Reading Processing Skills among EFL Learners in Different Proficiency Levels

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ABSTRACT

This study aims to understand how EFL learners in different reading proficiency levels comprehend L2 texts, using five-component skills involving measures of (1) vocabulary knowledge, (2) drawing inferences and predictions, (3) knowledge of text structure and discourse organization, (4) identifying the main idea and summarizing skills, and (5) identifying supporting information of L2 texts. One-hundred and forty-six Japanese undergraduates majoring in different disciplines participated in this study. Correlation analyses, discriminant function analysis, and regression analysis revealed that identifying specific information and drawing inferences contributed greatly to the distinction of three proficiency levels. Results also indicated that Japanese students' attentional processes involving inferencing, problem solving, monitoring and resolving ambiguity were rather low. Further, results confirmed that L2 proficiency supports the efficient functioning of both lower-level and higher-level processing skills deemed crucial for the text model of comprehension as well as the situation model of reader interpretation.

INTRODUCTION

Though little research on individual skills such as word recognition (Akamatsu, 2002), working memory activation (Ikeno, 2002), inference generation (Collins & Tajika, 1996; Muramoto, 2000) is available in the EFL context, no research has so far been documented in the literature that explores the simultaneous contribution of subcomponent skills to reading comprehension among EFL (English as a Foreign Language) learners with varying levels of reading proficiency, who have less exposure to L2 (second language) print. In particular, the study examined the extent to which the skills of (1) vocabulary knowledge, (2) drawing inferences and predictions, (3) knowledge of text structure and discourse organization, (4) identifying the main idea and summarizing skills, and (5) identifying supporting information of the texts can discriminate between EFL learners of different reading proficiency levels as measured by a reading comprehension test (hereafter, RCT) and the effect of these component skills on EFL learners' text comprehension. In addition, the Test of English for International Communication (TOEIC) targeted at EFL learners, measures general English in an international business context. The test mainly consists of two sections, listening and reading with 100 multiple-choice items each. The reading section is divided into 3 parts on (1) recognition of an error in a sentence, (2) filling in of a blank within a sentence, and (3) multiple-choice comprehension questions, based on short texts such as notices, news items, letters, announcements, memos, and so forth. Though there are criticisms leveled against different

aspects of both the original and new versions of the TOEIC test (Alderson, 2000; Buck, 2001; Chapman & Newfields, 2008), our aim of this study is how these component skills contribute to the TOEIC reading scores. In particular, the following research questions were addressed in this study:

1. How are the different reading component skills related to the total scores of the RCT? How are they related to TOIEC reading scores?
2. To what extent can the reading component skills discriminate between EFL learners with different levels of reading proficiency? How do they differ in terms of different levels of reading proficiency?
3. How do these reading component skills contribute to total TOIEC reading score?

Text Comprehension

Reading comprehension, at its most fundamental level, involves the efficient application of lower-level processes (Stanovich, 1986; Carrel, 1984) consisting of phonological awareness, word recognition skills, and syntactic awareness, all of which are crucial for the development of successful reading comprehension (Stanovich, 1986). It also involves higher-level processing skills of syntax, semantics, and discourse structures together with higher-order knowledge of text representation and the integration of ideas within the readers' global knowledge (Grabe, 2009; Grabe & Stoller, 2011). Therefore, readers need to integrate and combine a variety of cognitive, linguistic, and non-linguistic skills and processes for efficient and successful text comprehension.

Among several reading comprehension models, Construction-Integration (CI) model (Kintisch 1998; Kintsch & van Dijk, 1978) is considered the most current and valid reading comprehension model, applicable even to L2 text comprehension. The CI model distinguishes between a text model of reader comprehension and a situation model of reader interpretation. According to the text model, comprehension takes place at both local and global levels: Local-level processes (micro-structure) employ language knowledge through nouns, predicates, and modifiers to build sentence-level understanding while the global level processes (macro-structure) utilize language knowledge together with cohesion and text structure to understand sentence-level relationships and to ultimately create a text-based understanding. During these processes, inferences are generated based on the content of the text and this mental representation of the text assists the readers in creating a text-based model of understanding. Similarly, these local and global properties of the text can either facilitate or debilitate comprehension processes depending on the reader who interacts with the text.

In fluent text comprehension, what do the readers do? They not only create a text model of understanding the text, but also build a situation model of text interpretation: readers integrate the text information with their prior knowledge through elaboration and inference generation processes and construct independent interpretations of the text. Based on a number of factors such as the readers' goals, prior knowledge, the purpose of reading, genre activation, evaluation of the importance of information, and attitudes toward the writer, readers construct independent interpretations of the text (Grabe, 2009). Therefore, this two-level text-processing model incorporates both the author's meaning and the reader's interpretation based on the text information. In this process, the higher-order processing skills such as identifying text structure, discourse organization, inference generation, prediction, monitoring and so on, along with lower-level processes of word recognition, syntactic parsing, and proposition formation and integration

contributes to fluent text comprehension (Kintisch, 1998; Grabe, 2009). It is important to note that all these processes are automatic for a fluent reader, and if this automatic processing fails, the reader may engage in a more strategic problem-solving process (Kintsch, 1988).

Vocabulary Knowledge

According to the CI model (Kintisch, 1998), at the lower level of text model of reading comprehension, word recognition and understanding the relational properties between nouns, predicates, and modifiers (the microstructure of the text or local properties of the text) contribute to the production of a set of propositions as main idea units of a text. Hence, lexical or vocabulary knowledge is considered a major contributor to reading comprehension. Some researchers claim that a reader needs to know at least 95% of the words on a page to read a text instructionally while 98-99% vocabulary knowledge is required to read a text independently (Laufer, 2001; Nation, 2001; Schmitt, 2000). Other researchers argue that L2 university students require at least 10,000 word families (Hazenberg & Hulstijn, 1996) while still other researchers speculate that they need at least 20,000 word families (Grabe & Stoller, 2011). In L2 assessment research too, strong relationships between vocabulary and reading comprehension have been reported (Qian, 2002).

Knowledge of Discourse Organization and Understanding Text Structure

Discourse knowledge, which is considered another significant contributor of reading comprehension, includes the discourse structure of the text, the influence of discourse signaling, the roles of inferencing and comprehension monitoring (Koda, 2005; Meyer & Poon, 2001; Nation, 2005; Pressley, 2002). Discourse structure awareness is considered as a type of metalinguistic awareness at the text level (Nagy, 2007) and often is associated with a set of reading strategies such as identifying main ideas, organizational patterns in texts, and specific genre features of texts, and inferring connections among parts of the text. Greater metalinguistic awareness helps readers effectively utilize strategies and reflect on how the discourse provides support for a specific interpretation of the text information (Grabe, 2009). The propositions such as transitional words, topic sentences, sentence-initial phrases, anaphoric linkages, and various grammatical structures link ideas together, show relationships, indicate transitions from one idea to the next, and build coherence in the texts (Kintsch, 1998; Kintsch & Rawson, 2005; Singer, 1990). The knowledge of this discourse information assists readers to identify specific organizational patterns in texts and construct a coherent understanding of the information allowing them to build a text model of comprehension.

Text structure refers to the ways that the author organizes information in the text either narrative or expository. The narrative text typically has a general structural pattern whereas the expository text has several patterns such as “description, sequence, listing, compare and contrast, cause-effect, and problem-solution, and analysis” (Grabe, 2009, p. 251). Text structure helps the reader understand the author’s purposes such as whether to inform the reader or persuade the reader. Therefore, readers rely on the rhetorical structures of the text to form a text model and background knowledge of text structures to form a situational model.

Identifying Main Ideas and Summarization Skills

Readers require the ability to identify main ideas in the text, integrate them into a text model of reading, and develop an appropriate situation model of reader interpretation (Grabe,

2009). In order to comprehend main ideas readers need knowledge of a large receptive vocabulary, basic grammar, effective comprehension strategies, strategic processing abilities to maintain a high level of comprehension, and an awareness of discourse structure (Grabe, 2009; Pressley, 2002). This skill supports the fluent reader in establishing the gist of the text. Understanding the main idea in the text helps the reader draw conclusions, evaluate, and critically interpret the content of the text.

Summary involves restating the main ideas in a text in the readers' own words and expressions (McNamara, 2007). In other words, in summarization, the reader differentiates key ideas from supporting ideas and constructs logical connections between them. According to Kintisch and van Dijk (1978), three stages are involved in the summarization process. First, the reader comprehends the text as a coherent whole (text cohesion) while deleting unnecessary information. Next, s/he compresses the meaning into its gist through generalization and finally constructs a new text through generation of recall. The summarization process operates at the global level and these three stages transform the microstructure of the text to produce a macrostructure. Research shows that summarization provides a way of improving metacomprehenison accuracy (Theide & Anderson, 2003) as this process involves more accurate monitoring which leads to more effective regulation.

Drawing Inferences

Writers do not always state every detail. In this instance, the reader is left to fill in the details that are not explicitly stated in the text by integrating information within the texts or by incorporating general knowledge. Inference generation is also involved in the text model of comprehension where readers identify different ways of making connections between ideas from different parts of the text to capture explicit meaning with the use of their prior knowledge (Grabe, 2009). In this process, several integrative functions occur across the clauses within the text and they can be classified in terms of lexical inferences, anaphoric inferences, spatial, temporal, or thematic inferences (McKoon & Ratcliff, 1992). However, in deeper level comprehension or in a situation model of reader interpretation, the reader has to make causal, elaborative and predictive inferences which go beyond the explicitly stated content with the use of his/her relevant prior knowledge of the world (Kintsch, 1998). Research in EFL context reveals that inference generation was higher among learners of higher L2 proficiency than those of lower L2 proficiency (Collins & Tajika, 1996; Muramoto, 2000; Shimizu, 2002).

Identifying Specific or Supporting Information

Comprehending a text fully is identifying all supporting information to the main idea of the text. Comprehension of supporting information or specific detailed information to the main idea involves knowledge of vocabulary, grammar, discourse and text structure, effective comprehension strategies, and effective strategic processing abilities (Grabe, 2009). Identifying supporting information is most directly supported by engaging in the interactions around a text and fluent readers can easily identify this detailed information related to the main idea.

METHOD

Participants

A total of 146 Japanese EFL learners [74 (53%) females and 66 (47%) males], the majority being 18-20 years of age, in the first and the second years, who were majoring in education, engineering, dentistry, sciences, economics, and literature at a national university of Japan, participated in this study. These students had been exposed to formal English education for more than 6 years. Twenty students were excluded from the sample because of missing data.

Instruments

The RCT consisted of four passages selected from several educational sources with 10 multiple-choice (MC) questions each totaling 40 questions. The passages ranged from 267 to 357 words in length with an average of 319 words. The readability levels varied somewhat across the passages that were fairly difficult for the EFL learners. The average Flesch Reading Ease value was 55.20 for the four passages. The lexical density of the four passages ranged from .59 to .61. The questions in the RCT included eight items on vocabulary knowledge, seven items on identifying main ideas and summarization skills, seven items on generation of inferences and prediction, 11 items on identifying supporting or specific details of the texts, and seven items on knowledge of text structure and discourse organization. The RCT was pilot-tested among 13 students in the same university including a native speaker of English and some modifications were made in the wording of questions and item difficulty. The one-hour test in a paper and pencil format was administered to the participants during their regular English class time. The Cronbach alpha coefficient for 40 MC items in the RCT for 146 cases was .70.

The TOIEC test consists of two sections on listening and reading comprehension with 100 items in each section and the duration is two hours with one hour to perform each section. The total score amounts to 990 points summing 495 for listening and 495 for reading sections. The participants took the TOEIC test two weeks prior to administering the RCT as a requirement of university regulation. The reliability of the TOEIC test was unavailable. Only the TOEIC reading scores were used in our analysis.

Data Analysis

We analyzed data using SPSS 19 Advanced Version. In the preliminary analysis, no outliers were found and the scores of both the RCT and TOIEC scores were normally distributed. The relationship among the variables with the EFL reading comprehension was calculated by correlation analysis. The contribution of each of the variables to the discrimination among students at different proficiency levels in the sample was examined using discriminant functional analysis and the one-way ANOVA analysis. Finally, how these component skill variables contributed to the TOEIC reading comprehension was analyzed by regression analysis. For all analyses, a 95% confidence interval was maintained.

RESULTS

Research Question One

How are the different reading component skills related to the total RCT scores? How are they related to the TOIEC reading scores?

First, the relationship between the total scores of the RCT and all other reading component skills was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. An examination of the patterns of correlation among the variables showed that all the component variables correlated significantly with RCT scores. The highest correlate of the RCT was identifying specific information, [$r = .74$, $R^2 = .55$, $p < .000$] followed by the knowledge of text structure and discourse organization, [$r = .60$, $R^2 = .36$, $p < .000$], vocabulary knowledge, [$r = .59$, $R^2 = .35$, $p < .000$], drawing inferences, [$r = .54$, $R^2 = .29$, $p < .000$], and identifying the main idea and summarizing skills, [$r = .50$, $R^2 = .25$, $p < .000$], respectively. Only, a modest correlation between the RCT and the TOIEC reading, [$r = .41$, $R^2 = .17$, $p < .000$] was identified. All variables related to each other with significant differences; however, identifying main idea and summarization did not correlate with vocabulary knowledge ($r = .10$), and drawing inferences ($r = .05$).

Descriptive statistics showed that the Japanese participants performed the items on specific information ($M = 61.11$, $SD = 18.10$) better than the items on other component skills. They also equally performed the items on vocabulary knowledge ($M = 59.72$, $SD = 17.46$), identifying text-structure and discourse organization ($M = 59.52$, $SD = 19.10$) followed by identifying the main idea and summarization skills ($M = 56.69$, $SD = 18.77$). The scores on drawing inferences ($M = 46.15$, $SD = 20.22$) were the lowest indicating that Japanese learners' inferencing skills were low in L2 text comprehension. Results suggested that there was a clear distinction between Japanese students' inference skills and the other four component skills. Furthermore, a clear distinction was observed in their performance on the RCT ($M = 57.16$, $SD = 11.31$) and the TOIEC reading section ($M = 41.58$, SD = 11.34).

Research Question Two

To what extent can the reading component skills discriminate between EFL learners with different levels of reading proficiency? How do they differ in terms of different levels of reading proficiency?

Before computing the discriminant analysis, we categorized participants into three groups: participants whose z-scores on the RCT were higher than 0.5 were regarded as members of the high-level group (n = 28, 22%); those whose z-scores were between zero and 0.5 were categorized as the intermediate-level group (n = 72, 57%), while those whose z-scores were less than zero were considered as the lower-level group (n = 26, 21%). As shown in Table 3, the majority of the sample was intermediate-level readers. However, it is important to note that this kind of grouping was based only on the readers' RCT scores. Similarly, this categorization does not consider the three groups as completely distinct and diverse, but the variability of the scores

on the reading comprehension test within the sample was large enough for categorizing into low, intermediate, and high-level readers.

Table 1. Statistical Significance of Discriminant Functions Observed

Function	% Variance Eigenvalue	Canonical Correlation	Wilks' lambda	*df*	*sig.*	*p*
1	4.470	98.2	.904	.169	10	.000
2	.084	1.8	100.0	.923	4	.046

Table 2. Contribution of Variables according to Discriminant Function Analysis

Component skill	Wilks' Lambda	*F(2, 123)*	*Sig.*	Structure Matrix Function 1	Function 2
Vocabulary knowledge	.678	29.145	.000	.322.	.376*
Specific information	.534	53.772	.000	.436	-.552*
Text structure and discourse organization	.726	23.181	.000	.287	-.304*
Drawing inferences	.740	21.586	.000	.265	.657*.
Main idea and summarization	.800	15.368	.000	.236*	-.117

A direct discriminant analysis was performed using five reading component skill variables as predictors of membership in three reading proficiency groups. Predictors were the five components, while the groups were high, intermediate and low-levels of reading proficiency. Evaluations of assumptions of linearity, normality, and multicollinearity were satisfactory. As shown in Table 1, two discriminant functions were derived from the analysis and both were significant. Similarly, they accounted for 98.2 % and 1.8%, respectively, of the between-group variability. The variance of the first discriminant function is accounted for 81.72% (canonical correlation = $.904^2$) by the group membership, while that of the second discriminant is accounted for 7.72% (canonical correlation = 278^2). The first discriminant function is largely a measure of identifying specific information and it separates the high-level group from the intermediate and low-level groups. The second discriminant function is largely a measure of drawing inferences and it discriminates the high group from the low group, with the intermediate group falling between these two. The structure matrix of correlations between predictors and the discriminant functions, as seen in Table 2, suggests that the best predictor for distinguishing between the high group and the other two groups in the first discriminant function was identifying specific information, (Wilks' Lambda, .169, $p = .000$, $r = .44$) accounting for 19% of the shared variance in the difference between the high level group and the other two groups. In the second discriminant function, the best predictor for distinguishing between the intermediate group and the other two groups was drawing inferences, (Wilks' Lambda, .923, $p = .046$, $r = .66$) accounting for 44%, shared variance in the difference between the intermediate group and the other two groups. As shown in Table 3, the high-group performed better in identifying specific information ($M = 76.62$, $SD = 8.72$), vocabulary ($M = 75.89$, $SD = 14.00$), knowledge of text structure and discourse organization ($M = 72.45$, $SD = 15.02$), identifying main idea and summarization skills ($M = 72.14$, $SD = 14.00$), and drawing inferences ($M = 64.29$, $SD = 14.29$) than the intermediate and the low- level groups.

One predictor, identifying specific information has a loading in excess of -.55 on the second discriminant function, which distinguishes the high and the low groups with the intermediate group falling between these two.

Table 3. Means and SDs of Reading Skills among Reading Proficiency Levels

Variables	**High (28, 22%)**		**Intermediate (72, 57%)**		**Low (26, 21%)**	
	M	***SD***	***M***	***SD***	***M***	***SD***
Specific information	76.62	8.72	62.88	14.61	39.51	13.59
Vocabulary	75.89	14.00	58.33	13.92	46.15	16.50
Text structure and discourse organization	72.45	15.02	60.71	17.08	42.31	15.90
Main idea and summarization	68.37	15.72	57.14	16.44	42.86	19.38
Drawing inferences	64.29	14.29	43.25	18.72	34.62	17.23
RCT total score	72.14	4.55	57.15	4.39	41.06	6.41
TOIEC reading score	46.68	12.56	43.20	10.04	31.62	6.79

The stability of the classification procedure was checked by a cross-validation run. Classification statistics determined the accuracy with which the variables classified the readers as high, intermediate, and low-level readers. The results indicated that altogether the variables correctly classified 98.4% of the cases as high, intermediate and low-level readers. Of the 28 skilled readers, 27 (96.4 %) were classified correctly as high-level readers. The one misclassified reader was the one who scored relatively low on the component measures. Of the 72 intermediate-level readers, 71 (98.6%) were classified correctly as intermediate-level readers and the one misclassified reader was the one who scored relatively high on the component measures though classified as intermediate-level. Of the 26 low-level readers, 22 (84.6%) were classified correctly and the four misclassified readers scored relatively high on the component measures though they were originally classified as low-level readers. Overall, this indicates a high degree of consistency in classifying the sample into high, intermediate and low-level readers.

As the discriminant functional analysis showed a clear distinction of students in three text comprehension levels, a one-way between-groups analysis of variance (see Table 4) was conducted as a follow-up analysis to explore the effect of reading component skills at the three levels of reading performance. What is interesting to find is that the observed effects were statistically significant with high eta squared values in all component skills and the TOIEC reading score among the three groups: Specific information [$F(2, 124) = 53.77$, $p = .0005$, $\eta^2 = .47$], vocabulary knowledge [$F(2, 124) = 29.15$, $p = .000$, $\eta^2 = .32$], text structure and discourse organization [$F(2, 124) = 23.18$, $p = .000$, $\eta^2 = .27$], identifying main ideas and summarization skills [$F(2, 124) = 15.37$, $p = .000$, $\eta^2 = .20$], drawing inferences [$F(2, 124) = 21.59$, $p = .000$, $\eta^2 = .26$], and the TOEIC reading score [$F(2, 124) = 17.09$, $p = .000$, $\eta^2 = .22$].

Table 4. Results of One-Way Between-groups ANOVA Analysis

Variables	Sum of Squares	*df*	Mean Square	F	*Sig.*	Eta2
Total RCT score	13027.00	2	6513.50	271.36	.000	.82
TOEIC reading score	3493.79	2	1746.89	17.09	.000	.22
Specific information	19093.89	2	9546.94	53.77	.000	.47
Vocabulary knowledge	12247.21	2	6123.61	29.15	.000	.32
Text structure and discourse organization	12485.98	2	6242.99	23.18	.000	.27
Main idea and summarization	8807.90	2	4403.95	15.37	.000	.20
Drawing inferences	13272.41	2	6636.20	21.59	.000	.26

*p < .05, **p < .01

Effects of Learners' Reading Proficiency Level

As all observed effects were statistically significant in all component skills, post-hoc analyses were computed to examine where the differences were among the reading component skills and the three groups who performed differently on reading component skills. Multiple comparisons among reading component skills revealed that inference generation was statistically significant among the three groups with vocabulary knowledge [t = 6.04: p = .000], identifying text-structure and discourse organization [t = 5.26: p = .000], specific idea identification [t = 5.82: p = .000], and main idea identification and summarizing skills [t = 4.13: p = .000]. No other statistically significant differences were found among other components. With regard to the reading proficiency levels, insignificant differences arose only in the TOEIC reading scores between the high (M = 46.68, SD = 12.56), and the intermediate (M = 43.20, SD = 10.04) groups and drawing inferences between the intermediate (M = 43.25, SD = 18.72) and the low (M = 34.62, SD = 17.23) groups. Except for these two, all other reading component skills in terms of the three reading proficiency levels were significant.

These follow-up tests showed that, for every component, the high group scored higher than the intermediate and low-level readers. As demonstrated in Table 2, the high-level learners performed consistently better than those in the lower text comprehension levels, with more or less regular distances between them, even though the three reading proficiency groups varied in their test performance across different component skills. Both the intermediate and the high groups performed better on the specific idea identification tasks than the other component tasks in the RCT while the low group performed better on vocabulary items but there was a little variation among the students between the intermediate and low groups. By comparison, the three groups performed more poorly in inference generation; there was no significant difference between the intermediate and the low-level groups while a statistically significant difference was observed between the intermediate and high-level groups.

Among the three proficiency levels in both RCT and TOEIC reading scores, there existed a larger variation across the scores among the high-level students between the RCT and TOEIC reading scores; the very little variation across the scores among the low and the intermediate groups showed a non-significant difference between the two scores. The results also revealed that the TOEIC reading score was non-significant between the intermediate and higher group

while it was significant between the high and the low-level groups. Similarly, we observed a clear positive linear relationship among the Japanese students in three text comprehension levels.

Research Question Three

How do the five reading components contribute to TOIEC reading score?

We were also interested to examine how the different component skills in the reading comprehension measure we administered, contributed to the total TOIEC reading scores. A multiple regression analysis was conducted to examine the effects of the five reading component skills on the TOIEC reading performance. First, identifying specific information, text structure and discourse organization, identifying main ideas and summarizing skills, vocabulary knowledge, and drawing inferences were entered to predict the TOEIC reading scores of Japanese students. As shown in Table 5, the results of the regression analysis revealed that the model including all five component skills as a whole accounted for 18% of the variance in Japanese students' TOIEC reading test performance. According to these results, identifying specific details (11.8%) followed by text structure and discourse knowledge (5%) were considered the best predictors of Japanese students' TOIEC reading scores while other component skills did not have any significant effect on TOEIC reading scores.

Table 5. Multiple Regression Analysis (Dependent Variable: TOEIC Reading Score)

Independent variables	**R2**	**Adjusted R2**	**F**	**ß**	**t**	***p***
Specific information	.118	.111	16.64	.248	3.71	.000
Text structure and discourse organization	.169	.155	7.45	.189	2.69	.007
Main ideas and summarization	.174	.154	.80	.089	2.11	.373
Vocabulary knowledge	.179	.152	.73	.067	1.00	.392
Drawing inferences	.182	.148	.44	.059	.76	.507

** *p<.000 **p<.001 *p<.01

DISCUSSION

The purpose of this study was to examine the relationship of different comprehension component skills among EFL university undergraduates' text comprehension. The results indicated different weights for the variables in characterizing the high, intermediate and low-level readers. These results indicate that these three groups are qualitatively different from one another. Results showed a positive linear relationship between all five-component skills and the reading performance among the three groups indicating that as the readers became more skilled, there was a great match between their performance on the component skills and their respective reading comprehension performance. This finding is also consistent with the results of those L1 based studies that have shown that different comprehension skills contribute differently in different reader groups in different proficiency levels (Palinscar & Brown, 1984).

In all the component skills of reading, the low-level group was found to score statistically lower than their proficient counterparts. Results revealed that both high and intermediate groups

performed items on identifying specific information the best followed by the items on vocabulary and text structure and discourse knowledge. The items on specific idea identification were not as challenging for high and intermediate groups as they were skilled in locating where the specific information in the text was by engaging in the search process that usually includes scanning and skimming. However, the lower group still found it difficult to do so. Knowledge on vocabulary, grammar, discourse structure together with effective comprehension strategies and strategic processing abilities are required to locate the specific information related to the main idea. Therefore, lower-level students' deficiency in these abilities would account for their low performance in these tasks.

Results also found that the lower level students performed best on vocabulary items followed by the items on main idea identification. According to the CI model, the meaning construction commences with the bottom-up activation of lexis such as nouns, predicates or modifiers and then leads to the gradual formation of specific meaning by integrating the meaning of words into phrases, sentences and text units (Kintsch, 1998). Therefore, as vocabulary knowledge is considered a lower-order processing skill, the low-level readers would perform these vocabulary tasks better than other types of tasks on text structure or inference generation, or specific idea identification.

Lower level students also performed comparatively better on main idea identification tasks than other higher-order component tasks. Even the intermediate and high-level groups performed better on these items than the low-level group as they could determine what the text was about by skimming under the time pressure. However, we should note here that items on summarization skills were included in this category. An in-depth analysis of individual items showed that all three groups almost performed well on main idea identification items but performed very poorly on items on summarization skills. If we actually separated them into two components, there would have been a complete contrast in their performance on the tasks between identifying main idea and summarization skill. Therefore, integrating these two skills into one component does not show the true picture of EFL learners' performance on these two types of skills.

Summarization tasks given in the test involved compression processes together with attentional processes only within a paragraph; however, we should note here that these were multiple-choice items not meant to test their productive skill in summarization but tested how they could condense the meaning of a specific paragraph or determine to label a specific paragraph with an appropriate subtitle. These results may be explained by the fact that though Japanese EFL learners can understand the main idea through microstructure propositions of the text, they find it difficult to produce a macrostructure partially due to their low proficiency in the target language; similarly, their skills in accurate monitoring which leads to more accurate regulation, attentional processes, and synthesizing skills are still developing. In other words, their metacomprehension accuracy was still low (Nagy, 2007). This finding is not so surprising and is consistent with that of the researchers in the L1 context who have even claimed that people were not proficient at monitoring comprehension (Theide & Anderson, 2003) unless they were taught to do so. Theide and Anderson (2003) found that when students wrote summaries after a delay, their metacomprehension accuracy dramatically improved because more accurate monitoring led to more effective regulation of learning which in turn produced greater test performance (Theide, 1999; Nelson, Dunlosky, Graf, & Narens, 1994).

It is interesting to find that all students, in spite of their levels, performed least on items on drawing inferences. These tasks were based on both text model and situation model of text

comprehension. Predicting upcoming information and identifying *true* items where the reader had to make elaborative and predictive inferences based on the information of the passage were quite challenging and hard for the EFL learner. To answer these tasks correctly, readers have to involve inferencing, problem solving, monitoring and resolving ambiguity. As we mentioned earlier, Japanese students' may be still developing these abilities in their comprehension process. This is true with Davey (1988) who reported that his participants found items that required inferencing significantly more difficult than items that asked for explicitly stated information. This is also similar to other studies done in the Japanese context (Collins & Tajika, 1996; Muramoto, 2000; Shimizu, 2002). It is worth to note here that in the L2 context, specifically poor EFL readers, unlike fluent EFL readers, may be restricted by lack of vocabulary and grammar knowledge and thus prevents them even from the basic textual information. This weakness does not confirm that they do not engage in higher-level processing. High-order processing in some form is already available to all EFL readers from their L1 (Grabe, 2009, Koda, 2005). Hence, their inability to carry out lower-level processing in an efficient way may restrict in efficiently utilizing these already acquired higher-level cognitive resources from being used for comprehension (Grabe, 2009). However, it is worthy of future research to examine how EFL learners' specifically Japanese students' inference generation, monitoring, problem solving and resolving ambiguity skills affect their L1 text comprehension. The results of this study confirmed that language proficiency constantly affects EFL learners' L2 text comprehension and those who possess high proficiency in the language could employ their cognitive resources and skills for better text comprehension. Similarly, both higher and lower-order reading component skills included in the RCT are crucial for EFL learners for the text model of comprehension as well as a situation model of reader interpretation.

It was also found that the TOIEC total score was comparatively lower than that of the RCT in this study and the correlation between the RCT score and the total TOIEC score was in the median range. Similarly, the RCT scores, as a whole, were higher for all the students than those of the TOEIC. A possible explanation for this difference is that the constructs used in the two tests are different: in the TOEIC reading section, there is a lexical item task consisting about 60 items and 40 items are on reading comprehension. Therefore, the TOEIC reading score is both a composite of lexical knowledge as well as reading comprehension. Another possible explanation is the number of passages and the items included in two tests. In the RCT, only 4 passages with 10 question items each were used while the TOIEC reading question items were based on more than 10 passages with different lengths on international business content. Therefore, our sample EFL learners who were still in either the first or the second year might have performed poorly on theses unfamiliar contents. The other possible reasons for their comparatively higher performance on the RCT were the utilization of fairly difficult readability level of the passages and of more K1 and K2 word families in the texts used in the RCT while these factors are unavailable in the TOEIC reading test. Similarly, the unavailability of question items in the TOIEC reading section exerts difficulty in comparison of question items and constructs of reading comprehension between the RCT and the TOEIC reading section. The results also showed that only identifying specific information and knowledge on text structure and discourse organization contributed significantly to the TOIEC reading scores indicating that that the task types in the TOIEC and the RCT were different.

In summary, the present study demonstrated an important relationship between the various components of reading skills and EFL reading comprehension. Identifying specific idea information showed the strongest contribution to the discrimination of high-level readers from

intermediate and low level EFL readers while drawing inferences showed the strongest contribution to the discrimination of intermediate-level readers from high and low-level readers. These latter findings suggest a clear link between the efficiency of these component processes and skills in EFL reading comprehension. These findings extend into EFL reading that both text model and situation model of reading interpretation are important and useful in EFL reading.

Pedagogical Implications

The findings of the study have a number of implications for classroom pedagogy. These findings suggest that EFL reading practitioners should be aware of the role of these component processes in EFL reading instruction and consider ways to incorporate activities into their pedagogical practices in order to enhance the efficiency of these processes even when they are high-level readers. The intermediate and low-level readers lack lower-level processes such as vocabulary, grammar and syntactic knowledge. As Grabe (2009) suggests, the initial goal of instruction should be to reinforce a text model of comprehension.

One way of encouraging the development of efficient component processing skills in EFL reading involves instruction exercises that are specifically designed to target individual skills and their sub-skills including vocabulary development. The study found that Japanese EFL students' attentional processes were low. Therefore, teachers could instruct the learners how to apply strategies appropriately, engage in metacognitive awareness and monitoring, draw inferences for text processing, and text evaluation using background knowledge as appropriate when reading particularly difficult materials.

In addition, integrating extensive reading component into EFL reading instruction (Day & Bamford, 1998) not only offers a meaningful and motivating context for reading L2 texts but also creates an opportunity for improving general language proficiency. It may also enhance students' acquisition of a large vocabulary and improve higher-level processing skills. By providing such kind of a context, the readers are able to use these sub-components simultaneously in the process of understanding these texts.

Reading instruction should also include discourse structure awareness among learners for more effective comprehension. Research has demonstrated that teaching discourse structure awareness has a strong impact on reading comprehension (Grabe, 2003; Jiang & Grabe, 2007). Similarly, teaching students to recognize the underlying text structure of texts and signal words can help them focus attention on key concepts and relationships, predict what is to come, and monitor their comprehension as they read. It will also invoke relevant background information and schemas which facilitate their construction of both text model understanding and interpretation of texts.

Similarly, instruction to generate summaries of texts helps students improve their text comprehension as well as writing (Wittrock & Alesandrini, 1990). Summary writing helps students focus attention on more important information of the text (Pearson & Fielding, 1996), build relations among the information in the text and relate this information to their prior knowledge (Wittrock & Alesandrini, 1990); it also promotes self-evaluation during reading (Palincsar & Brown, 1984), and monitoring accuracy and effectiveness of their self-regulated learning which ultimately leads to the improvement of their comprehension (Theid & Anderson, 2003).

Finally, improving among learners the metalinguistic knowledge of word and word-parts, syntactic awareness, discourse structure awareness, and awareness of how to accomplish goals,

monitor comprehension, and evaluate information are crucial for successful text comprehension (Nagy, 2007).

Limitations and Suggestions for Future Research

The present study used relatively few measures to test each specific component skill. This decision was mainly due to the number of component skills measured and feasibility of administration. However, future studies should include more items and lengthy passages in measuring both lower and higher-level comprehension component skills and a larger number of items in each measure. These additions might then increase the reliability and validity of the measures used and allows a more subtle examination of the effects of tasks varying in their linguistic and cognitive demands. For example, a possible added measure might be lexical–semantic measure, word recognition measure, syntactic tasks, and so forth. In the current study, these measures were not used since the main aim of the reading comprehension test was to measure some important higher-order component skills together with vocabulary knowledge. Similarly, as Alderson (2000) suggests, in answering multiple-choice format questions, test takers have to simultaneously engage in overlapping skills, i.e., finding the correct answer from the distracters by using both test taking strategies as well as comprehension strategies; hence, the reading tests with multiple choice items involve skills above those involved in text comprehension. Thus, future studies should focus on more alternative assessments on reading comprehension.

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