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READING IN ENGLISH AS A FOREIGN LANGUAGE: RELATIVE CONTRIBUTIONS OF VOCABULARY AND PHONOLOGICAL AWARENESS

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Abstract

This study was designed to examine the relative contributions to EFL learners' reading comprehension of vocabulary size and phonological awareness, potentially significant for the mainly Japanese university students who were the subjects of the study, because of the transfer of L1 reading behaviors which may interfere with fluent reading in English which is a growing necessity for the 'global human resources' Japan needs to participate fully in international society. Since both vocabulary size and pronunciation are known to be related to reading skill, this study measured learners' vocabulary size, phonemic distinction ability, and reading comprehension ability, all using well-known standard tests. A further test of general awareness of English phonology, suggested by Coulson et al. (2013), was also carried out. The results were then statistically examined for any possible correlations, and what they might tell us about the

relationships between these various abilities. Although no evidence was found to support a strong relationship between vocabulary alone and reading comprehension, there were indications of interaction between phonological awareness and vocabulary. A relationship between aural phonological distinction ability and reading comprehension was clearly indicated, and there was strong evidence of an effect for the subjects' first language. These results suggest that phonological knowledge does, indeed, have a part to play in reading comprehension, and possibly reading speed. This underlines the importance of reading aloud practice and encouraging learners' to acquire accurate pronunciation when teaching reading.

Keywords

EFL, Reading, Vocabulary, Phonology, Pronunciation

1. Introduction

The present paper is a continuation of work undertaken earlier (Ihata, 2013/2014), with the addition of a more specifically designed test to examine awareness of English phonology. The entire study was originally inspired by the role for accurate pronunciation in rapid decoding of text suggested by Walter (2007), and by Han (2013) in relation to speed of lexical access. The first intention was to examine the relationship between pronunciation and speed of lexical access, however, although there is experimental work on testing vocabulary and speed of lexical access (Iso, 2012, for example), the lack of convenient reliable measures for the latter led to concentration on those skills that were more amenable to ready assessment, with standard tests for the most part.

Vocabulary is well-established as a measure of language proficiency and has frequently been found to be a key factor in predicting performance on reading comprehension tasks (see, for example, Alderson, 1984, 2000; Anderson & Freebody, 1981; Kang et al. 2012; Koda, 2005; Ma & Lin, 2015; Moghadam et al. 2012; Sidek & Ab. Rahim, 2015; Waring & Takahashi, 2000), although there is less conclusive research on the role played by phonemic or phonological awareness (but see, for example, Khatib & Fat'hi, 2012; Koda, 1998; Melby-Lervåg & Lervåg (2014); Mirzabel et al., 2016; Walter, 2007; Yoshikawa & Yamashita, 2014). There is growing interest in this area, but perhaps particularly in terms of the cross language transfer of phonological awareness (Hipfner-Boucher & Chen, 2016; Melby-Lervåg & Lervåg 2011). Eyckmans & Lindstromberg (2017) have also examined the power of phonological awareness raising to increase L2 learners' memory of English idioms which featured alliteration (*miss the mark*) or assonance (*get this show on the road*).

Reading is an extremely complex activity, even in one's own language. It is now generally viewed as a derived skill that builds on spoken language (Tunmer, 1997: 28), and Perfetti (2003:3) further asserts that all writing systems represent spoken languages; they do not encode meaning directly, and there are no writing systems currently in use that bypass language to erect an independent system of signs (Perfetti:5). There is a common perception, among Japanese people at least, that the Chinese characters they use (known in Japan as *kanji*) do encode meaning directly, without the mediation of phonology. However, Kess and Miyamoto (1999) quote a wealth of research that provides evidence of both Japanese and Chinese subjects accessing phonological as well as semantic information during word recognition tasks involving reading Chinese characters (See also Akamatsu, 2005; Hu & Catts, 1993, 1998; Perfetti & Zhang, 1995). Effective reading also involves the use of critical thinking, but although instruction in this area can often have benefits for English learners (See Lestari, 2015, for example), it is beyond the scope of the present paper to delve into the more cognitive aspects of the process.

For native speakers of English, phonological activation is early and effective as a decoding strategy (Kess & Miyamoto, 1999:200), and has even been found to operate very effectively for deaf children (Dillon, de Jong & Pisoni, 2012), whereas Japanese speakers reading in their own language tend to rely more on the graphemic/orthographic information available in the early stages of decoding, and phonological activation is relatively late. This appears to be related to the complex nature of the Japanese writing system, which has an unusually deep orthography, commonly employing a combination of 3 or 4 different scripts. Chinese style *kanji* characters are used for the root meanings of words, and simpler native *hiragana* script for function words and grammatical inflections. Another even simpler native script, *katakana*, is used for loan words, although an alphabetic transliteration called *romaji* is also employed. Since the *kanji* characters were originally 'mapped onto' the Japanese language, they may have several phonetic realizations, depending on the particular word they are used to transcribe, and it is often necessary to pay very close attention to the surrounding information on the page. For example, in *chii*(*sa*) = 'small', *shougakko* = 'elementary school', and *Kobayashi* = a common family name, the underlined syllables are all written with the same character, 小, which has the basic meaning of 'small'.

2. Research Issues

The question that immediately suggests itself here is what the result of this difference in reading behaviors will be for Japanese learners reading in English as a foreign language. Is there

any significant effect for phonological awareness, and therefore a good case for including work on pronunciation even in reading classes, as suggested by Walter (2007)? Does a good knowledge of vocabulary help to offset weakness in this area and/or promote comprehension where both abilities are relatively strong? These are questions that the current study was designed to examine. There have been a lot of studies that demonstrate the significance of vocabulary in reading comprehension (Nation & Wang, 1999; Zhang & Anual, 2008, for example), but far less for the role of phonology, as I have mentioned, and I believe it may warrant closer attention.

Long term experience of teaching English reading classes to mainly Japanese university students, and observation of their general difficulty in reading aloud at all fluently, coupled with frequent confusions of near homophones in their writing (which seldom resembled each other in meaning), suggested that phonological knowledge played a role in their reading and recognition of English words, independently of actual vocabulary knowledge itself.

So, the research objectives here were to examine the effect on reading comprehension of vocabulary size alone and of phonological awareness alone, but also to examine the evidence for any effect that might be the result of interaction between the two. The scope of this study is, admittedly, small, with only 28 subjects, but since it partially replicates a previous study (Ihata 2013/2014), there was the possibility that some of the results, at least might overlap and allow fairly firm conclusions to be drawn. They may still only be tentative in terms of generalizing them to a larger population, of course.

3. Method

One class of university students, at Musashino University in Tokyo, comprised entirely of Global Communication majors, taking English with Chinese or English with Japanese (in the case of the overseas students, mostly Chinese nationals), were selected as test subjects. They were an EFL Reading class of mixed juniors and seniors (28 subjects: 9 seniors and 19 juniors, of whom 17 were Japanese, 8 Chinese, 1 Vietnamese, 1 Malaysian (but also Chinese speaking), and 1 Cambodian (a Khmer speaker)). The tests used were chosen for their reputation as standard tests of ability, although the Listening Test, the Oxford Placement Test's Listening Test, from Test Pack 2 (Allan, 1992), was not one specifically designed to test phonemic awareness. However, most of the items on the test do, in fact, rely on the learner's ability to distinguish words containing similar-sounding phonemes (e.g. *shirts*/*shorts*, *loved*/*loathed*) in whole-sentence contexts, so it was felt that it might be employed as an initial sampling measure. This was supplemented by a test of

phonological deficit, similar to one devised by Coulson et al. (2013), in which 25 pseudo-homophones (words that resembled real words when read aloud, such as *leyber*, *sizzerz*, *yooz*) were mixed with 24 pronounceable non-words (originally 25, but it was noticed during the test that 'endi' had been included twice and selection of it was only counted once per subject). Although this is not exactly what is meant be a 'miscue' analysis, it does resemble the notion as defined by Sitorus et al. (2015), "Readers' miscues include substitutions of the written word with another, additions, omissions, and alterations to the word sequence." (our underlining). Students were asked to read the words aloud and to circle those which they felt were pseudo-homophones, i.e. they sounded the same as a real word. Each student did this test individually in a classroom with a researcher. They were prevented from communicating with each other concerning the test while it was in progress to avoid them influencing each other. Vocabulary knowledge was measured using Paul Nation's Vocabulary Size Test (Nation & Beglar, 2007), and the Extensive Reading Foundation's online placement test was used to examine reading comprehension ability. All the tests were administered during the first semester of the academic year, from May to July, 2017.

Given the significant number of Chinese-speaking students in the group, Language was also included as a possible factor influencing reading comprehension ability.

4. Results and Discussion

Results were tabulated and subjected to statistical analysis. The initial analysis, using the standard Pearson correlation measure, did not provide any evidence of a significant relationship between vocabulary size and reading comprehension scores (Table 1 below). There was also no indication of a link between their performance on the test of phonological deficit (hereafter referred to as 'word identification task') and reading score, although a significant relationship between Word Identification and Vocabulary size is suggested. The Listening (phonemic distinction) ability shows a firm relation to Reading Comprehension ability, but the most significant relationship was between the subjects' first language and their reading comprehension ability, which appeared to be very strong (significance = .007 for $p \leq 0.01$)

In fact, the average reading test score for the Chinese speaking students was 12.66 versus 8.6 for the majority Japanese subjects. Other languages spoken by members of the group (Vietnamese and Khmer) were each represented by only one subject and any results associated with them deemed irrelevant, although they may have influenced the statistics slightly, since both scored over 14. The disparity between Chinese-speaking and Japanese-speaking subjects here may

be explained by the fact that the overseas students tend to have more familiarity with English, because of their home country's education system devoting more time to the study of English, or because of higher levels of motivation to acquire linguistic competence that they can use to gain more rewarding or more lucrative employment later. (The downturn in Japan's economic performance has depressed employment for new graduates over the past few years, and students are keenly aware of the difficulty they face in securing employment.) It is also possibly related to the structure of the language giving Chinese learners an advantage, since both Chinese and English share the SVO sentence structure, whereas Japanese follows the SOV pattern. Vietnamese and Khmer are also both SVO languages.

Table 1: *Correlations between Subjects' Phonemic/Phonological awareness, First Language, and Reading Comprehension Scores*

		Word Identification	**Listening**	**Vocabulary**	**Reading**	**Language**
Word Identification	Pearson Correlation Sig. (1-tailed)	1	.154 .217	**.326*** **.045**	.187 .171	-.202 .152
Listening	Pearson Correlation Sig. (1-tailed)	.154 .217	1	.017 .466	**.371*** **.026**	.161 .207
Vocabulary	Pearson Correlation Sig. (1-tailed)	**.326*** **.045**	.017 .466	1	.102 .302	-.061 .380
Reading Comprehension	Pearson Correlation Sig. (1-tailed)	.187 .171	**.371*** **.026**	.102 .302	1	**.458**** **.007**
Language	Pearson Correlation Sig. (1-tailed)	-.202 .152	.161 .207	-.061 .380	**.458**** **.007**	1

*. Correlation is significant at the 0.05 level (1-tailed).

**. Correlation is significant at the 0.01 level (1-tailed).

The evidence of connections between the phonemic/phonological awareness ability levels (Word Identification or Listening) and Vocabulary or Reading Comprehension ability was further examined through a series of one-way ANOVA tests and other measures of correlation (Kendall's tau b and Spearman's rho) (Table 2 below). While the ANOVA results were disappointing, revealing only a very weak (non-significant – $p \leq 0.060$, F= 2.422) effect for phonemic distinction

(Listening), the non-Pearson correlations re-confirmed this effect with statistical significance and the very strong connection with the subject's first language.

Table 2: *Non-Pearson Correlations for Reading Comprehension with Phonemic/Phonological Awareness, First Language, and Vocabulary Size*

		Word ID	Listening	Vocab-ulary	Reading	Language
Word Identi-fication	Kendall's tau b Corr. Coefficient Sig. (2-tailed)	1	.122 .389	. 187 .181	.181 .189	-.029 .854
Listening	Kendall's tau b Corr. Coefficient Sig. (2-tailed)	.122 .389	1	-.036 .759	**.341*** **.013**	.204 .197
Vocabulary	Kendall's tau b Corr. Coefficient Sig. (2-tailed)	187 .181	-.036 .759	1	.090 .512	-.201 198
Reading Compre-hension	Kendall's tau b Corr. Coefficient Sig. (2-tailed)	.181 .189	**.341*** **.013**	.090 .512	1	**.420**** **.006**
Language	Kendall's tau b Corr. Coefficient Sig. (2-tailed)	-.029 .854	.204 .197	-.201 198	**.420**** **.006**	1
Word Identi-fication	Spearman's rho Corr. Coefficient Sig. (2-tailed)	1	.161 .413	.233 .234	.247 .205	-.049 .803
Listening	Spearman's rho Corr. Coefficient Sig. (2-tailed)	.161 .413	1	-.095 .631	**.451*** **.016**	.248 .203
Vocabulary	Spearman's rho Corr. Coefficient Sig. (2-tailed)	.233 .234	-.095 .631	1	.123 .531	-.238 222
Reading Compre-hension	Spearman's rho Corr. Coefficient Sig. (2-tailed)	.247 .205	**.451*** **.016**	.123 .531	1	**.501**** **.007**
Language	Spearman's rho Corr. Coefficient Sig. (2-tailed)	-.049 .803	.248 .203	-.238 222	**.501**** **.007**	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

and this may be the explanation for the two factors' influence here. It appears that the aural distinction ability is much more significant than vocabulary size in itself, but it seems only logical to assume that phonological distinction ability can only be usefully employed on identifying words as they are read, and that known words will be identified more rapidly as a result of the automatic phonological processing of the written text as a person reads.

In other words, although it appears obvious that vocabulary has an important role to play in the reading process in any language, phonological knowledge is also a significant factor in decoding the text, particularly in a foreign language. Moreover, there is another factor at work in this case, since the subjects in question are almost all (93%) Japanese or Chinese language speakers. This means that they are dealing with a very different writing system from their own and that reading is bound to involve additional processes for them. It is true that both languages have a standard 'romanized' version which they learn in the early years of their education, but this script is little used in daily life. Much of the 'English' used around them in product or store names or on various goods from T-shirts to pencil cases is for decorative purposes only, and is seldom read. This, at least, has been my long-term experience with Japanese university students.

The relationships in the data presented in Tables 1 and 2 above appear to reflect this situation, since they indicate a link between Word Identification – a task that involves phonological recognition of the word rather than visual, but nonetheless is also influenced by the graphemic form of the words – and vocabulary knowledge. This is supported by the fact that 76.5% of the Japanese subjects and 55.6% of the Chinese speakers failed to select *yooz*, even though they pronounced it correctly and should have realized that it was 'use' (Appendix 2). It appears that they were slow to make the link between the unfamiliar visual form and the sound of the word. Likewise, *perss* was not recognized as 'purse' by 59% of Japanese and 55.6% of Chinese speakers. One-third of the Chinese-speaking subjects even failed to make the connection between *howss* and 'house'. On the other hand, mis-chosen non-words reveal links to some common problems in phonemic distinction, in cases such as *frex*, chosen by 65% of the Japanese subjects, probably due to the difficulty for them to distinguish /l/ and /r/. *Plag* reflects another common issue, distinguishing the open front vowel /a/ from the open mid-back vowel /ʌ/. The common selection of *vax* and *fliss* among the Chinese-speaking subjects (each was chosen by 55.6% of these subjects) may also reflect a problem of vowel distinction. Other wrongly chosen non-words may illustrate not only phonological deficit, but also possibly the power of the visual graphemic impression over the phonology for these non-alphabetic language users – *wotar*, for example, was everyone's favorite, with 94% of the Japanese and 89% of the Chinese speakers deciding it was a word, presumably 'water', even when their own pronunciation of it did not really match. In relation to this, an interesting article by Sheets (2012) recommends assessments of spelling ability as a means of understanding learners' grasp of sound-symbol correspondences, since, she claims, "Words that can be spelled can also be read, so spelling assessments reveal a measure of word reading or

decoding." *Wotar* was also selected by the Vietnamese and Khmer speakers. It is possible that the choice of *minduhl*, selected by 23.5 % of the Japanese speakers, is also visually influenced by the appearance of 'mind' at the beginning, although few, if any, pronounced it as /maɪnd /rather than /mɪnd /. Reed (2012:13) also underlines the fact that English spelling is by no means as irregular and unpredictable as it is commonly perceived to be.

The findings of the present study appear, at least, to provide evidence of some correlation between vocabulary size and phonological/phonemic awareness, indicating that they work together in complex ways to influence a person's reading comprehension ability in English as a foreign language. The Khmer speaking subject is a very interesting illustration of the complexity involved: he had the highest scores on both Word Identification and Listening tasks, and had the fifth highest reading comprehension score, yet his vocabulary knowledge seems very little above the average for the group (51.4% vs. the average of 48.2%). He is a fluent and very comfortable speaker of English and has recently made noticeable progress in both speaking skills, including pronunciation improvement, and reading and understanding the deeper meaning of texts. It will be interesting to chart his progress in future.

It also seems pertinent here to mention that, when Yoshikawa and Yamashita (2014) examined the role of phonemic awareness in the reading comprehension of L1-Japanese readers, their findings revealed that phonemic awareness made an indirect contribution to reading comprehension through decoding, which along with vocabulary knowledge directly supports reading comprehension. They also found evidence to support a role for phonemic awareness in their subjects' reading in English as a second language. Furthermore, Yeung, Siegel & Chan (2012) found that Hong Kong Chinese children learning English who received special phonological awareness instruction performed significantly better than their peers who did not on tests of word reading, spelling and expressive vocabulary.

5. Conclusion

These findings, particularly in the light of similar results obtained with a not too different group of subjects previously (Ihata, 2013/2014) suggest, as with the wealth of research referred to in the Introduction above that phonological awareness and vocabulary knowledge interact in complex ways with EFL reading comprehension ability. It may be that the process is similar to that reported by Yoshikawa & Yamashita (2014) for L1 reading among Japanese adults. It is also

indicated here that this relationship may additionally be influenced by the learner's first language being one that uses a non-alphabetic writing system, particularly noticeable in the case of the Japanese subjects, whose own written language employs an unusually deep orthography and has a different basic sentence structure to English. The Chinese speaking subjects may have some advantages in that the Chinese orthography is relatively shallow (compared to Japanese) and shares the SVO structure of English, as do Khmer and Vietnamese.

Overall, the evidence appears to support a key role for phonological awareness, in conjunction with vocabulary knowledge, in the EFL reading process, and there is increasing interest in the significance of phonological knowledge (Khatib & Fat'hi, 2012). We tend to assume this as a given in first language reading in English, because of the lack of transparency in the sound-symbol correspondence, and there is doubtless a tendency to overlook the need for it with second language learners, who are normally older and already fully literate in their first language. Certainly, most examination preparation classes at university level in Japan are oriented towards expanding the students' vocabulary, with little emphasis on pronunciation work, and class sizes have tended to make it impossible to deal effectively with individual cases. I believe the findings here indicate that Walter (2007), Mirzabel et al. (2016) and others are right in assuming a significant role for pronunciation practice in improving reading skills. There are various ways in which this might be achieved, including having learners read texts aloud in the classroom, and encouraging them to also practice this outside the classroom as much as possible. It is also likely to be helpful to persuade students to make efforts to acquire the correct pronunciation of new vocabulary or expressions at the same time as they learn them as vocabulary items. Nation's (Nation, 2001; Laufer & Nation, 2005) encouragement to improve vocabulary size through the use of word cards lends itself well to this, since learners can include personalized notes on pronunciation. Drawing attention to patterns or rules guiding the pronunciation of English names and words may also be of assistance to second language learners, just as it is to native speaker children in the early years of learning to read. It is interesting to note here that Dillon, de Jong & Pisoni's (2012) study of deaf children in the U.S. found that phonological awareness correlated strongly with reading comprehension scores, and they also found that size of vocabulary knowledge seemed to be "a mediating factor in the relationship the children's phonological awareness and reading skills".

The present study is, of course, too limited and lacking proper control of all factors to be able to make firm pronouncements regarding the actual relationship between phonological

awareness, vocabulary size and reading comprehension, and much more research is needed in this area, given the potential benefits of relatively simple training.

We hope to undertake future research investigating more closely the interactions between phonological/phonemic awareness, vocabulary knowledge, and reading comprehension. It would also be valuable to examine the similarities and differences between users of alphabetic and non-alphabetic languages in terms of the effectiveness of training which gives special attention to the phonology and pronunciation of written English. Most recent studies in a similar area (Hipfner-Boucher & Chen, 2016; Melby-Lervåg & Lervåg 2011, for example) appear to focus on L1/L2 cross-linguistic transfer and the benefits involved.

* The earlier work referred to in this paper was originally presented in Seoul in 2013 at, and is included in the *Proceedings* of, the KOTESOL International Conference 2013. The study reported here was all undertaken in the 2017 academic year, and included different types of analysis.

References

Akamatsu, N. (2005). Effects of Reading Proficiency on Word Recognition. In V. Cook & B. Bassetti (Eds.), *Second Language Writing Systems* (pp. 238-259). Clevedon, UK: Multilingual Matters Ltd.

Alderson, J. C. (1984). Reading in a Foreign Language: A Reading Problem or a Language Problem? In J. C. Alderson & A. H. Urquhart (Eds.), *Reading in a Foreign Language* (pp. 1-24). New York: Longman.

Alderson, J. C. (2000). *Assessing Reading*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511732935

Allan, D. (1992). *Oxford Placement Test: Test pack. Test 2*. Oxford: Oxford University Press.

Anderson, R. C. & Freebody, P. (1981). Vocabulary Knowledge. In J. T. Guthrie (Ed.), *Comprehension and Teaching: Research Reviews.* Newark, Del: International Reading Association.

Coulson, D., Ariiso, M., Kojima, R. & Tanaka, M. (2013). Difficulties in Reading English Words: How do Japanese Learners Perform on a Test of Phonological Deficit? Vocabulary Learning and Instruction, 2 (1), 56-63. doi: 10.7820/vli.v02.1coulson.et.al

Dillon, C. M., de Jong, K. & Pisoni, D. B. (2012). Phonological Awareness, Reading Skills and Vocabulary Knowledge in Children Who Use Cochlear Implants. The Journal of Deaf Studies and Deaf Education, 17 (2), 2015-226. https://doi.org/10.1093/deafed/enr043

Extensive Reading Foundation Placement Test. Retrieved from https://erfpt.ealps. shinshu-u.ac.jp/

Eyckmans, J. & Lindstromberg, S. (2017). The Power of Sound in L2 Idiom Learning. Language Teaching Research, 21 (3), 341-361. https://doi.org/10.1177/1362168816655831

Han, Feifei. (2013). Speed of Lexical Access and Strategic Processing in FL Reading. Paper presented at the KOTESOL International Conference 2013, Seoul.

Hipfner-Boucher, K. & Chen, X. (2016). Cross Language Transfer of Metalinguistic and Cognitive Skills in Second Language Learning. In Xi Chen, X., V. Dronjic, & R. Helms-Park, (Eds.), *Reading in a Second Language: Cognitive and Psycholinguistic Issues* (pp. 99-132). Oxford: Routledge.

Hu, C-F, & Catts, H. W. (1993). Phonological Recoding as a Universal Process?: Evidence from Beginning Readers of Chinese. Reading and Writing: An Inter- disciplinary Journal, 5 (3), 325-337. https://doi.org/10.1007/BF01027395

Hu, C-F, & Catts, H. W. (1998). The Role of Phonological Processing in Early Reading Ability: What We Can Learn from Chinese. Scientific Studies of Reading, 2 (1), 55-79. https://doi.org/10.1207/s1532799xssr0201_3

Ihata, A. C. (2013/2014). Linking Thinking on Reading in English – Vocabulary and Phonemic Awareness. Paper presented at the KOTESOL International Conference 2013, Seoul. Published in the conference *Proceedings* in 2014 *(*ISSN 1598-0472).

Iso, Tatsuo. (2012). Examining the Validity of the Lexical Access Time Test (LEXATT2) Vocabulary Learning and Instruction, 1 (1). http://dx.doi.org/10.7820/vli.v01.1.2187-2759

Khatib, M. and Fat'hi, J. (2012). On the Role of Phonological Processing in L2 Reading. Journal of Language Teaching and Research, 3 (1), 66-73. https://doi.org/10.4304/jltr.3.1.66-73

Kang, Y., Kang, H. S. and Park, J. (2012). Is It Vocabulary Breadth or Depth that Better Predicts Korean EFL Learners' Reading Comprehension? English Teaching, 67 (4), 149-171. https://doi.org/10.15858/engtea.67.4.201212.149

Kess, J. F. & Miyamoto, T. (1999). *The Japanese Mental Lexicon: Psycholinguistic studies of kanji and kana processing*. Philadelphia/Amsterdam: John Benjamins Publishing Company.

Koda, K. (1998). The Role of Phonemic Awareness in Second Language Reading. Second Language Research 14, 194-215. https://doi.org/10.1191/026765898676398460

Koda, K. (2005). *Insights into Second Language Reading*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781139524841

Laufer, B., Meara, P., & Nation, I.S.P. (2005). Ten Best Ideas for Teaching Vocabulary. The Language Teacher 29 (7), 11-14. Retrieved from http://jalt-publications.org/tlt/issues/2005-07_29.7

Lestari, W. L. (2015). The Teaching of Critical Reading in an EFL Classroom. People: International Journal of Social Sciences, 1 (2), 519-530.

Ma, Y. and Lin, W. (2015). A Study on the Relationship between English Reading Comprehension and English Vocabulary Knowledge. Education Research International, 2015, Article ID 209154, 14 pages, https://doi.org/10.1155/2015/209154

Melby-Lervåg, M., & Lervåg, A. (2011). Cross-linguistic Transfer of Oral Language, Decoding, Phonological Awareness and Reading Comprehension: A Meta-analysis of the Correlational Evidence. Journal of Research in Reading 34 (1), 114-135. https://doi.org/10.1111/j.1467-9817.2010.01477.x

Melby-Lervåg, M., & Lervåg, A. (2014). Reading Comprehension and its Underlying Components in Second-Language Learners: A Meta-analysis of Studies Comparing First- and Second-Language Learners. Psychological Bulletin, 140 (2), 409-433. https://doi.org/10.1037/a0033890

Mirbazel, S. K., Arjmandi, M. & Bazargani, D. T. (2016). The Effect of Phonemic Awareness of English Sounds on the Improvement of Reading Ability of Iraninan Junior Secondary Program (Jsp) Students. Modern Journal of Language Teaching Methods, 6 (4), 186-198.

Moghadam, S. H., Zainal, Z. & Ghaderpour, M. (2012). A Review on the Important Role of Vocabulary Knowledge in Reading Comprehension Performance. Procedia – Social and Behavioural Sciences, 66, 555-563. https://doi.org/10.1016/j.sbspro.2012.11.300

Nation, I.S.P. (2001). *Learning Vocabulary in Another Language*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781139524759

Nation, I. S. P. & Beglar, D. (2007). A Vocabulary Size Test. The Language Teacher 31 (7), 9-13. Retrieved from http://jalt-publications.org/tlt/issues/2007-07_31.7 Actual test available from http://www.lextutor.ca/tests/levels/recognition/ 1_14k/

Nation, I.S.P. & Wang, K. (1999). Graded readers and vocabulary. Reading in a Foreign Language, 12 (2), 355-380.

Perfetti, C. A. (2003). The Universal Grammar of Reading. Scientific Studies of Reading, 7 (1), 3-24. https://doi.org/10.1207/S1532799XSSR0701_02

Perfetti, C. A. & Zhang, S. (1995). Very Early Phonological Activation in Chinese Reading. Journal of Experimental Psychology: Learning, Memory, and Cognition, 21 (1), 24-33. https://doi.org/10.1037/0278-7393.21.1.24

Reed, D. K. (2012).Why Teach Spelling? Portsmouth, NH: RMC Research Corporation, Center on Instruction. Retrieved from http://files.eric.ed.gov/fulltext/ED531869.pdf

Sheets, Wendy. (2012). Understanding Orthography and its Implications for English Language Learners. Published by the Literacy Collaborative at The Ohio State University. Retrieved from http://lcosu.blogspot.jp/2012/04/understanding-orthography-and.html

Sidek, H. M. and Ab. Rahim, H. (2015). The Role of Vocabulary Knowledge in Reading Comprehension: A Cross-linguistic Study. Procedia – Social and Behavioural Sciences, 197, 50-56. https://doi.org/10.1016/j.sbspro.2015.07.046

Sitorus, F. R., Silalahi, W. P. and Lin, H. (2015). Exploring Reading Process of Taiwanese Students: Using Miscue Analysis. People: International Journal of Social Sciences, 1 (2), 1367-1374.

Tunmer, William, E. (1997). Metalinguistic Skills in Reading Development. In V. Edwards & D. Corson (Eds.), *Encyclopedia of Language and Education* (vol. 2: Literacy, pp. 27-36). Dordrecht: Kluwer Academic Publishers.

Walter, C. (2007). First- to Second-language Reading Comprehension. International Journal of Applied Linguistics, 17 (1), 14-37. https://doi.org/10.1111/j.1473-4192.2007.00131.x

Waring, R. & Takahashi, S. (2000). *The 'Why' and 'How' of Using Graded Readers.* Tokyo: Oxford University Press.

Yeung, S. S. S., Siegel, L. S. & Chan, C. K. K. (2012). Effects of a Phonological Awareness Program on English Reading and Spelling among Hong Kong Chinese ESL Children. Reading and Writing 26 (5), 681-704. https://doi.org/10.1007/s11145-012-9383-6

Yoshikawa, L. and Yamashita, J. (2014). Phonemic Awareness and Reading Comprehension among Japanese Adult Learners of English. Open Journal of Modern Linguistics, 4 (4), October, 2014. Retrieved from https://www.scirp.org/journal/PaperInformation.aspx?PaperID=50283

Zhang, L. J. & Anual, S. B. (2008). The Role of Vocabulary in Reading Comprehension. RELC Journal 39 (1), 51-76. https://doi.org/10.1177/0033688208091140

Appendix 1

List of Words Used in the Test of Phonological Deficit (Correct answers in bold)

* The non-word ‘endi’ was originally mistakenly included twice. It only counted once as a mis-choice. ‘Vax’ was also discovered to exist, but to be extremely obscure, and certainly unknown to these subjects.

neym	**sootkeis**	**teecha**
fossit	astru	**yooz**
joxer	tamk	fliss
eniwan	**konkreet**	**kween**
droos	endi*	**jenuhruss**
mander	**egzam**	minduhl
eeziy	montuhl	**leyber**
quink	vax	kredot
lastik	**kwolity**	**rimuuv**
borl	plag	siver
endi	**kreess**	**evagriin**
perss	**sizzerz**	**kirten**
lechfor	labrit	proil
frex	**krismass**	**lornch**
howss	nambo	wotar
gragl	misgid	**espeshull**

ronsit

fome

kamta

Appendix 2

Missed Real Words by Subject First Language (N = 28) (Empty cells indicate all subjects correctly identified the word) * K = Khmer V = Vietnamese

Word (as it appeared)	Japanese-speaking Subjects (%)	Chinese-speaking Subjects (%)	Other language Subjects (No. of people & language)	Total (%)
neym	23.5	22		21.4
eniwan		33.3	1 K*	14.3
eeziy		11		3.6
borl	6	11	1 V	10.7
perss	59	55.6	1 K, 1 V	60.7
howss	11.8	33.3		17.9
sootkeis	53	66.7		53.6
konkreet		22		7
egzam		11		3.6
urlee	23.5	55.6		32.1
kwolity	29.4	11		21.4
kreess	94.1	44.4	1 V	75
sizzerz	11.8	33.3	1 V	21.4
krismass		22	1 V	10.7
teecha	23.5	11		17.9
yooz	76.5	55.6	1 V	67.9
kween	23.5	33.3		25
jenuhruss	76.5	66.7		71.4
leyber	23.5	33.3		25
rimuuv	23.5	55.6		32.1
evagriin	70.6	77.8	1 V	71.4
kirten	11.8	33.3		17.9
lornch	35.3	55.6	1 V	42.9
espeshull	59	55.6	1 V	57.1
fome	23.5	44.4	1 V	32.1

Non-Words Wrongly Selected by Subject First Language (N = 28) (Empty cells indicate all subjects correctly identified the word) * K = Khmer V = Vietnamese

Word (as it appeared)	**Japanese-speaking Subjects (%)**	**Chinese-speaking Subjects (%)**	**Other language Subjects (No. of people & language)**	**Total (%)**
fossit	12	55.6		25
joxer	6	22		7
mander	18	44.4		25
quink	6	11	1 K*	10.
lastik	12	44.4		21.4
endi	6	44.4	1 V	21.4
lechfor		11		3.6
frex	65	44.4	1 K	57
gragl		11		3.6
astru	12	22	1 K	17.9
tamk	41	44.4	1 K	39.3
montuhl	23.5	11		17.9
vax	6	55.6	1 K	25
plag	76.5	44.4		60.7
labrit	12	44.4		21.4
misgid	6	22		10.7
fliss		55.6		17.9
minduhl	23.5		1 K	17.9
kredot	6	11		7
siver	35	66.7		39.3
proil	12	22		14.3
wotar	94	89	1 K, 1 V	89.3
ronsit				
kamta		22		7