative	
1	7	5.915	19.718	19.718	2.293	7.643	7.643	3.446	11.487	11.487	.826
2	4	2.481	8.271	27.989	4.776	15.919	23.561	2.657	8.857	20.344	.713
3	2	2.278	7.593	35.582	1.416	4.720	28.281	1.935	6.449	26.792	.518
4	4	2.085	6.949	42.531	1.760	5.866	34.147	1.920	6.401	33.194	.565
5	3	1.889	6.296	48.827	1.553	5.178	39.325	1.840	6.132	39.325	.624

Note. F＝Factor, I＝Number of items, Variance (%), Cumulative (%).

Table 3 shows the number of factors of the MARSI after factor loading. The questionnaire had 30 items in total. However, the 10 unclassified items (items 1, 4, 5, 6, 11, 13, 14, 15, 16, 18) were eliminated because these values of factor loading were lower. I labeled five factors as follows.

Table 3 Explanatory Factor Analysis for a Major Factor Method With Varimax Rotation

Items	Factors				
	1	2	3	4	5
G 3. I think about what I know to help me understand what I read.	.746				
P 30. I try to guess the meaning of unknown words or phrases.	.701				
G 29. I check to see if my guesses about the text are right or wrong.	.663				.410
G 19. I use context clues to help me better understand what I'm reading.	.641				
G 17. I use tables, figures, and pictures in text to increase my understanding.	.578				
S 20. I paraphrase (restate ideas in my own words) to better understand what I read.	.493				
G 26. I try to guess what the material is about when I read.	.490	.450			
G 25. I check my understanding when I come across conflicting information.		.746			
G 22. I use typographical aids like bold face and italics to identify key information.		.620			
G 10. I skim the text first by noting characteristics like length and organization.		.444			
S 24. I go back and forth in the text to find relationships among ideas in it.		.431			
P 8. I read slowly but carefully to be sure I understand what I'm reading.			.847		
S 9. I discuss what I read with others to check my understanding.			.593		
G 23. I critically analyze and evaluate the information presented in the text.				.765	−.497
S 2. I take notes while reading to help me understand what I read.				.561	
G 7. I think about whether the content of the text fits my reading purpose.				.482	
P 21. I try to picture or visualize information to help remember what I read.				.406	
S 12. I underline or circle information in the text to help me remember it.					.600
S 28. I ask myself questions I like to have answered in the text.					.562
P 27. When text becomes difficult, I re-read to increase my understanding.					.506

Note. $N=68$, Extraction Method: Maximum likelihood estimation; Rotation Method: Varimax; Factor loadings>.40, Factor 1=Top-down Processing by Inference; Factor 2=Advanced Sentence Level Processing; Factor 3=Interactive Processing; Factor 4=Deep Comprehension Processing; Factor 5=Basic Sentence Level Processing, G= Global reading strategies; P=Problem-solving reading strategies; S=Support reading strategies.

First, Factor 1 included seven items, items 3, 30, 29, 19, 17, 20, and 26, accounting for 11.5% of the variance. Factor 1 represents top-down processing. The highest frequency was item 3: "I think about what I know to help me understand what I read." It implies that it is important for students to activate background knowledge in reading comprehension. In addition, some items were contained a keyword, "guess." For instance, "I try to guess the meaning of unknown words or phrases" (item 30), "I check to see if my guesses about the text are right or wrong" (item 29), and "I try to guess what the material is about when I read" (item 26). Besides, Factor 1 had the following two items: "I use context clues to help me better understand what I'm reading" (item 19) and "I use tables, figures, and pictures in text to increase my understanding" (item 17). These are strategies that infer the meaning of a text from context clues or visual information besides the text. Item 20: "I paraphrase (restate ideas in my own words) to better understand what I read" represents top-down processing

that looks through the whole text. I labeled Factor 1 "Top-down Processing by Inference."

Second, Factor 2 consisted of four items, items 25, 22, 10, and 24. It accounted for 8.9% of the total variance. Factor 2 is related to both top-down and bottom-up processing. For instance, "I check my understanding when I come across conflicting information" (item 25), "I go back and forth in the text to find relationships among ideas in it" (item 24), and "I use typographical aids like bold face and italics to identify key information" (item 22). When faced by difficult problems, students try to solve each problem at a discourse level. These are strategy items that find out relationships among sentences through the whole text. Item 10: "I skim the text first by noting characteristics like length and organization" represents top-down processing at the whole-text level. This factor includes both global and local strategies. Therefore, I labeled Factor 2 "Advanced Sentence Level Processing."

Third, Factor 3 had two items: "I read slowly but carefully to be sure I understand what I'm reading" (item 8) and "I discuss what I read with others to check my understanding" (item 9). It accounted for 6.4% of the variance. These items are involved in interaction with oneself or others. Students read carefully by themselves, or they get information by discussing the contents of a text with others to check their understanding. Thus, I labeled Factor 3 "Interactive Processing."

Fourth, Factor 4 obtained four items, items 23, 2, 7, and 21, accounting for 6.4% of the variance. Two items: "I take notes while reading to help me understand what I read" (item 2) and "I try to picture or visualize information to help remember what I read" (item 21) were considered the strategies that remember text information to make their understanding easy. In addition, other items are necessary to understand the contents deeply through the whole text: "I critically analyze and evaluate the information presented in the text" (item 23) and "I think about whether the content of the text fits my reading purpose" (item 7). It is important to analyze critically and reflect one's reading purpose to enhance metacognition. Accordingly, this factor represents top-down processing. I named Factor 4 "Deep Comprehension Processing."

The last was Factor 5 with three items: "I underline or circle information in the text to help me remember it" (item 12), "I ask myself questions I like to have answered in the text" (item 28), and "When text becomes difficult, and I re-read to increase my understand-

ing" (item 27) accounted for 6.1% of the variance. Probably, students would read and understand a text sentence by sentence. They would also read a text by confirming each sentence or making questions clear. Thus, it represents bottom-up processing. I named Factor 5 "Basic Sentence Level Processing."

Table 4　Categories of Five Factors of the MARSI

Factor/Name	Items	Global strategies	Variance (%)	Cronbach's α
1 Top-down Processing by Inference	7	5	11.5	.826
2 Advanced Sentence Level Processing	4	3	8.9	.713
3 Interactive Processing	2	0	6.4	.518
4 Deep Comprehension Processing	4	2	6.4	.565
5 Basic Sentence Level Processing	3	0	6.1	.624
Total	20	10	39.3	.649

Table 4 represents categories of five factors of the MARSI. As shown in the results, the participants monitored their reading process of inference strategies including top-down processing. It is important to recognize that they monitored sentence level processing simultaneously. With respect to global reading strategies (13 items) produced by Mokhtari and Reichard (2002), the 10 items are contained in the results of the present study. It implies that the students tend to use global reading strategies more than problem-solving or support reading strategies.

Research Question 2

An independent samples t-test was performed, with factor scores of the MARSI as dependent variables, and higher- and lower-score groups as independent variables (see Table 5). The results showed that there was a significant difference in Factor 1, Top-Down Processing by Inference (t (61)＝2.10, $p<.040$, d＝0.53), which suggested that the higher-score group has more inference-making ability than the lower-score group when reading academic texts.

Table 5　Descriptive Group Statistic and t-Test Between the Two Groups

Factors	Group	N	Mean	SD	p
1. Top-down Processing by Inference	A	34	0.2600133	0.84817522	.040
(TPI)	B	29	−0.2296541	1.00340732	
2. Advanced Sentence Level Processing	A	34	−0.1679885	0.94164185	.180
(ASLP)	B	29	0.1459103	0.88366493	
3. Interactive Processing	A	34	−0.0552378	0.86824804	.267
(IP)	B	29	0.1923966	0.87998102	
4. Deep Comprehension Processing	A	34	−0.0809643	0.94409744	.589
(DCP)	B	29	0.0437273	0.86560787	
5. Basic Sentence Level Processing	A	34	0.0099236	0.90379714	.945
(BSLP)	B	29	0.0265620	1.00007402	

Note. Group A (N＝34)＝Higher-Score Group (from 24 to 13 points); Group B (N＝29)＝Lower -Score Group (from 12 to 1 points).

Discussion

Responding to Research Question 1

This study created five factors that accounted for 39.3% of the total variance. As shown in the results, TPI (Factor 1) was related to top-down processing. In particular, the participants monitored global reading strategy use by inference. ASLP (Factor 2) was involved in not only global but also local strategies at a discourse level. IP (Factor 3) represented interactive processing that integrates text information with prior knowledge of oneself or others. DCP (Factor 4) featured global strategies that understand text information deeply. BSLP (Factor 5) was connected to bottom-up processing at a sentence level.

Carrell (1989) pointed out that good L2 readers used more global strategies or top-down processing. Ishihara (1999) mentioned that poor readers cannot develop their metacognitive awareness of global strategies in the items concerning text gist. With respect to three subscales by the MARSI, the result of a factor analysis shows that the students in the present study monitor their reading process that is related to global reading strategies. The students have read a large amount of academic texts for two semesters. In addition, a teacher emphasized in the class strategy that catches the gist of what the writer intends. It could be stated that strategy instruction enables students to use reading strategies while reading academic texts. I suggest that the instruction helps students increase the metacognitive aware-

ness of global strategies. Indeed, all the factors of the total variance accounted for less than 50 %. The ratio was not a high proportion; however, it is true that the 10 items of global strategies are seen in Table 3. It indicates that the students' metacognitive awareness of global reading strategies is high in the study.

However, good readers do not just tend to use global reading strategies. Rather, good readers have the ability to choose the strategies that they want to use. As noted above, bottom-up processing is a significant factor in reading comprehension (Adachi & Oishi, 2017; Grabe, 2009; Yamashita & Yokoyama, 2004). Poor readers do not acquire sufficient local strategies, including grammatical and vocabulary knowledge. Therefore, they need to achieve a higher level of bottom-up processing by acquiring sufficient knowledge of vocabulary and grammar in order to be able to utilize global strategies (Ono et al., 2001). It means that it is important to increase grammatical and vocabulary knowledge. Academic passages often use different words that are synonymous in meaning. That is, a word or a phrase is expressed in other words in the text. Accordingly, students have to find out which parts represent the same meaning to comprehend the content of a text. It is indispensable for students to acquire basic reading skills such as vocabulary and sentence structure.

Responding to Research Question 2

The second research question addressed the issue that good readers tend to employ metacognitive strategies of making inferences more frequently than poor readers. It clarified that inference strategies contribute to reading comprehension. The result supported the previous research that good readers can infer the meaning of written texts (Carrell, 1989). Factor 1 included inference strategies. Making inferences are necessary to see through the writer's intentions and the concealed information behind the text in reading comprehension. Inference ability helps students integrate new information with prior knowledge. Hence, the finding supports the notion that students should heighten their metacognitive awareness of inference strategies in reading comprehension.

On the other hand, Shikano (2013) reported that there were no statistical differences between the two reading proficiency groups with respect to guessing strategies including top-down processing. The result is different from that of the present study. I suggest two possi-

bilities why the difference occurs. First, the difference may be affected by the instruction for two semesters. The previous research did not explain whether reading strategies were taught in the class. Aghaie and Zhang (2012) mentioned that strategy instruction has an influence on reading strategy use. The students in the present study have learned global reading strategies that are important to understand the whole meaning of a text, such as paragraph reading or making inferences. Therefore, the strategy instruction in the class might account for a different result. Second, the way of dividing two groups was not the same. Shikano (2013) did not use test scores. The material was a practice TOEFL reading passage. The participants in her study assessed their reading proficiency by self-evaluation. In the present study, participants' prior reading scores from the TOEFL iBT were used. It can be surmised that self-assessment of reading ability and actual reading scores of the test are not the same standards.

Working Memory refers to inference ability between reading proficiency groups. Field (2004) noted that higher-level processes are related to background knowledge, inference ability, the ability to interpret and construct a global meaning of a text. A greater amount of Working Memory would be activated for comprehension processing. Good readers do not have to spend much capacity on lower-level processes. Therefore, good readers have more capacity to use higher level processes than poor readers. On the other hand, poor readers probably spend a great amount of capacity on lower-level processes that include bottom-up processing. As a result, they make few demands upon Working Memory regarding higher-level processes. In short, poor readers do not acquire the vocabulary and grammar skills that are necessary for bottom-up processing well. Therefore, poor readers have less capacity to use higher-level processes such as making inferences. Hence, inference ability is related to higher-level processes of Working Memory. What is more, this phenomenon occurs largely in L2 reading. As Morishima (2013) stated above, there is a big difference in terms of consumption for lower-level processes between L1 and L2 reading. Working Memory plays a significant role on language processing.

Conclusion

The focus of the current research was to investigate metacognitive awareness of reading

strategies in reading comprehension. This study attempts to provide several insights into whether metacognitive awareness of reading strategies influences English reading ability. First, the results revealed that the participants had five factors from the MARSI in common: TPI, ASLP, IP, DCP, and BSLP. As a result, their metacognitive awareness of global strategies is the highest. One might also suggest that reading strategy instruction enhances students' metacognitive awareness of reading strategies. Second, the significant difference was seen only in Top-down Processing by Inference (Factor 1) between the two groups. Good readers tend to use inference strategies more frequently than poor readers.

As for pedagogical implications, first it should be noted the fact that reading is involved in some factors such as capacity of Working Memory and the difference between L1 and L2 reading. Second, students should receive reading strategies of instruction in order to become successful readers. Besides, it is crucial to acquire not only reading strategies but also basic reading skills of vocabulary and grammar to bolster reading comprehension. Third, it is important that students reflect on their reading process to enhance metacognition.

In this study, there are limitations. First, the sampling size of the participants was not large. Second, some qualitative research should have been carried out to obtain more precise results. These omissions should be remedied in a follow-up study.

I believe that metacognitive awareness is of great significance in reading comprehension. Further study will be undertaken to explore how Japanese EFL learners monitor, control, and regulate their reading process through qualitative data. In addition, a longitudinal study is necessary to see how their reading process has been changed.

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Appendix A: Questionnaire on the MARSI

Metacognitive Awareness of Reading Strategies Inventory（MARSI）Version 1.0
大学のリーディングクラスで英語の教材を読む時、どのような状況が最も当てはまるかを
1〜5 の中から選んでください。
率直にありのままお答え下さい。大学の成績とは一切関係ありません。ご協力よろしくお
願いいたします。
回答例（1〜5 の数字をひとつ選び、その番号に○印をつけてください。）

1	2	3	4	5
全く、ほとんどしない	たまにしかしない	時々(50%の頻度)する	たいていする	常に(ほぼ毎日)する

リーディングクラスで英語教材を読むときのストラテジー（読解方略）	スケール（尺度）				
1. 私は英語の教材を、目的をもって読む。	1	2	3	4	5
2. 私は内容を理解する助けとして、メモをとりながら読む。	1	2	3	4	5
3. 私は内容を理解する助けとして、自分が知っていることを思い浮かべる。	1	2	3	4	5
4. 私は内容を把握するために、読む前に文全体にさっと目を通す。	1	2	3	4	5
5. 私は文が難しくなると、内容を理解する助けとして、音読する。	1	2	3	4	5
6. 私は文中にある重要な情報を振り返るために、読んだ内容を要約する。	1	2	3	4	5
7. 私は読む文の内容が自分の読解目的に合っているかどうか、について考える。	1	2	3	4	5
8. 私は読んでいるものが理解できているかを確かめるために、ゆっくりではあるが注意深く読む。	1	2	3	4	5
9. 私は自分の理解を確認するために、ほかの人と読んだ内容について話し合う。	1	2	3	4	5
10. 私は文の長さや構成といった特徴を知るために、最初に文全体にさっと目を通す(スキミング)。	1	2	3	4	5
11. 私は集中力がなくなってきたら、すでに読んだところの段落にもう一度戻ろうとする。	1	2	3	4	5
12. 私は内容を思い出す助けとして、文中の情報に下線や丸印をつける。	1	2	3	4	5
13. 私は読んでいるものによって、読む速さを変える。	1	2	3	4	5
14. 私はきちんと読むべき箇所とそうでない箇所を、見極めて読む。	1	2	3	4	5
15. 私は内容を理解する助けとして、辞書などの道具を活用する。	1	2	3	4	5
16. 文が難しくなるとき、私はよりいっそう何を読んでいるかに注意して読む。	1	2	3	4	5
17. 私は理解を深めるために、文にある表、グラフ、絵や写真などを利用する。	1	2	3	4	5
18. 私は時折、読むのをやめて、何を読んでいるかについて考える。	1	2	3	4	5
19. 私は内容をより深く理解できる助けとして、文脈からのヒントを利用する。	1	2	3	4	5
20. 私は内容をより深く理解するために、自分の言葉で言い換え（パラフレーズ）をする。	1	2	3	4	5
21. 私は内容を思い出す助けとして情報を絵で表現したり、視覚化しようとする。	1	2	3	4	5
22. 私は重要な情報を確認するために、大文字やイタリック体のような書体の変化に注目する。	1	2	3	4	5
23. 私は文に出てきた情報を批判的に分析、評価する。	1	2	3	4	5
24. 私は文の中にある考えのつながりを見つけるために、文を行ったり来たりしながら読む。	1	2	3	4	5
25. 私は矛盾する情報に出くわすとき、自分の解釈を確認する。	1	2	3	4	5
26. 私は読むとき、その教材が何に関するものなのかを推測しようとする。	1	2	3	4	5
27. 文が難しくなるとき、私は理解を深めるために読み返す。	1	2	3	4	5
28. 私は答えが文の中に入っていると期待しながら読む。	1	2	3	4	5
29. 私は文に関する自分の推測が正しいのか、間違っているのかどうかを知るためにその文を確認する。	1	2	3	4	5
30. 私は知らない語や語句の意味を推測しようとする。	1	2	3	4	5

Reference: Mokhtari, K., & Reichard, C.（2002）. Assessing students' metacognitive awareness of reading strategies. *Journal of Educational Psychology, 94*（2）, 249-259.

Appendix B: Consent Form

データ収集への協力のお願いと同意書

　私は現在、英語読解力とメタ認知の関係性について研究しています。つきましては
この質問紙調査を研究材料のひとつとし、その関係性を調査したいと考えています。
なお、この調査を実施するに際して入手した個人情報は、研究以外には使用しないと
ともに厳重に管理することを誓います。何卒ご協力よろしくお願い申し上げます。

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E-mail: ibm004@dwc.doshisha.ac.jp

</div>

データ収集についての同意書

どちらかに必ず☑してください。

☐　上記に同意する

☐　上記に同意しない

クラス　　　　　　名前　　　　　　　　　　　　　　　　学籍番号