Effects of Linguistic Knowledge, Cohesion, and L1 Background on Comprehension of L2 Expository Text

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Abstract

This study examined the effects of linguistic knowledge and textual cohesion on expository text comprehension for second language (L2) readers. Chinese- and English-speaking L2 learners and native (L1) speakers of Japanese read and recalled passages. Text cohesion was manipulated by eliminating some explicit cues for integration of prior text (i.e., the low cohesion version) from the original text (i.e., the high cohesion version). Vocabulary and grammar knowledge was assessed via multiple-choice sentence completion. The results revealed that although Chinese speakers had more advanced linguistic knowledge than English speakers, content recall was similar between the two groups. Unlike natives L2 learners did not benefit from the explicit cues for integration in the high cohesion texts. Furthermore, the relative strength of contribution of vocabulary and grammar knowledge to comprehension differed between Chinese and English speakers. These findings not only confirm the importance of efficiency in lower-level processes in L2 reading but also suggest some effect of L1 background on development of L2 linguistic knowledge and its relation to L2 text comprehension.

Key words : reading of an xpository text, vocabulary and grammar knowledge, cohesion, L1 background

１．Background

Text comprehension consists of multiple levels of processing and involves the interaction between bottom-up input-driven processing and top-down conceptually driven processing. In order to comprehend a text, the reader

must recognize words, and parse sentences to extract propositions. In addition, the reader must make connections between ideas or propositions in the text, as well as between the text's content and general knowledge. Relations between ideas or propositions may or may not be explicitly cued in the text. When not, the reader must generate various types of inferences (i.e., propositions) from general knowledge to fill the gaps. Progressing through the text, the reader tries to construct a coherent representation of the content of the text in memory which consists of propositions and relations, both text-based and knowledge-based.

Comprehension of an informational text tends to pose cognitive demands for less experienced readers including L2 learners (Coté, Goldman, & Saul, 1998). Informational expository texts are generally processed for the purpose of acquiring information or knowledge and learning. They tend to contain vocabularies and content which may be abstract, technical or specialized for which the reader may not have sufficient prior knowledge. In addition, more variety of organizational structures (e.g., collection of descriptions, comparison-contrast, cause-effect, problem-solution) and relations (e.g., part-whole, case-category, logical) are used in expository texts than in narratives (Britton & Black, 1985; Graesser, Millis, & Zwaan, 1997).

When reading a text in L2, there are more possibilities that the reader encounters some processing difficulties that may lead to the construction of a less coherent representation of the text in memory. The most likely cause of the difficulty is unfamiliarity of the language of the text and limitation of the reader's language proficiency. Research accumulated evidence that L2 grammar and vocabulary knowledge, and L2 decoding affect the processes and the products of reading comprehension (Koda, 2007; Jeon & Yamashita, 2014). L1-based general comprehension skill may transfer to or used in the L2 reading context. For most L2 readers, however, L2 linguistic knowledge seems to play a more important role than L1-based general comprehension skill (Bernhardt & Kamil, 1995; Bossers, 1990; Lee & Schallert, 1997). Bernhardt (2000), reviewing prior studies on this issue, concluded that L2 linguistic

knowledge can account for about 30% (vocabulary 27%, grammar 3%) of the variance in L2 reading whereas L1-based comprehension skills about 20 %. However, it has not been made clear how L2 linguistic knowledge and L1-based comprehension skill contribute to L2 reading, each independently and in interaction. In this connection the L1-L2 language distance may affect development of L2 linguistic knowledge as well as L2 reading (Koda, 2007; Jeon & Yamashita, 2014; Schepens, van der Slik, & van Hout, 2015). Empirical research is needed to illuminate how the L1-L2 language distance may come into play in development of L2 linguistic knowledge and its relation to L2 reading comprehension.

Regarding the reading of an expository text, some research suggested that L2 readers who integrate information and pay attention to text structure may be more successful in comprehension, compared with those who do not do so (Block, 1986). L2 readers who are encouraged to engage in relational and integrative processing may comprehend a text better than those who read as they normally do (Horiba, 2000). When reading a scientific, technical passage, L2 learners may benefit from the signaling devices (e.g., "the problem is…," "as a result…," "the solution is…") contained in the text (Yamamoto, 1994). However, L2 readers with limited L2 proficiency may have difficulty using cohesive devices such as logical connectives explicitly presented in the text (Goldman & Murray, 1992). Because of the limitation of human being's cognitive capacity or working memory, L2 readers with limited L2 proficiency may not (be able to) allocate cognitive resources to relational and integrative processes at discourse level. For example, a recent study by Morishima (2013), conducting reading-time experiments with inconsistency detection and probe verification, revealed that L2 learners had difficulty in reactivating prior text information and integrating information from nonadjacent sentences. These studies altogether suggest that basic linguistic knowledge necessary for word recognition and sentence parsing is a pre-requite for fluent reading, and that efficiency in these lower-level processes is important and allows the allocation of cognitive resources for higher-level processes including relational and

integrative processes at discourse level.

In the present study the participants were L2 learners and native speakers of Japanese. The L2 learners were native speakers of Chinese and English. There are some interesting similarities and differences between and among these languages. Simply stating, Japanese employs a combination of letters or syllabaries called *kana*, and Chinese characters called *kanji* as its writing system. The former represents a syllable or mora whereas the latter represents a morpheme or a word. In terms of morpho-syntax, Japanese is an agglutinate language whose canonical word order is SOV and which has the case marking system. Chinese is a logographic language and uses characters, like *kanji* in Japanese. However, morpho-syntactically speaking, unlike Japanese, Chinese is an isolated language with the SVO word order. English is an alphabetic language in which a letter or a string of letters represents a phoneme, unlike Japanese and Chinese. The canonical word order in English is SVO, like Chinese. These three languages belong to different language families. Japanese belongs to the Altaic language family, whereas Chinese is a member of the Sino-Tibetan language family and English the Indo-European language family.

The effect of L1 background on learning and reading in L2 Japanese has been examined in a limited number of studies. For example, Matsunaga (1999) reported that no correlation was found between reading comprehension and oral proficiency for the Chinese group whereas high correlation was found for the non-Chinese group. Horiba (2012), examining the relation between vocabulary knowledge and reading comprehension for Chinese and Korean speakers and natives, found that the Korean group comprehended expository texts as well as the Chinese group although the Korean group scored on the vocabulary breadth and depth tests more poorly than the Chinese group. In addition, moderate correlations were found between L2 learners' reading comprehension and breadth and depth of vocabulary, with knowledge of syntagmatic association being particularly important to the Chinese group but not to the Korean group. Tateoka (1996), examining the effect of text

structure, found that Chinese and Korean speakers and natives comprehended and recalled a passage in the original *ki-sho-ten-ketsu* writing style better than the English-structure version, whereas the opposite was true for English speakers. The findings of these studies altogether suggest that development of linguistic knowledge and reading in L2 both may be influenced by the learner's L1 background. However, it has not been made fully clear what is similar or different between L2 learners who are from different L1 backgrounds in regard to L2 linguistic knowledge and its relation to L2 reading.

　Thus, the purpose of this study is two-fold. The study was designed to assess development of linguistic (i.e., vocabulary and grammar) knowledge and its relation to reading comprehension of expository texts for L2 learners. The study also intended to explore how they differ between L2 learners who have different L1 backgrounds. The participants of the study were Chinese speakers and English speakers with a group of native speakers of Japanese being included as baseline.

２．Research Questions

　The following research questions were prepared for the study:

Q1． Does development of linguistic knowledge (vocabulary and grammar) differ between L2 learners who differ in L1 background?

Q2． Does linguistic knowledge affect reading comprehension of expository texts? Does its effect differ between L2 learners who differ in L1 background?

Q3． Does degree of textual cohesion affect comprehension of expository texts? Does its effect differ between L2 learners who differ in L1 background?

Q4． Does the effect of linguistic knowledge and textual cohesion differ between L2 learners and native speakers?

３．Method

3.1. Participants

The participants of this study were forty-nine English-speaking L2 learners and forty-nine Chinese-speaking L2 learners, and forty native speakers of Japanese (as baseline). The individuals in the English group were undergraduate students who were enrolled in advanced Japanese language courses at a university in Australia. Those in the Chinese group were students who were enrolled in a Japanese language school in Tokyo and planning to enter a university in Japan. Those in the L1 group were undergraduate students who were enrolled in a Japanese linguistics course in a university near Tokyo.

3.2. Materials and measures

3.2.1. The reading comprehension test

Two short expository passages were used in the study: the *Travel* text and the *Clock* text. They are argumentative essays that appeared in regular columns in the newpaper, *Asahi*, called *Tenseijingo* (Vox populi, vox dei) at the bottom of the front page of the morning newspaper. These essays typically deal with some current topics about which the author makes some comments or arguments. These types of materials are popular for reading for pleasure and learning by both L1 and L2 speakers of Japanese. Essays of this type have been most extensively studied as typical Japanese writing called the *ki-sho-ten-ketsu* 'introduction-follow-up-change-conclusion' style in the field of contrastive rhetoric (e.g., Hinds, 1983, 1984). The passages were selected by considering the content and the linguistic features of the texts in relation to the participants' educational backgrounds and interests.

For each passage, two versions were created by manipulating the degree of textual cohesion. In the high-cohesion version, the text was presented in its original form: the *Travel* text (17 sentences, 57 events) and the *Clock* text (24 sentences, 53 events). In the low-cohesion version, some portions of the original text were missing which explicitly signal the relation and integration

of prior text and thus contribute to textual cohesion. The low-cohesion version of text was shorter than the original, high-cohesion version: the *Travel* text (14 sentences, 53 events) and the Clock text (21 sentences, 45 events).

Reading comprehension was assessed by using the read and recall procedure. Each participant read one text (i.e., one version of one passage) and later recalled its content using his or her L1. Participants were randomly assigned to one text within the group of the same L1 background. Before reading, they were asked to read a passage for comprehension; they were also told that they would be later asked to answer some questions about its content. After reading, they were first asked to solve some arithmetic problems (in order to minimize the effect of short-term memory or possible rote memory) and then given a recall task. In the recall task, they were asked to write down what they remembered of the content of the text as much as possible, as much in detail as possible, by using their L1.

3.2.2. The vocabulary test and the grammar test

Vocabulary knowledge and grammar knowledge were assessed by using a vocabulary test and a grammar test, respectively, in which the test-taker was asked to complete a short sentence by filling in the blank with an answer selected from the four alternatives provided for each target linguistic item (i.e., the multiple-choice format with one correct answer and three distracters per item). The vocabulary test consisted of thirty-three test items with the target words from two levels of frequency; there were six versions of the test used in the study. The grammar test consisted of thirty-three items with the targets from three levels of frequency; there were three versions of the test used in the study. These tests were originally developed in a large-scale research project (Horiba et al., 2004) and adapted for the present study.

The original texts of vocabulary and grammar were developed as follows (Horiba et al. 2004). For the vocabulary test, 200 target items were randomly selected from a list of about 13,000 words for Levels 1 and 2, the corpus prepared for the Japanese-Language Proficiency test (Japan Foundation,

1994, 1998, 2001, 2002). The target items for the grammar test were 100 items that were randomly selected from a list of 700 grammar items prepared for Levels 1, 2 and 3 of the JLP Test used in various study materials. Our examination of the JLPT items revealed that the length and complexity of contextual sentences varied across items considerably, that some sentences contained possibly problematic words and expressions other than the targets, and that some sentences for the Level 1 test contained low frequency words such as technical, abstract, and/or literary. In order to assess L2 learners' knowledge of the target vocabulary and grammar items more reliably, we rewrote some of the input sentences by simplifying the syntactic and propositional structures and/or using general topics for the target vocabulary/grammar items. By using the newly created test items, six versions of the vocabulary test were created, each of which contained thirty-three target items and two filler items, and three versions of the grammar test was created, each of which contained thirty-three target items and one filler item. The equivalency of the versions was confirmed by multiple testings with L2 learners of Japanese from various L1 backgrounds.

3.3. Procedure
The participants first took the reading comprehension test (30 min.), and then the vocabulary test (15 min.) and the grammar test (15 min.). Between the vocabulary test and the grammar test, they filled in a questionnaire which was designed to elicit information about their language learning and use.

3.4. Analysis
Responses to the vocabulary test and the grammar test were scored by using the predetermined answer keys. Two judges scored all the responses and reached 1.00 inter-rater agreement. Test scores (in percentage) were analyzed by using *ANOVAs* to examine the effect of group and level of item frequency on vocabulary knowledge and grammar knowledge, respectively.

For scoring recall protocols, test passages were first parsed into events

or statements (roughly equivalent to clauses). Recall protocols were scored by using a list of events which are contained in both the high- and the low-cohesion texts. Recall protocols produced in Chinese and English were translated into Japanese. Each recall protocol was scored by three judges (two native speakers of Japanese and one native or near native speaker of the learner's L1). The inter-rater reliability was .94 and all disagreements were resolved through discussion. The probability of events recalled was calculated (and converted into percentage) for each protocol and for text and group. Recall scores were analyzed by using *ANOVAs* to examine the effect of text topic, cohesion, and group. In addition, recall scores were analyzed by using the regression technique with vocabulary and grammar scores as predictors in order to examine the relation between linguistic knowledge and reading comprehension.

4．Results
4.1. Vocabulary knowledge

The descriptive statistics of the percentage scores on the vocabulary test are presented in Table 1. L2 learners scored much lower than native speakers. Between two groups of L2 learners Chinese speakers outperformed English speakers. These observations were confirmed by *ANOVA* and post-hoc comparison tests (Table 2). There was a significant effect of group on the vocabulary scores.

Table 1

Descriptive statistics for vocabulary knowledge by group

Group		*N*	*M*	*SD*	*SE*
L2 learners	Chinese	49	79.22	9.88	1.41
	English	49	53.93	18.06	2.58
Native		40	97.35	3.23	.51

Table 2

ANOVA and post-hoc comparisons on vocabulary knowledge

Source	*d.f.*	*SS*	*MS*	*F*	*P*
Between	2	42576.88	21288.44	138.46	.0001
Within	135	20756.05	153.75		
Total	137	63332.93			

Comparison	Mean Difference	Fisher *PSLD*	Scheffe *F*
L2-Chinese vs. L2-English	25.29	4.96 *	50.97 *
L2-Chinese vs. Native	- 18.13	5.23 *	23.54 *
NNS-Eng vs. NS	- 43.42	5.23 *	135.03 *

* p < .05

Further analyses revealed that there were significant effects of frequency on L2 learners' vocabulary scores. As expected, both Chinese and English speakers performed significantly better on the more frequent vocabulary items than on the less frequent items. As for native speakers the less frequent items were scored better than the more frequent items. The results of group comparisons were similar between the two frequency levels.

4.2. Grammar knowledge

The descriptive statistics of the percentage scores on the grammar test are presented in Table 3. Like the vocabulary test, L2 learners scored much lower than native speakers. Between the two groups of L2 learners Chinese speakers scored higher than English speakers. These observations were confirmed by *ANOVA* and post-hoc comparison tests (Table 4).

Table 3

Descriptive statistics for grammar knowledge by group

Group		*N*	*M*	*SD*	*SE*
L2 learners	Chinese	49	55.50	16.58	2.37
	English	49	41.65	18.76	2.68
Native		40	97.35	5.84	.92

Table 4

ANOVA and post-hoc comparisons on grammar knowledge

Source	d.f.	SS	MS	F	P
Between	2	65229.30	32614.65	140.13	.0001
Within	135	31419.86	232.74		
Total	137	96649.16			

Comparison	Mean Difference	Fisher *PSLD*	Scheffe *F*
L2-Chinese vs. L2-English	13.86	6.10 *	10.10 *
L2-Chinese vs. Native	- 39.23	6.43 *	72.82 *
L2-English vs. Native	- 53.09	6.43 *	133.34 *

* p < .05

Further analysis revealed that there were significant effects of frequency on grammar scores. All groups, both L2 learners and native speakers, performed significantly better on more frequent grammar items than on less frequent items. The results of group comparison tests were similar among levels of frequency, but the differences between Chinese and English speakers on most frequent items were quite small.

4.3. Comparison between vocabulary knowledge and grammar knowledge

An examination of the descriptive statistics for the vocabulary scores and the grammar scores revealed that there were both differences and similarities between the two groups of L2 learners. Naitve speakers performed equally well on the vocabulary test (M = 97.4) and the grammar test (M = 97.4) with relatively small individual differences (SD = 3.2 on vocabulary; SD = 5.8 on grammar). These findings indicate that these native speakers were rather homogeneous and had sophisticated and balanced linguistic knowledge. In contrast, L2 learners performed with greater variability in regard to components of linguistic knowledge as well as L1 background. Chinese speakers performed much better on the vocabulary test (M = 79.2) than on the

grammar test (M = 55.5), with individual difference being much smaller for vocabulary (SD = 9.9) than for grammar (SD = 16.6). As for English speakers, they scored more similarly between the vocabulary test (M = 53.9, SD = 18.6) and the grammar test (M = 41.7, SD = 18.8), with individual difference being large for both. Furthermore, although Chinese speakers outperformed English speakers on both tests, group difference was considerably smaller for grammar than for vocabulary.

There were significant moderate correlations between the vocabulary scores and the grammar scores for the Chinese group (r = .453, p < .001), the English group (r = .686, p < .0001), and the native group (r = .517, p < .001).

4.4. Reading comprehension

The descriptive statistics of recall scores (in percentage) are presented in Table 5. Like the vocabulary test and the grammar test, L2 learners scored much lower than native speakers on the recall test. Unlike the two linguistic knowledge tests, scores on the recall test were rather close between Chinese speakers and English speakers. In addition, both groups of L2 learners scored higher on low cohesion texts than high cohesion texts, which was contrary to native speakers. Native speakers scored better on high cohesion texts than on low cohesion texts.

Statistical analysis generally confirmed the above observations (Table 6). There was a significant effect of group on recall. Recalls by native speakers were significantly higher than L2 learners with no significant differences being found between the two L2 groups. There was also a near significant effect of the group-cohesion interaction. L2 learners, both Chinese and English speakers, did not perform better in recall of high cohesion texts than recall of low cohesion texts (F = 1.5/1.0, $n.s.$). In contrast, native speakers performed better on high cohesion texts than low cohesion texts (F = 3.5, p < .07).

Table 5

Descriptive statistics for reading comprehension by group

Group		Text topic and cohesion			
		Clock		*Travel*	
		High	Low	High	Low
L2 learners	Chinese	38.10	40.44	20.46	26.42
	English	5.56	40.74	19.59	22.01
Native		49.11	42.47	36.02	26.23

Table 6

ANOVA and post-hoc comparisons on reading comprehension

Source	d.f.	SS	MS	F	P
Group (A)	2	1838.5	919.25	5.50	.005
Cohesion (B)	1	4.30	4.30	.03	.872
AB	2	983.59	491.80	2.94	.056
Topic (C)	1	7967.24	7967.24	47.66	.0001
AC	2	44.50	22.25	.13	.875
BC	1	16.06	16.06	.10	.757
ABC	2	39.72	19.86	.12	.888
Error	126	21061.67	167.16		

4.5. Relation between linguistic knowledge and reading comprehension

Relations between reading comprehension and linguistic knolwdge were analyzed by using the regression technique with text topic, cohesion, vocabulary score and grammar score as predicting variables (Table 7). Results indicated that some differences were found in patterns between Chinese speakers and English speakers as well as between L2 learners and native speakers. For Chinese-speaking L2 learners, topic was entered first and then vocabulary was entered, with grammar and cohesion not being entered. For English-speaking L2 learners, grammar was entered first, contributing a large share of variance, and topic second, with vocabulary and cohesion not being entered. As for native speakers, only entered was topic with no other varibles being entered.

Table 7

Stepwise regression results by group

Group		Step	Variable	R^2	SE	F
L2 learners	Chinese	1	Topic	.32	11.84	21.68
		2	Vocabulary	.39	11.10	16.10
		(Variables not included: grammar & cohesion)				
	English	1	Grammar	.40	12.35	30.69
		2	Topic	.58	10.40	31.76
		(Variables not included: vocabulary & cohesion)				
NS		1	Topic	.22	14.21	10.55
		(Variables not included: vocabulary, grammar, & cohesion)				

５．Discussion

5.1. Development of L2 linguistic knowledge and L1 background

The results of the vocabulary test and the grammar test together suggest that there are some similarities and differences in development of linguistic knowledge between L2 learners with the Chinese background and those with the English background. For both groups of L2 learners, the effect of item frequency was found on both the vocabulary test and the grammar test, suggesting that generally linguistic items which are encountered more frequently and used more often are learned faster than less frequently occurring or used items.

However, the test scores indicated that development of components of linguistic knowledge, vocabulary and grammar, differed between Chinese speakers and English speakers in term of degree and balance. Chinese speakers performed much better on vocabulary than grammar, indicating that their vocabulary knowledge was more highly developed than their grammar knowledge. In addition, individual differences were much smaller on vocabulary scores than on grammar scores, suggesting that their vocabulary knowledge may be more consistent or reliable than their grammar knowledge. These patterns of test scores may be related to the stage of

knowledge development, but they may also be indicative of some effect of L1-L2 language distance on these components of linguistic knowledge. It is reasonable to suspect that Chinese speakers who are literate in their L1 would find their L1 knowledge of orthography and vocabulary useful when they process kanji characters and words written in kanji (especially Chinese origin vocabularies) in L2 Japanese. These advantages may particularly influence the development of L2 vocabulary knowledge and facilitate their performances on the receptive vocabulary test used in this study. Interestingly, Chinese speakers' grammar scores showed more resemblance to English speakers' vocabulary and grammar scores than their own scores for vocabulary. This particular observation may be an additional support for the (non)effect of L1-L2 language distance; Chinese speakers' L1 grammar knowledge would not facilitate learning of L2 Japanese grammar.

As for English speakers, their test performances were more similar between vocabulary and grammar, suggesting that there was a greater balance in development of vocabulary and grammar knowledge components. For English speakers, their L1-based linguistic knowledge would have little impact on learning of vocabulary and grammar in the linguistically (i.e., lexically and syntactically) distant L2 Japanese. Furthermore, it may be that development of vocabulary and grammar knowledge in L2 Japanese for these English-speaking learners reflect more clearly the effect of formal language learning and use in which there is more balance or interrelation between vocabulary and grammar components. Obviously these possibilities and speculations need to be empirically examined in future research.

5.2. Contribution of L2 linguistic knowledge to L2 reading

Despite the fact that Chinese speakers had more advanced linguistic knowledge than English speakers, there were no significant differences in the amount of content recall between Chinese and English speakers, suggesting that the two groups of L2 learners achieved similar levels of reading comprehension. These findings support some of the findings of Horiba (2012).

In addition, the results of the analysis of the relationship between linguistic knowledge and reading comprehension revealed clear differences between the groups. For Chinese speakers, vocabulary was a predictor variable selected after text topic, accounting for a small but significant amount of variance in recall. For English speakers, grammar was a predictor variable selected first, accounting for a relatively large amount of variance in recall.

These differences may reflect how different components of linguistic knowledge were used during text processing for L2 readers who have different L1 backgrounds. Passages were written in Japanese by using a combination of *kanji* or Chinese characters and phonographic scripts called *kana*. *Kanji* characters are used to represent the stems of content words such as nouns, verbs and adjectives, whereas *kana* letters are used to represent grammatical inflections and particles. Presumably Chinese speakers may have paid heavier attention to content vocabulary items, which are written in familiar *kanji* characters, and much less attention to grammar items, which are written in *kana*, while progressing through the texts. A phenomenon often reported by teachers and advanced Chinese learners of Japanese. In contrast, English speakers, who had less developed L2 vocabulary knowledge and quite limited *kanji* knowledge compared to the Chinese counterparts and who had more balanced L2 linguistic knowledge, may have found attention to grammatical inflections and particles, which are written in more familiar *kana* letters, to be more profitable for understanding the sentences and the content of the texts. Differences in lower-level processes between L2 learners from different L1 backgrounds need to be closely examined in experimental studies.

5.3. Effect of textual cohesion in L2 reading

The results of recalls revealed that there were no significant differences in amount of content information recalled between the high cohesion text and the low cohesion text, suggesting that L2 learners did not benefit from the explicit cues for integration of prior text when reading the high cohesion texts. In fact, descriptively speaking, L2 learners regardless of L1 background

performed better in recall for the low cohesion texts than the high cohesion texts. In contrast, native speakers did recall significantly more content information for the high cohesion texts than the low cohesion texts, indicating that explicit textual cues for integration facilitated the construction of a coherent representation of the text for proficient readers.

These findings can be interpreted as follows. In reading comprehension of expository texts, efficient and effective lower-level processing such as lexical access and sentence parsing is important. In the present study, the high cohesion texts contained explicit linguistic cues for relating and integrating relatively larger or distant text segments, while such cues were missing in the low cohesion texts. In other words, the high cohesion texts contained more ideas and relations and were longer compared with the low cohesion texts. These L2 learners with limited language proficiency or linguistic knowledge needed to allocate substantial amount of cognitive resources to lower-level processing and have few resources left available for higher level processing such as integration of larger text segments and elaboration with relevant general knowledge. For these L2 learners the provision of the explicit linguistic cues for cohesion may have posed additional cognitive demands and rather inhibited the construction of a coherent representation of the text.

The fact that no significant effect of degree of cohesion was found for both groups of L2 learners may also suggest that knowledge of text structure of the *ki-sho-ten-ketsu* style may not enhance comprehension of expository texts for readers with limited L2 proficiency. Chinese speakers, who were believed to have knowledge of this type of text structure from L1 reading experiences, did not perform better than English speakers who were less familiar with the text structure. In addition, some L2 learners who presumably had experiences with expository texts in Japanese may have recognized the text structure during reading but not benefited from the explicit cues for integration provided in the high cohesion texts. Thus, knowledge of and sensitivity to text structure may not facilitate the processing and comprehension of an expository text unless lower-level processes are efficient enough to allow resource allocation

to discourse level processes. Native speakers, with sophisticated linguistic knowledge and text structure knowledge, were able to take advantage of the explicit cues for integration of prior text provided in the high cohesion texts, constructing more coherent, more elaborated representations of the texts.

6．Conclusion

Based on the findings of the study the following conclusions were made. First, development of L2 linguistic (i.e., vocabulary and grammar) knowledge is influenced by item frequency for all learners. However, L2 linguistic knowledge may have different characteristics in terms of strength or growth of its components. Second, L2 learners who have different levels of L2 linguistic knowledge may achieve a similar level of reading comprehension of a text. Furthermore, the relation between L2 linguistic knowledge and L2 reading comprehension may differ between L2 learners who have different L1 backgrounds. Third, unlike native speakers, L2 learners may not benefit from explicit cues for integration of prior text that are contained in an expository text.

Thus, the present study confirmed the importance of efficiency in lower-level lexical and syntactic processing in reading comprehension. Without adequate fluency in lower-level processing L2 readers may not be able to use explicit textual cues for integration of prior text and may construct a less coherent, fragmented representation of the text. Moreover, based on the findings of the study suggestions were made that L1-related linguistic knowledge and processing skills may influence the development of L2 linguistic knowledge as well as the process of L2 reading comprehension in different ways depending on the L1-L2 linguistic distance. Research on this complex issue is quite limited and needs substantial amount of attention from researchers with various language background and expertise.

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