

**Effects of Oral Reading Practice on
Reading Comprehension of Japanese Learners of
English as a Foreign Language**

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Chapter 1

Introduction

1.1 Focus

There has been an upsurge in demand, for the last decade, from various fields, such as commerce, information, science, technology and industry, concerning Japanese learners' English communicative proficiency, which is synonymous with Hymes' (1972) communicative competence, a concept that includes ability to use English as well as knowledge of English. In response to this, eventually, it seems that English language teaching (ELT) researchers and practitioners in Japan made a determination to seek ways to develop Japanese learners' English communicative proficiency. The Ministry of Education, Culture, Sports, Science and Technology (2003) established attainment targets for English abilities, in the strategic plan, of junior and senior high school students and of university students who would use English in the work place. Compliantly, the current Course of Study for foreign languages (2003) puts a principal emphasis on the development of "practical communication abilities" of junior and senior high school students. It seems that the development of English communicative proficiency for Japanese people is now a must that cannot be postponed any longer.

Under the circumstances, oral reading has made a comeback in ELT in Japan. One reason for this lies in anecdotal evidence, mainly shown by English-speaking professionals in various fields, that oral reading was helpful for the improvement of their English proficiency (Kunihiro, 1999; Takeuchi, 2003; Togo, 2002), which is synonymously used with Canale & Swain's (1980) communicative competence, a concept for overall knowledge of English, consisting of not only grammatical competence but also sociolinguistic competence, strategic

competence and discourse competence. Another lies in the development of brain sciences such as neuro-psychology, cognitive psychology and experimental psychology, suggesting: (a) a cognitively demanding activity such as oral reading is likely to activate working memory (Osaka, et al., 1999; Osaka, 2002); and (b) oral reading is an activity that is likely to activate many regions of the brain (Kawashima, 2002; Miura, et al., 2003).

Moreover, some traditional criticisms against oral reading have been proved to be inadequate. The criticisms include: (a) learners who are overloaded in comprehending a text while reading aloud tend to do parrot-reading, i.e., oral reading without comprehension (Takanashi & Takahashi, 1987; Takayama, 1995); and (b) oral reading often hinders developing learners' reading speed or understanding the gist of a text (Takayama, 1995). The first shortcoming can be remedied if learners read a text aloud after comprehending it. The second shortcoming should not be emphasized because the reading speed of Japanese learners usually does not differ between silent and oral reading. The slow reading of learners is considered to be rooted in their excessive dependence on such reading strategies as sentence-level translation and dictionary use.

The revival of oral reading will not be short-lived so long as oral reading practice can contribute to the development of English communicative proficiency for Japanese learners. Since three major purposes of oral reading practice are to improve learners' (a) letter-sound connection; (b) passage comprehension; and (c) oral communication skills (Mineno, 1985; Niizato, 1991; Sakuma, 2000; Takayama, 1995), oral reading practice should supposedly make a contribution to the development of threshold-level English competence as well as English communicative proficiency. Here English competence, which is interchangeably used with English language ability and Canale & Swain's (1980) grammatical competence, is defined as knowledge of the grammar and vocabulary of English. Threshold-level English competence, which is required for conducting daily communication, is presumably at about

the pre-second level of STEP (Society for Testing English Proficiency) examination.

However, there is a problem that would not allow us to support the contribution of oral reading to the development of English abilities. The problem is that the assertion concerning the purposes of oral reading practice is based primarily on anecdotal evidence, not based on rigid theoretical foundations nor on empirical validation. Although there are many other oral reading studies, this problem is commonly seen in most of the studies. Therefore, it is necessary to examine assertions concerning oral reading theoretically and empirically. If it is validated that oral reading practice can help to improve English competence and English communicative proficiency of Japanese learners, oral reading practice can constitute an indispensable part of English instruction. Thus, we decided, as a first step, to examine the effects of oral reading practice on reading abilities of Japanese learners because reading as well as grammar and vocabulary has been a targeted component of English language ability in ELT in Japan.

Before disclosing our blueprint of this thesis, reading abilities such as reading comprehension, reading fluency and overall reading proficiency should be provided clear definitions. Reading comprehension is defined as an ability to understand a text accurately and at an appropriate rate. The reason for not disregarding the rate is that comprehension, which is processed through word recognition, parsing, proposition formation, is affected by the processing efficiencies. Reading fluency is defined as an ability to read a text speedily with approximate understanding of it, which follows Harris & Hodges (1995) defining fluency as “freedom from word identification problems that might hinder comprehension in silent reading . . .” (p. 85). It is differentiated from reading speed and rate in which text understanding is disregarded. Although fluidity, concerning amount of reading, may be included in reading fluency (Segalowitz, 2000), it is excluded in this thesis because extensive reading is not treated. Reading proficiency, consisting of reading comprehension and

fluency, is defined as a reading ability to comprehend a text accurately and speedily. Moreover, overall reading proficiency, a concept used more frequently in L1 reading research, is an overall reading ability to comprehend a text accurately, speedily and fluidly. However, reading proficiency and overall reading proficiency may be nearly synonymous with reading comprehension for Japanese learners who are likely to lack reading fluency and fluidity.

Our first step is to examine how these reading abilities of Japanese learners are affected by oral reading practice. If oral reading practice can have positive effects on their reading comprehension and overall reading proficiency, it may almost mean that oral reading practice can help to improve their English language ability. Consequently, it may be interpreted as showing that oral reading practice can contribute to the development of English communicative proficiency of Japanese learners by helping to improve their English language ability. Although the indirect contribution may be small, it is at least beneficial for learners if oral reading practice can help to improve their reading comprehension and overall reading proficiency. Thus, it is worth while examining the effects of oral reading practice on reading comprehension and overall reading proficiency of Japanese learners.

The present thesis, as a primary goal, seeks to examine the effects of oral reading practice on reading comprehension and overall reading proficiency of Japanese learners. Others purposes are: (a) to review studies concerning oral reading; (b) to construct a theoretical model of oral reading; (c) to make assumptions about oral reading practice based on the theoretical model; (d) to empirically examine questions relevant to the assumptions about oral reading practice; and (e) to suggest an oral reading approach for the development of English communicative proficiency of Japanese learners.

1.2 Organization

This section provides definitions of oral reading and its relevant terms before revealing

the organization of the thesis. Oral reading is defined as an act of reading a text aloud in a voice at an audible level, (a) whether there are listeners or not; (b) whether readers understand the text or not; and (c) whether readers see the text at first sight or not. Mumbling and lip reading are not considered to be oral reading because they are not audible. Oral reading is used interchangeably with reading aloud.

Oral reading practice means any practice in which learners perform oral reading techniques, in class or out of class. Oral reading techniques that are frequently used in Japan are buzz reading, chorus reading, individual reading, paced reading, parallel reading and Read and Look-up (Osa, 1997; Yada, 1987). In buzz reading, which is also called free reading, learners read a text at individual paces. In chorus reading, the whole class or group read a text together simultaneously. In individual reading, a learner reads a text alone to the rest of class or group. In paced reading, learners read a text in chunks repeating after the model. In parallel reading, which is also called simultaneous reading, learners read a text simultaneously with the model. In Read and Look-up, which is synonymous with Look-up and Say, learners read a chunk or sentence in a text silently and look up to say the chunk or sentence aloud without looking at it, and then repeat the same action in the following chunks or sentences.

Oral reading ability, oral reading speed and oral reading fluency are concepts used in evaluating oral reading of learners. Oral reading ability is defined as an overall ability to read a passage aloud, mainly composed of four abilities: pronunciation, intonation, pause making and delivery. This definition is given so that highly complex processings of oral reading may be assessed through oral reading performance. Oral reading speed is expressed as the number of words that learners can read per minute, including mistakenly read words. Contrastively, oral reading fluency is expressed as the number of words that learners can correctly read per minute, excluding error words (Fuchs, et al., 1993; Fuchs, et al., 1988;

Jenkins, et al., 2003).

The present thesis consists of nine chapters including this introductory chapter. In chapter 2, issues concerning oral reading in ELT in Japan are reviewed based on Miyasako's (under review) classification: positions on oral reading, purposes of oral reading and processing of oral reading. The review shows, as common shortcomings among many studies concerning oral reading, that there are few rigid theoretical grounds, much less empirical grounds, to support their assertions. For the rectification, it is suggested that a model of oral reading should be constituted based on the componential processing view of reading, where written information is processed through several components, i.e., word recognition, parsing, proposition formation and comprehension (Grabe, 1999 & 2000; Grabe & Stroller, 2002), that can explain many assertions in the studies concerning oral reading.

In chapter 3 a model of oral reading is proposed so that we can establish a rigid theoretical foundation for empirical studies concerning oral reading. The oral reading model, primarily aimed at explaining the processing mechanism, is based on the componential processing view of reading. It is comprised of the DRC model of oral word reading (Coltheart & Rastle, 1994; Ziegler, et al., 2000) for the word recognition component and Baddeley's model (2000 & 2003) for working memory. The oral reading model is explained and its legitimacy is theoretically examined. Next, based on this model, assumptions are made concerning functions of oral reading practice that may favorably affect reading comprehension and overall reading proficiency of Japanese learners: oral reading practice helps them: (a) to establish the connection between letters and sounds; (b) to expand vocabulary; (c) to acquire grammar through consciousness raising; and (d) to improve the efficiency of working memory. These assumptions are explained with theoretical support.

Chapter 4 empirically examines preconditions for the assumptions about oral reading practice: reading comprehension and overall reading proficiency should have significant

relationships with letter-sound connection, vocabulary, grammar and working memory, so long as the assumptions are valid. The first and second studies mainly scrutinize the relationships of reading comprehension with the efficiency of phonological coding for letter-sound connection and with working memory capacity respectively for Japanese senior high school students. The third study compares between first- and third-year senior high school students: (a) the efficiency of phonological coding and working memory capacity; and (b) the relationships of these two variables with reading comprehension.

Chapter 5 empirically examines relationships of reading comprehension and reading proficiency of Japanese learners with variables relevant to oral reading. The first study examines the relationship of oral reading ability and its components, i.e., pronunciation, intonation, pause making and delivery, with English proficiency and its components, i.e., vocabulary, grammar, reading and listening, for Japanese senior high school students. One of the examined relationships is between their reading proficiency and oral reading ability, which concerns a precondition for our goal: to improve their reading comprehension and overall reading proficiency through oral reading practice. The second study examines the relationships of reading comprehension with oral reading speed and oral reading fluency. These relationships should also be significant so long as our goal is validly established. Finally, based on the study findings, we advance a hypothesis that oral reading practice improves reading comprehension and overall reading proficiency of Japanese senior high school students by helping them: (a) to establish the connection between letters and sounds; (b) to expand vocabulary; (c) to acquire grammar through consciousness raising; and (d) to improve the efficiency of working memory.

In chapter 6, preceding the study, a critical review is performed concerning studies that examined the effects of oral reading practice on reading and listening abilities and English language ability, and their findings and problems are revealed. The study investigates into

the effect of oral reading practice on English language ability of Japanese senior high school students. This study is highly relevant to studies that examine the oral reading hypothesis because reading comprehension principally comprises English language ability of Japanese learners.

In chapter 7, two studies mainly examine the oral reading hypothesis by investigating into the effect of oral reading practice on reading comprehension of Japanese senior high school students. Moreover, the first study explores what types of oral reading practice are more effective for them and what reading proficiency learners should have to benefit from oral reading practice. The second study examines the effects of oral reading practice on reading fluency and the efficiency of phonological coding. The study findings support the oral reading hypothesis.

Chapter 8 provides pedagogical implications from findings of the present thesis. Next, based on the implications and oral reading hypothesis, an oral reading approach is proposed, aiming at the development of English proficiency and English communicative proficiency of Japanese learners.

The final chapter, reviewing the preceding chapters, consolidates findings of the present thesis and reveals their significance. Next, it provides theoretical implications for ELT research in Japan. Finally, it reveals limitations of the present thesis and provides suggestions for future research.

Chapter 2

Oral Reading in English Language Teaching

This chapter reviews oral reading in ELT in Japan. There have been a lot of issues discussed concerning oral reading so far. Most of them, however, have been discussed within the frameworks of or from the perspectives of individual researchers, without any consensus among them. As a consequence of this, a systematic evaluation of the issues has been quite difficult. Therefore, aiming at a systematic evaluation, Miyasako (under review) classified the issues into thirteen categories. The categorized issues are reviewed and discussed so that we may identify problems about research concerning oral reading and oral reading instruction.

2.1 Classification of Oral Reading Issues

Issues concerning oral reading can be classified into three categories: (a) positions on oral reading; (b) purposes of oral reading; and (c) processing of oral reading (Figure 2.1) (Miyasako, under review). Category (a) has one topic concerning positions on oral reading, disapproval of oral reading.

Category (b) consists of three subcategories corresponding to three components in the processing of oral reading: (i) decoding skills; (ii) comprehension skills; and (iii) production skills. Subcategory (b-i) includes two topics concerning decoding skills, (α) letter-sound connection and (β) practice of pronunciation. Subcategory (b-ii) includes three topics concerning comprehension skills: (α) comprehension; (β) vocabulary and grammar; and (γ) evaluation of comprehension. Subcategory (b-iii) includes two topics concerning production skills, (α) oral production and (β) prosody.

Figure 2.1: Issues concerning Oral Reading

-
- (a) Positions on oral reading: disapproval of oral reading
 - (b) Purposes of oral reading
 - (i) Decoding skills: (α) letter-sound connection; (β) practice of pronunciation
 - (ii) Comprehension skills: (α) comprehension; (β) vocabulary and grammar; (γ) evaluation of comprehension
 - (iii) Production skills: (α) oral production; (β) prosody
 - (c) Processing of oral reading
 - (i) Mechanism: oral reading mechanism
 - (ii) Phenomenon: (α) parrot reading; (β) obstacles to silent reading; (γ) comprehension in oral and silent reading
 - (iii) Instruction: when to practice oral reading
-

Category (c) consists of three subcategories relevant to the processing of oral reading: (i) mechanism; (ii) phenomenon; and (iii) instruction. Subcategory (c-i) has one topic concerning the processing mechanism, oral reading mechanism. Subcategory (c-ii) includes three topics concerning phenomena occurring in the processing: (α) parrot reading; (β) obstacles to silent reading; and (γ) comprehension in oral and silent reading. Subcategory (c-iii) has one topic concerning its instruction, when to practice oral reading.

Therefore, oral reading issues are classified into thirteen topics. Each of these topics is reviewed in turn in the following sections.

2.2 Positions

Category (a) has one topic, disapproval of oral reading. Some Western researchers (Frisby, 1957; Gurry, 1955; Nuttall, 1982; Paine, 1973; Rivers, 1981; Sawyer, et al., 1989; Smith, 1978; West, 1960) disapprove of oral reading in spite of admitting its merits restrictively. They emphasize reading for comprehension as a main purpose of reading, and suggest that readers should proceed to silent reading as soon as possible. One reason for this

is that learners often read a text aloud without understanding, which is called parrot reading, because oral reading is a cognitively demanding task that requires both the processing of written information and its production almost concurrently (Frisby, 1957; Nuttall, 1982; Paine, 1973; Smith, 1978; West, 1960). The other is that oral reading may have learners catch the habit of lip reading and subvocal reading in silent reading, which may impede the improvement of their silent reading (Nuttall, 1982; Rivers, 1981; Sawyer, et al., 1989). Although these reasons are reviewed further in the relevant sections below, much of their criticism is not theoretically grounded but anecdotal. These criticsers make a sharp contrast with many other researchers, especially Japanese researchers, acknowledging some merits of oral reading, who scarcely show disapproval of it.

2.3 Purposes

Category (b), purposes of oral reading, has three subcategories: (i) decoding skills, (ii) comprehension skills and (iii) production skills. Eight topics in this category are reviewed in accordance with the subcategories.

2.3.1 Decoding Skills

2.3.1.1 Letter-Sound Connection

There are a number of studies that regard establishing the connection between letters and sounds as a purpose of oral reading (Chastain, 1988; Frisby, 1957; Funatsu, 1981; Griffin, 1992; Kido, 1993; Mineno, 1985; Niizato, 1991; Sakuma, 2000; Shimaoka, 1976; Suzuki, 1998; Takayama, 1995; Tsuchiya, 1990; Ushiroda, 1992; Watanabe, 1990; West, 1960). This is vitally important for Japanese learners whose mother tongue has quite different orthographical and phonological systems from English. Practicing oral reading helps learners become able to articulate words automatically. In other words, this purpose of

practicing oral reading is to develop phonemic awareness and phonological recoding. Phonemic awareness is a skill to recognize the correspondence between phonemes and graphemes, and phonological recoding is a skill to generate sounds corresponding to letters and consecutive letters (Tunmer & Chapman, 1999).

Although the importance of these decoding skills in reading has come to be acknowledged theoretically and empirically (Carver, 1998; Castle, 1999; Gough, et al., 1996; Grabe, 1999 & 2000; Grabe & Stroller, 2002; Nicholson, 1999; Snow, et al., 1998; Stanovich, 2000; Stanovich & Stanovich, 1999) and the effectiveness of oral reading practice in developing decoding skills has been acknowledged in L1 reading (Blum, et al., 1995; Carver & Hoffman, 1981; Dixon-Krauss, 1995; Dowhower, 1987; Herman, 1985; Homan, et al., 1993; Labbo & Teale, 1990; Rasinski, et al., 1994; Tingstrom, et al., 1995; Weinstein & Cooke, 1992; Young, et al., 1996), many of the above studies are not based on these theoretical and empirical grounds.

2.3.1.2 Practice of Pronunciation

Improving pronunciation of words is another purpose of oral reading (Chastain, 1988; Frisby, 1957; Gurry, 1955; Morris, 1954; Paine, 1973; Rivers, 1981; Sawyer, et al., 1989; West, 1960). Although this may appear to be a matter of course, as the maxim “Practice makes perfect” goes, many of these researchers bring up this function of oral reading, not referring to the connection between letters and sounds, partly because they do not fully recognize the importance of decoding skills in the mechanism of oral reading processing.

2.3.2 Comprehension Skills

2.3.2.1 Comprehension

There are several assertions concerning the improvement of learners’ comprehension

through oral reading: (a) oral reading provides phonological information and helps learners' comprehension (Goodman, 1968; Ito, 1976; Mineno, 1985; Niizato, 1991; Suzuki, 1998; Takayama, 1995; Watanabe, 1985 & 1990); (b) repeated oral reading of the same text helps its comprehension (Takahashi, 1975); (c) oral reading practice raises awareness of phrasal and grammatical chunks and helps their comprehension (Takanashi & Takahashi, 1984; Tsuchiya, 2004; Watanabe, 1985 & 1990); and (d) oral reading practice helps them understand sentences according to word order, i.e., understand the words in a consecutive manner without reading back (Sakuma, 2000; Watanabe, 1985 & 1990).

These assertions are given the following accounts. First, oral reading provides phonological information and enables learners with underdeveloped decoding skills to understand a text in aural mode (Goodman, 1968; Ito, 1976) (see section 2.4.1 below), which is effective for learners whose listening proficiencies are higher than their reading proficiencies. It also helps learners with inefficient decoding skills make the acoustic image, i.e., phonological representation, of written information by driving their attention to the processing (Mineno, 1985; Niizato, 1991; Takayama, 1995; Watanabe, 1985 & 1990). Consequently, learners may be able to comprehend a text according to word order and with more ease.

Second, the assertion concerning repeated oral reading is similar to that of repeated reading or guided repeated oral reading in L1 reading (Blum, et al., 1995; Carver & Hoffman, 1981; Dixon-Krauss, 1995; Dowhower, 1987; Herman, 1985; Homan, et al., 1993; Labbo & Teale, 1990; Rasinski, et al., 1994; Tingstrom, et al., 1995; Weinstein & Cooke, 1992; Young, et al., 1996), a recognized technique of developing reading fluency and reading proficiency, in that repeating reading, orally or silently, of the same text several times should improve its comprehension. Learners' gains in comprehension of the same text may also be transferred to their oral reading of other unfamiliar texts.

Third, oral reading with a model, which makes appropriate pauses after meaning units, helps learners analyze phrasal and grammatical chunks by raising awareness of them and allows for easier text comprehension. Fourth, oral reading, which does not allow learners to read back, helps them establish the habit of understanding meanings according to word order.

These are, however, our accounts of the assertions which give only anecdotal explanations except for the first assertion. The assertions should be examined theoretically and empirically to be accepted and put into practice.

2.3.2.2 Vocabulary and Grammar

Studies referring to the acquisition of vocabulary and grammar as a purpose of oral reading practice assert that oral reading practice should expand vocabulary and develop grammar (Kido, 1993; Komatsu, 2000; Morris, 1954; Nuttall, 1982; Oinoue, 1984; Tsuchiya, 2004). Their rationale is that vocabulary and grammar enriched through oral reading practice, if there is any, can naturally contribute to the improvement of comprehension.

In addition to this, however, we can give another explanation concerning the indirect contribution of enriched vocabulary and grammar to the improvement in terms of reading processing. According to a reading processing view, written information is processed through several components from lower to higher level processings in working memory, i.e., in the order of word recognition, parsing, proposition formation and comprehension (Grabe, 1999 & 2000; Grabe & Stroller, 2002), which we call the componential processing view of reading. The enriched vocabulary and grammar can make the processings of word recognition and parsing respectively more efficient and spare the working memory resources for the processing of comprehension. Consequently, this processing, with more resources left, allows readers to comprehend a text better. This account requires empirical validation.

Relevant to this purpose of oral reading, Kunihiro (1999) anecdotally asserts that one should acquire vocabulary and grammar by repeating oral reading abundantly, i.e., *Shikan-Rodoku*. The mechanism of *Shikan-Rodoku* is explained as the enhancement of vocabulary and grammar acquisition through consciousness raising (Miyasako, 2001). This acquisition process is called the internalization of vocabulary and grammar, which is counted as one of the purposes of oral reading, by some researchers (Niizato, 1991; Suzuki, 1998).

2.3.2.3 Evaluation of Comprehension

Studies regarding oral reading as a measuring tool of reading comprehension assert: (a) oral reading should be used in a formative evaluation of reading comprehension that is based on Goodman's (1969 & 1973) miscue analysis (Griffin, 1992; Nuttall, 1982; Sawyer, et al., 1989); (b) it should reflect learners' reading comprehension (Morris, 1954; Oinoue, 1984); and (c) it should be an approximate measure of English proficiency (Ikeda & Takeuchi, 2002; Kyodo, 1989).

Although the first assertion that is based on Goodman's miscue analysis is theoretically rigid, it should not be upheld. One reason for this is that they value top-down reading skills, such as schema use and inference, much more than decoding skills, not complying with a current mainstream view of reading, i.e., the componential processing view of reading (Grabe, 1999 & 2000; Grabe & Stoller, 2002), where top-down skills are used interactively in the higher level processing of comprehension. Another is that miscue analysis does not show high criterion-related validity or correlation with reading comprehension (Alderson, 2000; Bernhardt, 1991).

The second assertion, consistent with the view of many English teachers, requires theoretical and empirical substantiation, but studies that make the third assertion may partially contribute to it. Although a high criterion-related validity or correlation has not been

reported between oral reading tests and English proficiency so far (Ikeda & Takeuchi, 2002; Kyodo, 1989), oral reading fluency, a recognized measure of reading fluency and comprehension in L1 (Fuchs, et al., 1988; Jenkins, et al., 2003), can be an approximate measure of reading comprehension for Japanese learners, showing a modest criterion-related validity with reading comprehension. Oral reading speed can also be an approximate measure of it, showing a similar criterion-related validity with reading comprehension (Miyasako & Takatsuka, 2005b).

2.3.3 Production Skills

2.3.3.1 Oral Production

There are mainly two positions concerning oral production: (a) oral reading is an oral presentation skill such as reading literature aloud and oral interpretation (Omi, 1986; Sawyer, et al., 1989; Takanashi & Takahashi, 1984; West, 1960); and (b) oral reading practice improves oral communication skills (Chastain, 1988; Frisby, 1957; Ito, 1976; Kido, 1993; Mineno, 1985; Morris, 1954; Nakajima, 1995; Niizato, 1991; Oinoue, 1984; Paine, 1973; Sakuma, 2000; Sumibe, 1986; Suzuki, 1998; Takayama, 1995; Tsuchiya, 2004; Umiki, 1995; Ushiroda, 1992; Yada, 1987).

Although the first position may not regard oral reading practice as a means of developing oral communication skills, the practice of oral reading as a presentation skill will probably contribute to the development. The second assertion also appears valid impressionistically. However, there have been few theoretical grounds to examine the output processing of oral reading so far, although the output processing is plainly illustrated by Goodman (1968) (see section 2.4.1 below). The construction of an oral reading model that includes the elaborate mechanism of output processing is one of the tasks to be accomplished.

2.3.3.2 Prosody

Studies that count the improvement of prosody as a purpose of oral reading (Chastain, 1988; Funatsu, 1981; Gurry, 1955; Morris, 1954; Oinoue, 1984; Sawyer, et al., 1989; Tsuchiya, 2004) do not refer to oral reading as a presentation skill nor as a means of developing oral communication skills. It may be expected that improved prosody contributes to the development of oral communication skills, but this expectation has not been examined without an oral reading model that specifies the mechanism of output processing.

2.4 Processing

Category (c), processing of oral reading, has three subcategories: (i) mechanism, (ii) phenomenon and (iii) instruction. Five topics in this category are reviewed in accordance with the subcategories.

2.4.1 Mechanism

This subcategory has one topic, oral reading mechanism. In this topic there are two positions: (a) based on Goodman's oral reading model (Goodman, 1968; Ito, 1976; Mineno, 1985); and (b) explained by the componential processing view of reading (Bernhardt, 1983; Kaneda, 1984; Mizuno, 1994; Takanashi & Takahashi, 1984).

The first position is based on Goodman's (1968) reading model. According to this view of oral reading, there are three oral reading processings depending on learners' English proficiency levels, 1 to 3. At the proficiency level 3 for competent English learners, graphic information of a text is first decoded and its meaning is comprehended, and next the information is encoded phonologically and generated orally (Figure 2.2). At the proficiency levels 1 and 2 for lower proficiency learners, oral reading is a means of meaning comprehension. At the proficiency level 1, first, letters, letter patterns and word shapes are

recoded into phonemes, phonemic patterns and word names respectively, and mixed into aural input. Next, this input is recoded into oral language and further decoded into meaning (Figure 2.3). At the proficiency level 2, graphic and aural inputs are concurrently recoded into oral language, and then decoded into meaning (Figure 2.4).

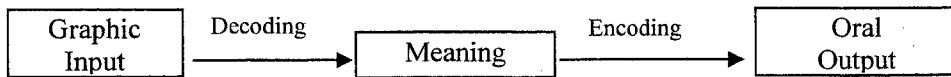


Figure 2.2: Oral Reading for Proficiency Level 3 (Goodman, 1968)

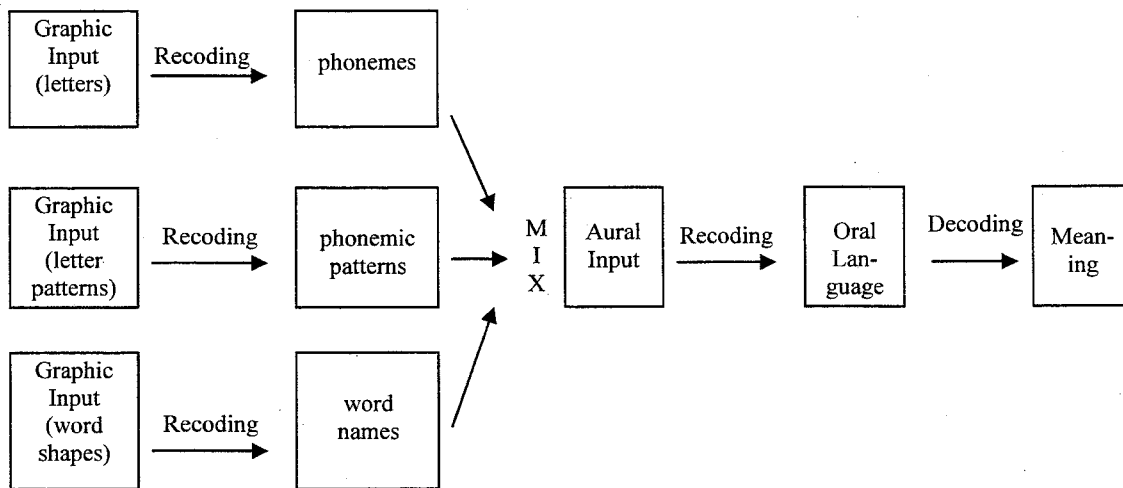


Figure 2.3: Oral Reading for Proficiency Level 1 (Goodman, 1968)

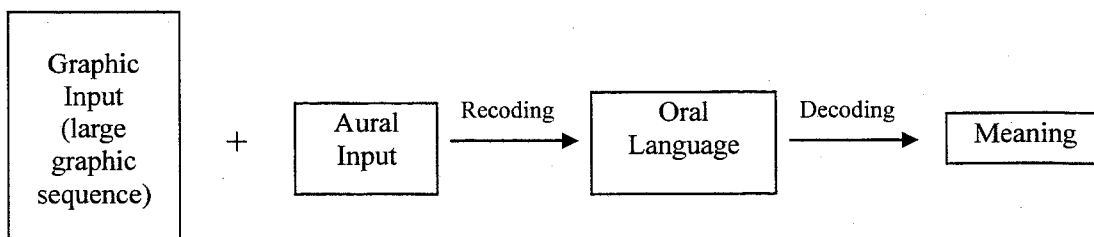


Figure 2.4: Oral Reading for Proficiency Level 2 (Goodman, 1968)

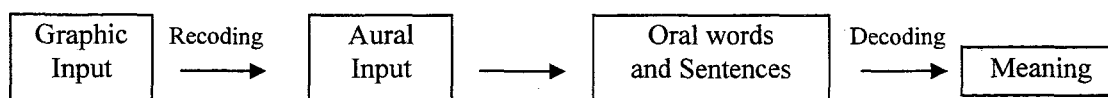


Figure 2.5: Oral Reading of Lower Level Learners (Ito, 1976)

Similarly, Ito (1976) assumes two oral reading processings depending on learners' English proficiency levels, higher and lower. The processings for higher and lower level learners almost comply with Goodman's levels 3 and 2 respectively with a slight modification of the latter for Japanese learners of English (Figure 2.5).

One problem with this position is that these oral reading models are based on Goodman's top-down reading model. The top-down model is now an outdated view of reading because it neglects significant roles that decoding skills play in the processing. Another is that the oral reading models are not elaborated enough to explain either the decoding or the encoding mechanisms, although the basic processings in Figures 2.2 to 2.5 may be supported.

In the second position, Kaneda (1984) assumes two processings of oral reading depending on learners' English proficiency levels, higher and lower. The higher level processing is consistent with Goodman's level 3, but at the lower level learners just code written information phonologically, bypassing comprehension. This phenomenon can be explained by the componential processing view shown above. The view assumes that written information is processed through word recognition, parsing, proposition formation and comprehension in this order. The phenomenon occurs at the lower level when learners with underdeveloped decoding skills consume the working memory resources before parsing is completed. Consequently, the information is outputted phonologically without being comprehended.

Also, Takanashi & Takahashi (1984), complying with the componential processing view, assume several aspects in the processing of oral reading such as connecting letters and

sounds, recognizing known words and understanding the text. Further, the componential processing view can account for the following phenomena: (a) learners often use up cognitive resources in phonological coding (Bernhardt, 1983); (b) parrot reading is likely to occur in learners who have not established the connection between letters and sounds; and (c) it is difficult to parallelly process oral output and comprehension of a text when learners have lower English proficiencies or when the text is demanding (Takanashi & Takahashi, 1984). A common cause of these phenomena is the trade-off of resources that happens when working memory is overloaded in the processing of oral reading.

From these accounts, it seems that the processing of oral reading, which generates phonological output of partially or completely processed written information with little time lag, can be explained based on the componential processing view of reading.

2.4.2 Phenomenon

2.4.2.1 Parrot Reading

There are a number of studies that point out parrot reading, which is oral reading without comprehension, as a demerit of oral reading that is frequently seen (Frisby, 1957; Funatsu, 1981; Kaneda, 1984; Mineno, 1985; Mizuno, 1994; Nuttall, 1982; Paine, 1973; Takahashi, 1975; Takanashi & Takahashi, 1984; Ushiroda, 1992; West, 1960; Yada, 1987). However, according to the componential processing view of oral reading, it is not often that learners generate acceptable phonological output without comprehension. Such oral reading is probably seen only when phonological output is generated with word recognition and parsing barely done, owing to the consumption of working memory resources. If parsing of a text is not completed, its oral output will be phonologically unacceptable. On the contrary, if processing which is done at a higher level than parsing, such as proposition formation, is performed, its output will be understood to some extent. Therefore, it is not appropriate that

many studies identify this unusual phenomenon, i.e., parrot reading, as a major shortcoming of oral reading. Also, the account of parrot reading from this perspective has to be empirically examined.

2.4.2.2 Obstacles to Silent Reading

Studies asserting that oral reading should impede a smooth development of silent reading show: (a) lip reading, buzz reading and subvocalization, for which oral reading can be responsible, impede silent reading (Mineno, 1985; Mizuno, 1994; Nuttall, 1982); and (b) oral reading may invite learners to form the habit of being aware of individual syllables and words (Morris, 1954; Rivers, 1981; Sawyer, et al., 1989). In contrast, other studies assert: (c) lip reading, buzz reading and subvocalization should be developmental phenomena seen in the transition from oral to silent reading (Nishimaki, 1986; Suzuki, 1998; Takanashi & Takahashi, 1984; Watanabe, 1990).

These assertions are not grounded theoretically. On the other hand, the componential processing view of reading considers it preferable that learners should spare the working memory resources for higher level processing by automatizing word recognition processing. However, even native speakers of English get written information represented phonologically in the word recognition processing of sight words in regular reading (Carver, 1998; Hoover & Gough, 1990; Perfetti, 1999; Perfetti, et al., 2002). In this case, lip reading, buzz reading and subvocalization are not problems to learners, so far as they do not impede silent reading speed considerably. As a matter of fact, it is often the case that oral reading is faster than silent reading that is dependent on translation. Moreover, oral reading practice improves both oral and silent reading speeds (Suzuki, 1998; Watanabe, 1990). Therefore, it is important to regard lip reading, buzz reading and subvocalization not as harmful but as developmental phenomena, as shown in studies (c), and to improve the efficiency of word

recognition, aiming at its automaticity. As learners' word recognition becomes more efficient, their overconsciousness of individual syllables and words, as pointed out in studies (b), will disappear.

2.4.2.3 Comprehension in Oral and Silent Reading

Two studies show that silent reading is more effective in comprehension than oral reading (Bernhardt, 1983; Hatori, 1977). Studies in L1 reading, on the other hand, state that although silent reading is more effective in the memorization of content and in reading speed than oral reading, there is no difference in comprehension between oral and silent reading (Gibson & Levin, 1975; Levin & Addis, 1979). Some of their accounts, referring to information processing, partially comply with the componential processing view of oral reading. According to this view, one has to divide his or her working memory resources between reading and phonological output processings, which makes the trade-off of resources more likely to occur. Consequently, the modest resources for reading processing make oral reading of native speakers inferior to silent reading in the memorization of content and in reading speed, and make that of foreign learners, who require more resources for phonological output processing, inferior to silent reading in comprehension as well as in the memorization of content and in reading speed.

2.4.3 Instruction

This subcategory has one topic, when to practice oral reading. Most studies concerning this topic recommend that learners should practice oral reading after understanding the text (Funatsu, 1981; Nishimaki, 1986; Nuttall, 1982; Rivers, 1981; Sumibe, 1986; Takanashi & Takahashi, 1984; Ushiroda, 1992; Yada, 1987). One reason for this is to lessen the cognitive load of oral reading, which is a cognitively demanding activity to process and produce

information almost concurrently, and another is to prevent parrot reading. This account is consistent with the componential processing view of oral reading.

However, there are studies that support learners' oral reading practice before understanding the text: (a) post-understanding oral reading does not develop the skill to comprehend a text through oral reading (Watanabe, 1985); (b) it does not matter when oral reading is practiced to improve decoding skills (Miyasako, 2005b); and (c) tasks with higher cognitive load may be more effective in activating the central executive and episodic buffer of working memory (Miyasako, 2004). Therefore, we should select when to practice oral reading depending on our pedagogical purposes.

2.5 Summary

In this chapter, oral reading issues in ELT in Japan were reviewed in accordance with Miyasako's classification of them. The category of positions on oral reading consisted of Western studies that disapproved of oral reading because of emphasizing silent reading for comprehension. However, the studies were not grounded theoretically or empirically.

In the second category, purposes of oral reading, studies on each topic asserted some merits of oral reading. Although many of these assertions did not have theoretical foundations, they could be explained with the componential processing view of reading. Similarly, in the third category, processing of oral reading, although the assertions of many studies concerning the topics belonging to this category were not grounded theoretically, most of them could be accounted for with the componential processing view of reading and oral reading.

From the review, it is clear that one problem that many studies concerning oral reading have in common lies in few rigid theoretical grounds, much less empirical grounds, to support their assertions. A possible cure for this situation is the componential processing view of

reading that can explain many assertions in the studies concerning oral reading. Also, the componential processing view of oral reading, which explains phonological output processing as well as reading processing, can probably be a more effective cure for it. A model of oral reading based on this view is substantiated in the next chapter.

Chapter 3

A Model of Oral Reading for Japanese Learners of English

The last chapter reviewed oral reading issues in ELT in Japan and identified the lack of theoretical and empirical grounds to support their assertions as the main problem in the past studies. It also revealed that many of the assertions were consistent with the componential processing view of reading (Grabe, 1999 & 2000; Grabe & Stroller, 2002).

In order to lay theoretical foundations for oral reading research, it is necessary to construct a model of oral reading that explains both the reading processing of written information and its phonological output processing. This is because existing oral reading models of Goodman's (1968) and Ito's (1976) are not sophisticated enough to explain either the reading processing or output processing (see section 2.4.1).

Contrastingly, there have been rigorous oral reading models of words, such as the dual-route cascaded (DRC) model (Coltheart & Rastle, 1994; Ziegler, et al., 2000) and the Triangle model (Plaut, et al., 1996; Seidenberg & McClelland, 1989), but they have been examined and debated mainly among neuropsychologists and experimental psychologists, not ELT researchers.

Thus, we should construct a model of oral reading that is not only based on the componential processing view of reading but also includes one of the oral word reading models as the component of word recognition. As a first step, we suggest a model of oral reading focused on the reading processing of written information in the slave systems of working memory, i.e., the phonological loop and episodic buffer (Baddeley, 2000 & 2003).

In this chapter, first, two oral reading models of words are reviewed and one of them is chosen to be the word recognition component of our oral reading model. Second, a model of

oral reading for Japanese learners of English, complying with the componential processing view of reading and Baddeley’s model of working memory, is proposed. Third, based on the model, assumptions about functions of oral reading in improving learners’ reading proficiency are shown and theoretically accounted for.

3.1 Oral Reading Models of Words

There are two oral reading models of words that have been recognized most across the boundaries of disciplines, i.e., the DRC and Triangle models. First, the DRC model (Coltheart & Rastle, 1994; Ziegler, et al., 2000; Figure 3.1) is a computer model based on Coltheart’s dual-route theory. This model assumes two routes in representing words

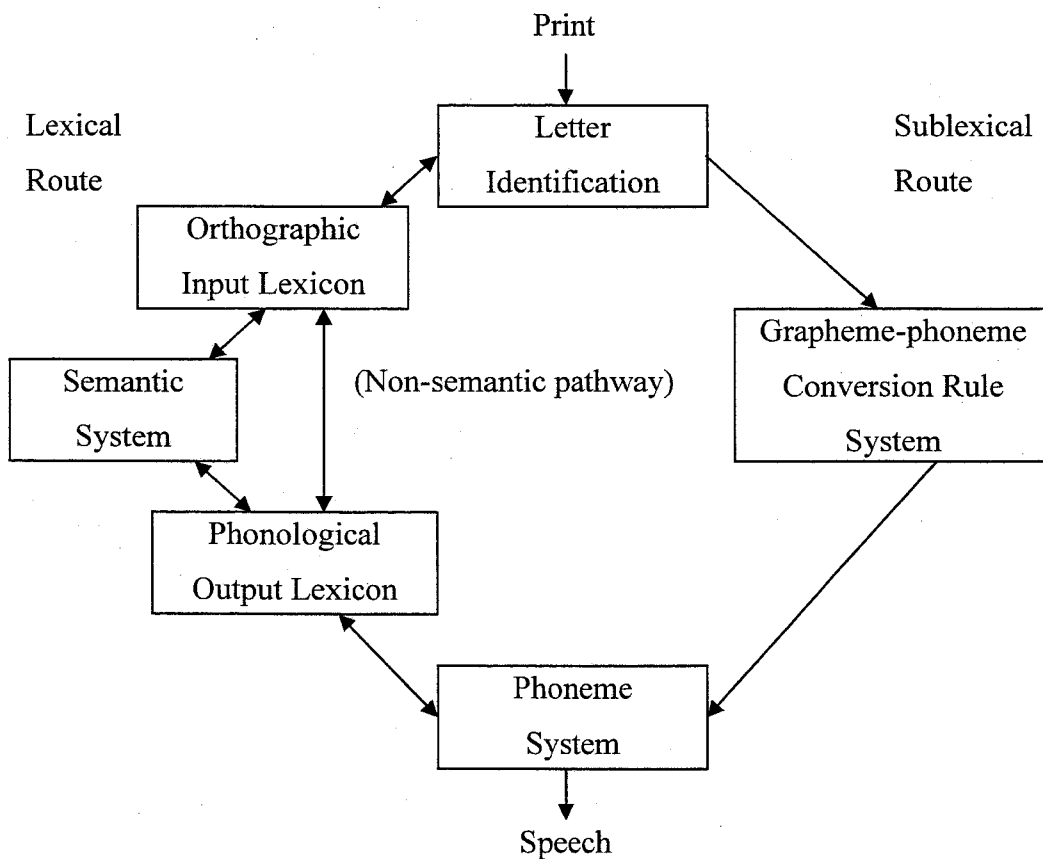


Figure 3.1: DRC Model (Ziegler, et al., 2000)

phonologically, i.e., lexical and sublexical routes. The lexical route, where known words and irregularly spelled words are mainly processed, is further subdivided into semantic and non-semantic pathways. In the semantic pathway, orthographic representations of words are first changed into semantic and then into phonological representations. In the non-semantic pathway, they are directly changed into phonological representations. Since both semantic and phonological representations are drawn from the corresponding lexicons assumed in this model, their processing speeds are fast. In addition, orthographic information is processed parallelly and interactively in these two pathways.

On the other hand, in the sublexical route, where unknown words and words difficult to read aloud are mainly processed, orthographic representations are coded phonologically by grapheme-phoneme conversion rules in a linear fashion. As a result of this, processing in the sublexical route is more time-consuming than in the lexical route. Consequently, in the DRC model, most orthographic information is phonologically represented by way of the lexical route, although the lexical and sublexical routes are activated parallelly and interactively. Usually, words are semantically represented faster than or as fast as phonologically.

Next, the Triangle model (Plaut, et al., 1996; Seidenberg & McClelland, 1989; Figure 3.2) is a connectionist computer model of oral word reading. This model does not assume dual routes nor orthographic, semantic and phonological lexicons as the DRC model does. Instead, it assumes a system that is composed of three domains, i.e., orthography, semantics and phonology. When words are inputted, these three domains and hidden units between them, which are interconnected to each other, are activated parallelly and interactively in accordance with the weight of orthographic, semantic and phonological information of the words. This processing continues until the inputted words are computed and identified in the system. In this model, words cannot be phonologically represented faster than

semantically.

Both models try to explain how words are orthographically, semantically and phonologically represented before being orally produced in different ways. The main differences between the models concern the lexicons and dual routes that the DRC model assumes but the Triangle model does not (Joubert & Lecours, 2000). With regard to the lexicons, a model with lexicons may be more familiar to ELT researchers and practitioners, but the whole system of the Triangle model can also be regarded as an integrated lexicon of orthography, semantics and phonology because the concept of lexicon itself is a metaphor (Murphy, 2003). In this case, the existence or nonexistence of lexicons may not matter much. Similarly, since orthographic information is processed parallelly and interactively in the lexical and sublexical routes of the DRC model, the processing in the dual routes resembles that of the Triangle model except for the linear grapheme-phoneme conversion in the sublexical

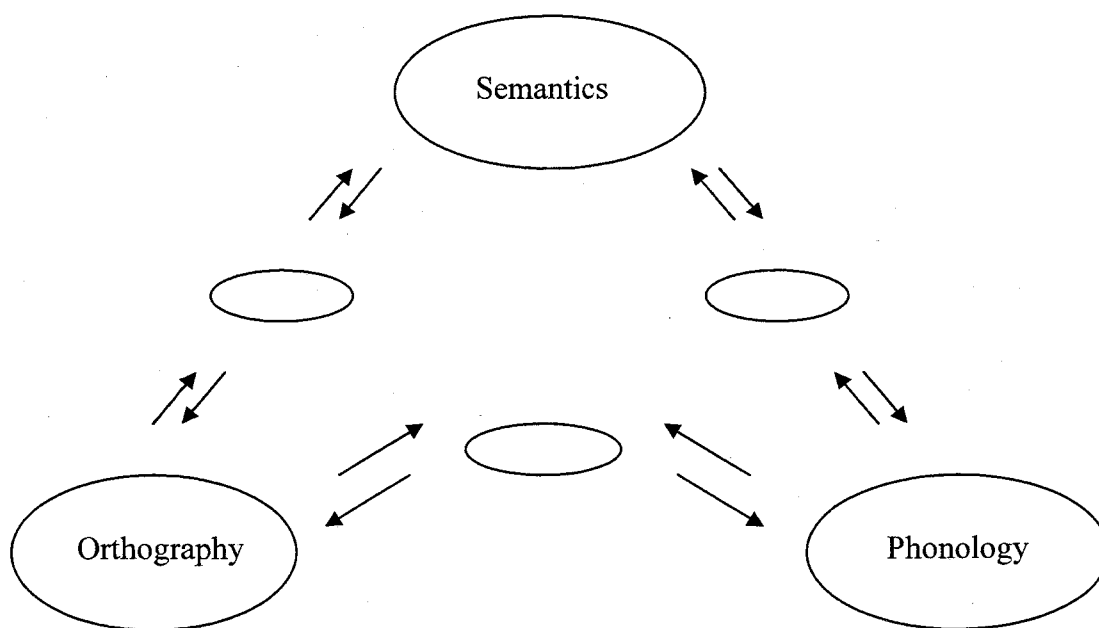


Figure 3.2: Triangle Model (Seidenberg & McClelland, 1989)

route. Thus, the processings in these two models may not be as different from each other as they appear. However, since phonological coding by grapheme-phoneme conversion has been known to play a vital role in decoding in incompetent readers (Castle, 1999; Gathercole & Baddeley, 1993; Grabe & Stroller, 2002; Snow, et al., 1998; Stanovich, 2000; Stanovich & Stanovich, 1999), a model of oral reading for Japanese learners of English should not dismiss this component. Thus, the DRC model seems to be the more preferable of the two in constituting a part of our oral reading model.

However, there is a problem in adopting the DRC model as the decoding component of our oral reading model. The reason for this comes from studies concerning phonology mediation, showing that faster phonological activation mediates lexical access (Lesch & Pollatsek, 1998; Rayner, et al., 1998). Perfetti and his colleagues also conducted a series of priming experiments to examine the activating speeds of orthography, phonology and semantics and found out that the activating speeds were fastest in orthography,

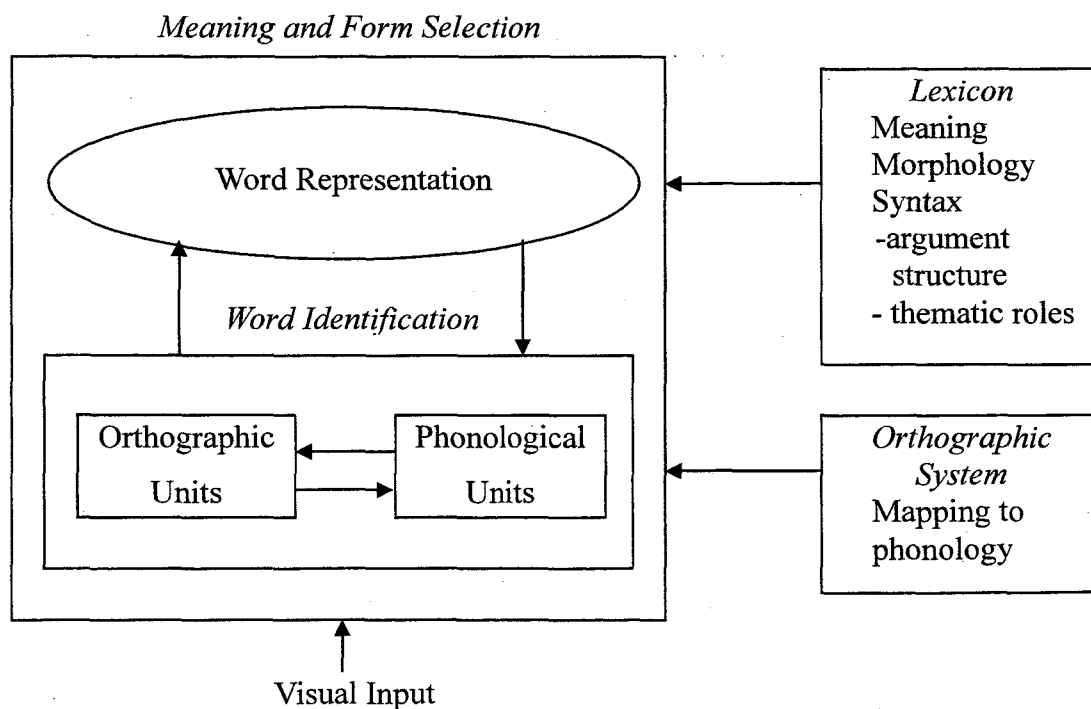


Figure 3.3: Word Recognition Processing in Perfetti's Reading Model (Perfetti, 1999)

followed by phonology and then lastly semantics (Booth, et al., 1999; Perfetti, 1999; Perfetti, et al., 2002; Tan & Perfetti, 1999). It was shown that phonology began to be automatically activated in smaller units, i.e., in phonemes, when parts of inputted words, i.e., graphemes, were orthographically activated, contrasting with semantics which was not usually accessed until whole words were orthographically activated. Consequently, words were represented phonologically faster than or as fast as semantically. Hence, pre-lexical activation of phonology constitutes a part of the word recognition processing in Perfetti's reading model (Perfetti, 1999; Perfetti, et al., 2002; Figure 3.3). Also, Kadota (2002) confirmed that words were not phonologically represented after semantic representation in Japanese college students of English.

Although pre-lexical activation of phonology is not compatible with the DRC model, this incompatibility may not be a fatal problem in our oral reading model for the following reasons. In the DRC framework, known or frequently used words are assumed to be parallelly and interactively accessed in whole words, not in smaller units, in the semantic and non-semantic pathways of the lexical route. Despite this assumption, pre-lexical phonology activation of these words might occur in this model: (a) if the non-semantic pathway were to be dominant over the semantic pathway or (b) if phonological activation in the non-semantic pathway were to occur in units smaller than words. Even in these hypothetical cases, however, differences in the activating speeds between phonology and semantics would be too minuscule to influence the reader's oral production of the words. Moreover, when pre-lexical activation of phonology is more widely acknowledged as vital in oral word reading, the conditions (a) and (b) may be taken into account when the model is revised. Thus, it seems that pre-lexical activation of phonology does not prevent us from adopting the DRC model as the decoding component of our oral reading model.

3.2 A Model of Oral Reading

In this section, a tentative model of oral reading for Japanese learners of English is proposed and explained. This model, incorporating the DRC model as the word recognition component, was constructed in compliance with a recent standard view of reading, i.e., the componential processing view of reading, and Baddeley's model of working memory.

The reason for the adoption of the DRC model was shown above. The componential processing view of reading, whose scheme had been almost unanimously consented to among researchers, was adopted because it could explain many of the issues concerning oral reading as shown in the last chapter. Baddeley's model was chosen among others because it was a multi-componential model having a particular slave-system for the processing of verbal information, i.e., phonological loop. Moreover, since phonological coding in the slave-system, complying with the DRC model, plays an important role in decoding words which are unknown and difficult to pronounce, the phonological loop is indispensable in the oral reading model for Japanese learners of English. Supposedly decoding skills of more than half of Japanese junior and senior high school students are underdeveloped with a small vocabulary of less than 1,000 words in terms of lemma (Miyasako & Takatsuka, forthcoming). Thus, it seems that this oral reading model has a legitimate theoretical ground.

According to the componential processing view, written information is processed through several components: word recognition, parsing and proposition formation in the lower level processing and comprehension in the higher level processing (Grabe, 1999 & 2000; Grabe & Stroller, 2002). The lower level processing takes place almost automatically mainly in the phonological loop of working memory. When written words are seen by a competent English reader, they are first phonologically and semantically accessed and represented by way of orthographic representation, i.e., recognized as words. Second, they

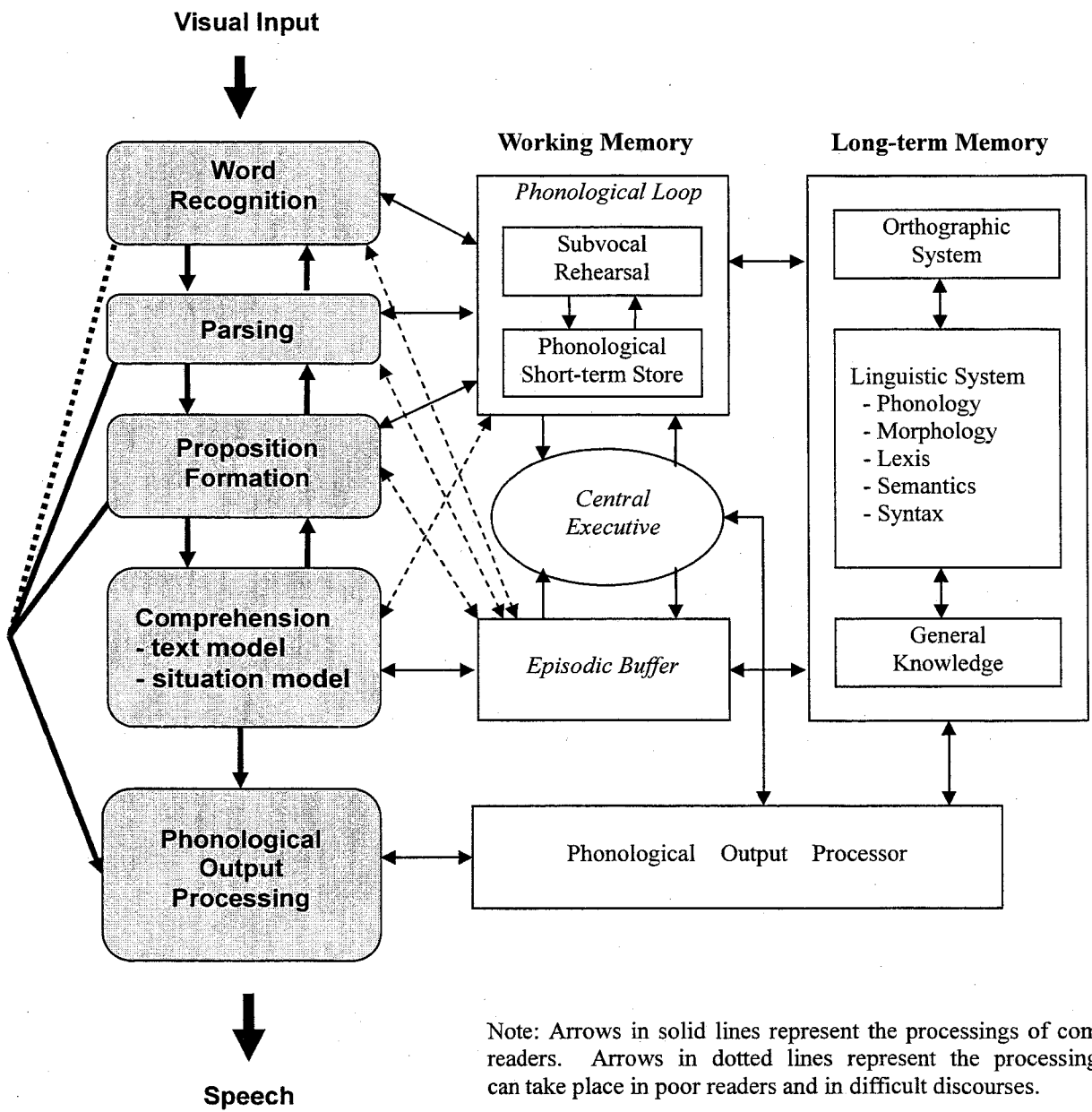


Figure 3.4: Oral Reading Model

are grammatically parsed as clauses and sentences, and then their propositions are formed. These propositions in the higher level processing are comprehended as the text model and further interpreted as the reader's situation model in the episodic buffer of working memory, where relevant information from the phonological loop, visuo-spatial sketchpad and long-term memory is integrated consciously under the control of the central executive. This componential reading mechanism, coupled with the DRC model for word recognition, constitutes a processing part in our model of oral reading (Miyasako, under review; Figure 3.4), which is a cognitive activity to process and orally produce written information almost concurrently. This model, seeking to explain the processing mechanism of oral reading of written words at first sight, is examined in the order of componential processings, i.e., word recognition, parsing, proposition formation and comprehension.

3.2.1 Word Recognition

When words are seen by a competent reader of English, they are recognized in the phonological loop as the DRC model shows. Words which are unknown and difficult to pronounce are phonologically coded with grapheme-phoneme conversion rules in the subvocal rehearsal and sent to the phonological short-term store, where the phonological representations are lexically accessed. Known and irregularly-spelled words are semantically and phonologically accessed in the phonological short-term store almost concurrently. If words are isolated, i.e., not part of a text, they are sent to the phonological output processor, where phonological representations are changed into sounds, and produced orally. If words compose a text, they are further processed within about two seconds.

When words are seen by an incompetent reader, the word-recognition processing varies depending on his or her English proficiency. Beginners who have hardly developed phonological awareness, i.e., grapheme-phoneme association, have to consciously decode

letters of the words in the episodic buffer, not in the phonological loop, contacting their grapheme-phoneme conversion rules in long-term memory. Consequently, they may not be able to orally produce the words smoothly with the processing resources in working memory used up. Those who have barely developed phonological awareness with a small vocabulary may be able to orally produce isolated words, but they are unlikely to read a text aloud smoothly with understanding and proper prosodic features. This is because recognized words are sent to the phonological output processor with the processing resources consumed before they are parsed and their propositions are formed. Those who have highly developed phonological awareness can probably recognize frequently-used known words automatically and save the processing resources for the following processing.

3.2.2 Parsing

For competent readers, recognized words are next grammatically parsed almost automatically in the phonological short-term store. This near automatic processing spares the working memory resources for further processings.

However, parsed information begins to be processed phonologically in the phonological output processor in chunks, such as phrases and clauses, concurrently with further processings being performed. A major reason for this is that oral reading requires the phonological output of completely or partially processed information with little time lag. Two other reasons are: (a) one's eye span is several words wide in the range of about four to fifteen letters to the left and right of the center of vision respectively (Rainer & Pollatesk, 1989); and (b) phonological processing is usually performed in meaningful chunks (Kadota, 2001).

Moreover, when an oral reading text contains complex structures, such as garden path sentences, parsing may be consciously performed in the episodic buffer. In this case the parsed clauses or sentences are sent to the phonological output processor without further

processings because the conscious parsing consumes the working memory resources. Consequently, the orally produced clauses and sentences may not express proper prosodic features.

For incompetent readers, who are likely to have undeveloped grammar, parsing is often not an easy processing automatically performed. These readers tend to consciously make mental efforts in parsing ordinary clauses and sentences in the episodic buffer, using up the working memory capacities. Even if they succeed in parsing them, the result will be similar to competent readers facing complex constructions. This oral production seems to be what is called “parrot reading”, i.e., oral reading without understanding. If they do not succeed in parsing them, the unsatisfactorily parsed clauses and sentences will be sent to the phonological output processor before the resources run out, but their oral production will be worse, probably not making itself understood properly.

3.2.3 Proposition Formation

Competent readers form propositions of parsed clauses and sentences almost involuntarily in the phonological short-term store. In oral reading, which is a resource-consuming activity of processing and orally producing written information almost simultaneously, however, working memory resources may run out by the time proposition formation is completed even for competent readers. Consequently, oral reading at first sight is a highly demanding task that even competent readers may not be good at. Moreover, when propositions of clauses and sentences are not straightforward, this processing will be consciously performed in the episodic buffer consuming more processing resources, as is the case with parsing. In this case, proposition formation may be hard to be done. Even if completed, the convoluted propositions may not be properly reflected in the oral production because resources for the production were traded off.

Incompetent readers, on the other hand, are usually not able to complete proposition formation in oral reading because of the shortage of working memory resources. They are likely to orally produce written information before reaching the proposition formation component.

3.2.4 Comprehension

After the lower level processing is completed mainly in the phonological loop, written information is comprehended as the text model and further interpreted as the situation model in the episodic buffer. This higher level processing takes place only in readers with working memory resources still available, i.e., competent readers who can store essential propositions of the text in the episodic buffer. Oral production with the processing of the text and situation models done can express the reader's comprehension and interpretation fully. Even oral production with only the text model completed can fulfill a basic communicative function of the text.

However, there may be exceptional cases where written discourses are so plain that readers hardly need any special knowledge or interpretation for this processing. In these cases, their comprehension processings may be almost automatically performed in the phonological loop.

3.3 Assumptions

Based on the oral reading model the following assumptions are made concerning functions of oral reading, contributing to the improvement of reading comprehension and overall reading proficiency of Japanese learners of English: (a) oral reading practice helps learners to establish the connection between letters and sounds; (b) it helps them to expand vocabulary; (c) it helps them to acquire grammar through consciousness raising; and (d) it

helps them to improve the efficiency of working memory (Miyasako, 2004 & 2005b; Miyasako & Takatsuka, 2004).

3.3.1 Letter-Sound Connection

The first assumption concerning the connection between letters and sounds has been supported anecdotally (Chastain, 1988; Frisby, 1957; Funatsu, 1981; Griffin, 1992; Kido, 1993; Mineno, 1985; Niizato, 1991; Sakuma, 2000; Shimaoka, 1976; Suzuki, 1998; Takayama, 1995; Tsuchiya, 1990; Ushiroda, 1992; Watanabe, 1990; West, 1960), but it is explained theoretically with this model.

According to the oral reading model, incorporating the DRC model for the word recognition component, unfamiliar words are phonologically coded in compliance with grapheme-phoneme conversion rules in the phonological loop of working memory. A major support for oral reading practice enhancing the connection between letters and sounds comes from studies acknowledging that the efficiency of word recognition is improved by oral reading practice in L1 (Blum, et al., 1995; Carver & Hoffman, 1981; Dixon-Krauss, 1995; Dowhower, 1987; Herman, 1985; Homan, et al., 1993; Labbo & Teale, 1990; Rasinski, et al., 1994; Tingstrom, et al., 1995; Weinstein & Cooke, 1992; Young, et al., 1996). Since there is supposedly no difference in the physiological functions of brains, including working memory, between native speakers and foreign learners of English, oral reading practice should also help Japanese learners establish letter-sound connections by improving the efficiency of word recognition. Therefore, this function of oral reading practice, i.e., developing decoding skills, which are acknowledged to play significant roles in reading processing (Carver, 1998; Castle, 1999; Gough, et al., 1996; Grabe, 1999 & 2000; Grabe & Stroller, 2002; Nicholson, 1999; Snow, et al., 1998; Stanovich, 2000; Stanovich & Stanovich, 1999), can contribute to the improvement of learners' reading comprehension and overall reading proficiency.

3.3.2 Vocabulary

The second assumption concerning vocabulary expansion has been supported anecdotally (Kido, 1993; Komatsu, 2000; Kunihiro, 1999; Morris, 1954; Niizato, 1991; Suzuki, 1998; Tsuchiya, 2004). Although Niizato (1991) and Suzuki (1998) try to explain the unconscious acquisition of unfamiliar lexical items through oral reading practice, which they call the internalization of vocabulary, a main theoretical support for this assumption lies in the frequency with which learners can be exposed to vocabulary in oral reading practice. Whereas studies concerning the relationship between vocabulary exposure and acquisition can be summarized as showing that learners usually acquire unfamiliar lexical items when encountering 5 to 16 times in reading (Nation, 1990), learners can easily exceed the frequency of vocabulary exposure required for the acquisition in oral reading practice. Also, repeated oral reading reinforces the acquisition of lexical items which are not sight words but can be inferred from the context. Therefore, enriched vocabulary through oral reading practice, however small it may be, can contribute to the improvement of learners' reading comprehension and overall reading proficiency.

Furthermore, the oral reading model gives an account of another indirect contribution that enriched vocabulary can make to the improvement of learners' reading abilities. Since familiar words are semantically and phonologically accessed in the lexical route faster than unfamiliar words phonologically coded in the sublexical route, enriched vocabulary can make the processing of word recognition more efficient and spare the working memory resources for higher level processing, so that learners may be able to understand a text better.

3.3.3 Grammar

Although there have been studies that anecdotally assert grammar acquisition through oral reading practice (Kido, 1993; Kunihiro, 1999; Niizato, 1991; Oinoue, 1984; Suzuki,

1998; Tsuchiya, 2004), they have not referred to its mechanism except for two studies (Niizato, 1991; Suzuki, 1998), which call the unconscious acquisition of grammar through oral reading the internalization of grammar.

Theoretically, however, the third assumption concerning grammar identifies the mechanism of enhancing grammar acquisition through oral reading practice as grammatical consciousness raising, which makes learners aware of specific grammatical features (Larsen-Freeman, 2003). Japanese learners are highly conscious of grammar because of the way they are taught grammar, i.e., explicit grammar teaching based on the grammar translation method. Consequently, they tend to pay attention to specific grammatical features in reading comprehensible passages aloud, if their working memory resources are available for this. Then, they may be able to notice some grammatical gaps in their interlanguages when practicing oral reading of comprehensible passages and restructure them, as SLA research shows (Doughty, 2001; Ellis, 1997; Hinkel & Fotos, 2002; Larsen-Freeman, 2003; Richards, 2002; Schmidt, 2001; Skehan, 1998). In other words, oral reading practice can be a spontaneous grammatical consciousness raising activity for Japanese learners of English.

From the viewpoint of reading processing, our oral reading model gives a similar account of possibly restructured grammar concerning the improvement of learners' reading abilities as was the case with vocabulary. The improved grammar can make the processing of parsing more efficient and spare the working memory resources for proposition formation and comprehension.

3.3.4 Working Memory

So far there have been no studies concerning the improvement in the efficiency of working memory through oral reading practice. However, the fourth assumption was made

in the developments of brain sciences such as cognitive, developmental and experimental psychology and neuropsychology. Baddeley's (2000 & 2003) model of working memory, which is adopted in the oral reading model, consists of the central executive and three slave-systems, i.e., phonological loop, visuo-spatial sketchpad and episodic buffer. As shown in the above account of the oral reading model, verbal information is processed in the phonological loop and episodic buffer under the control of the central executive. The efficiencies of these components are improved through oral reading practice for the following reasons.

First, concerning the efficiency of phonological loop, one theoretical support lies in studies upholding that oral reading practice can enhance the connection between letters and sounds, acknowledging that the efficiency of word recognition is improved by oral reading practice in L1 (Blum, et al., 1995; Carver & Hoffman, 1981; Dixon-Krauss, 1995; Dowhower, 1987; Herman, 1985; Homan, et al., 1993; Labbo & Teale, 1990; Rasinski, et al., 1994; Tingstrom, et al., 1995; Weinstein & Cooke, 1992; Young, et al., 1996). This improvement in the efficiency of word recognition means more efficiency in the phonological loop.

Another comes from a similarity in the processings of oral reading and shadowing, i.e., repeating someone's utterances almost simultaneously following them like their shadows while listening to them. Since practicing shadowing has a favorable effect on the efficiency of subvocal rehearsal in the phonological loop (Tamai, 2001), oral reading practice, which shares the processing of inputted information with shadowing except for the initial mode difference, visual or aural, should also improve the efficiency of this slave system (Miyasako, 2001 & 2005a).

Second, whereas the central executive and episodic buffer in Baddeley's (2000 & 2003) model can be integrated into the concept of working memory in a connectionist capacity theory of comprehension, Capacity Constrained Comprehension (Just & Carpenter, 1992), the

executive and buffer respectively manages attention and provides a space for processing and storing. On the other hand, the explanation of working memory by Capacity Constrained Comprehension is: (a) working memory deals with both the storage and processing of activated information simultaneously; (b) working memory is constrained in its processing resources; (c) the trading off between storage and processing occurs if the activated information exceeds the working memory capacity; and (d) individual differences in working memory capacity are reflected in their cognitive activities (Just & Carpenter, 1992).

Since cognitively more demanding tasks are likely to activate the executive and buffer more greatly (Osaka, et. al., 1999; Osaka, 2002), oral reading practice, which is a cognitively demanding and complex activity that deals with both comprehension and oral production of written information almost concurrently, may be able to improve the efficiencies of the central executive and episodic buffer. Moreover, a meta-study examining 77 studies concerning working memory in terms of Capacity Constrained Comprehension (Daneman & Merikle, 1996) concluded that working memory capacity as measured by the reading span test (RST) (Daneman & Carpenter, 1980) had a significant correlation with reading comprehension. Thus, it is assumed that oral reading practice may be able to improve reading comprehension by making the central executive and episodic buffer of working memory more efficient for Japanese learners of English.

3.5 Summary

In this chapter, our oral reading model was proposed in order to establish a rigid theoretical foundation for empirical studies concerning oral reading. The oral reading model focusing more on the processing than production mechanisms was based on the DRC model of oral word reading, the componential processing view of reading and Baddeley's model of working memory. Although this model may have been a tentative one to invite criticism, it

could provide us with a theoretical basis to discuss issues concerning oral reading.

Next, based on the oral reading model, assumptions concerning oral reading were presented: (a) oral reading practice helps learners to establish the connection between letters and sounds; (b) it helps them to expand vocabulary; (c) it helps them to acquire grammar through consciousness raising; and (d) it helps them to improve the efficiency of working memory. The assumptions were given theoretical explanations, which may not have been fully convincing, and could lay the foundations for further discussion. The following chapters present empirical evidence concerning the assumptions.

Chapter 4

Relevant Factors of Oral Reading and Reading Comprehension

In the last chapter a tentative model of oral reading was proposed aiming at laying theoretical foundations for oral reading. Based on the model, assumptions were made concerning functions of oral reading practice that might affect learners' reading comprehension and overall reading proficiency. These assumptions were also given theoretical support.

Since the assumptions should be validated not only theoretically but also empirically before they are widely accepted, the present and following chapters aim at the empirical examination of them. However, empirical studies concerning oral reading are still at a fledgling stage with its advent seen in the 1970s. The volume of research is limited as shown in the following overview.

One question that interested researchers was the mode of reading, i.e., which mode is more effective in reading comprehension, silent or oral. Hatori (1977), a pioneer who introduced empiricism into oral reading in ELT in Japan, compared the effectiveness of oral and silent reading in reading comprehension for senior high school students, and showed the superiority of silent over oral reading. This finding was confirmed by a study with college students (Takahashi & Takanashi, 1987).

Another concerned the efficacy of oral reading in measuring English and reading abilities. Kyodo (1989) and Ikeda & Takeuchi (2002) tried to gauge English proficiency of senior high school and college students respectively with their oral reading performance, but they could not obtain a high criterion-related validity or correlation between oral reading and English

proficiency. However, Miyasako & Takatsuka (2005b) showed that oral reading fluency, a recognized measure of reading fluency and comprehension in L1 (Fuchs, et al., 1988; Jenkins, et al., 2003), and oral reading speed could be approximate measures of reading comprehension of senior high school students.

Recently, relationships between factors relevant to oral reading began to be explored (Miyasako, 2002, 2003 & 2004; Miyasako & Takatsuka, 2004 & forthcoming). Also under investigation have been the effects of oral reading practice on English language ability, reading and writing abilities and the metacognition of oral reading, which were learners' perceptions of oral reading strategies and oral reading strategy use (Kido, 1993; Komatsu, 2000; Miyasako, 2002, 2003 & 2005a; Suzuki, 1998; Watanabe, 1990). Since most of these studies have direct or indirect relevance to the assumptions about oral reading, they can contribute to the empirical examination of the assumptions. Out of these recent empirical studies this chapter reports three studies that investigated into the relationships of reading comprehension with factors in the assumptions about oral reading, i.e., letter-sound connection and working memory.

4.1 Study 1

In the last chapter the following assumptions were made, based on the oral reading model, concerning functions of oral reading practice that might affect reading comprehension and overall reading proficiency for Japanese learners of English: (a) oral reading practice helps learners to establish the connection between letters and sounds; (b) it helps them to expand vocabulary; (c) it helps them to acquire grammar through consciousness raising; and (d) it helps them to improve the efficiency of working memory.

If the assumptions are valid, factors in the assumptions, i.e., letter-sound connection, vocabulary, grammar and working memory, should have significant relationships with reading

comprehension, which is nearly a synonym of overall reading proficiency to Japanese learners who are likely to lack fluency and fluidity. In other words, the significant relationships between these factors and reading comprehension of Japanese learners of English are preconditions for the assumptions. Therefore, these relationships should be examined.

Out of the assumed factors vocabulary and grammar have been recognized as predictors of reading comprehension (Alderson, 2000; Bernhardt, 1991; Laufer, 1997; Read, 2000). However, letter-sound connection and working memory had seldom been empirically examined concerning the relationships for Japanese learners of English until recently. Thus, we began to conduct experiments to examine the relationships, with reading comprehension, of the efficiencies of phonological coding and working memory, which were constructs for letter-sound connection and working memory respectively (Miyasako, 2004; Miyasako & Takatsuka, 2004). Study 1 primarily examined the relationship between the efficiency of phonological coding and reading comprehension.

4.1.1 Purposes

The purposes of this study (Miyasako & Takatsuka, 2004) were to investigate into the relationships of the efficiencies of phonological coding and lexical access with reading comprehension of senior high school students. The efficiency of phonological coding was the construct for letter-sound connection because letters and sounds are connected through grapheme-phoneme conversion rules in the sublexical route of word recognition, i.e., phonological coding. The efficiency of lexical access, which means lexical processing of words in both the lexical and sublexical routes of word recognition, was included in the investigation because the recognized relationship of vocabulary with reading comprehension lies in its size, not its processing efficacy.

Research questions addressed in the investigations concerning Japanese senior high

school students were: (1) what would be the relationships between the efficiencies of phonological coding and lexical access and reading comprehension?; and (2) what effects would the efficiencies of phonological coding and lexical access have on reading comprehension?

4.1.2 Method

4.1.2.1 Participants

The participants were 75 second-year senior high school students in Okayama in the school year 2003. Our judgment of their English proficiency was in the range of elementary to intermediate levels after their studying English as a foreign language for over four years.

4.1.2.2 Instruments

Three constructs of the experiments, i.e., the efficiencies of phonological coding and lexical access and reading comprehension, were measured with the following instruments. For the efficiency of phonological coding, the articulating speeds of English and Japanese words were respectively measured as the numbers of syllables and moras articulated in two seconds. The participants read aloud 40 familiar English words consisting of 116 syllables and 40 Japanese words consisting of 197 moras (Appendix A). The reason for using familiar words instead of pseudowords for the test, both of which are considered valid measures of word attack, i.e., phonological coding (Quiroga, et al., 2002; Stage, et al., 2001), lay in the difficulties in controlling the participants' hesitation and guessing time in naming unknown words and in judging the correctness of their word naming. The formulae for the articulating speeds were as follows: English articulating speed = 116 (syllables in 40 words) x 2.0 / time for articulating 40 words (sec.); Japanese articulating speed = 197 (moras in 40 words) x 2.0 / time for articulating 40 words (sec.).

Second, the efficiency of lexical access was gauged with Stroop color-naming tasks (Stroop, 1935), where the participants named colors of a series of patches and read aloud a series of color words that were printed in colors different from the colors the words represented, e.g., “red” printed in green. The gap in time between the participants’ visual accessing of the colors and their lexical accessing of the words was measured as Stroop interference (Dyer, 1971). The features of the tasks, following Osaka (1990), were: (a) the card was horizontally set A4 in size (Appendix B); (b) the number of stimuli was 48 in 8 rows and 6 columns; (c) the kinds of stimuli were color patches (red, blue, yellow and green), Kanji words (“赤”, “青”, “黄” and “緑”), Kana words (“あか”, “あお”, “き” and “みどり”) and English words (“red”, “blue”, “yellow” and “green”); and (d) the response languages were English and Japanese.

In the Stroop tasks each color appeared twice in a row, not positioned consecutively, and so did each stimulus. The participants named both in English and Japanese the colors of 48 stimuli in each of four different cards. Stroop interference was calculated within Japanese and English respectively as follows: Stroop interference = (color-naming time for a word card) – (color-naming time for the patch card).

Third, the participants’ reading comprehension was measured in terms of their scores in the reading section (20 points for 20 items in 30 minutes) of the past version of *Assessment of Communicative English* (ACE) (Association for English Language Proficiency Assessment = ELPA). This test was considered a valid measure of English proficiency because it was developed based on Item Response Theory as were TOEFL and TOEIC.

4.1.2.3 Procedure

The assessments of the efficiencies of phonological coding and lexical access, and that of reading comprehension were conducted in this order during a regular class. In the Stroop

tasks, five different cards for each stimulus were made and randomly assigned to the participants. The participants' were directed to "try to name the colors of the patches or read aloud the words on the cards as accurately and as soon as possible." For the efficiencies of phonological coding and lexical access, the participants measured the time they spent with stopwatches by themselves. The order in measuring the phonological-coding speeds was English and Japanese, and the order of the Stroop tasks was color patch (Japanese and English), Kanji (Japanese and English), English (Japanese and English) and Kana (Japanese and English).

4.1.3 Results

4.1.3.1 Phonological Coding, Lexical Access and Reading Comprehension

In the analyses, the participants who had negative values in Stroop interference for measuring the efficiency of lexical access, due to color blindness or for other reasons, were excluded as invalid for the analyses. Consequently, the number of the participants analyzed reduced to 48.

Means of the three constructs were 16.798 (SD = 2.864) and 5.969 (SD = .972) respectively for the efficiency of phonological coding measured as Japanese and English articulating speeds, and 10.333 (SD = 3.497) for reading comprehension in terms of the scores in the reading section of ACE ($\alpha = .689$). Clearly, phonological coding was much faster in Japanese than in English for the participants [$F(1, 94) = 615.314, p < .01$].

Table 4.1 shows the means of color-naming time for all the stimulus cards responded in English and Japanese. Based on the data, Stroop interference for the efficiency of lexical access was calculated within Japanese and English respectively by subtracting the color-naming time that they spent for the patch card from the color-naming time that the participants spent for a word card. Stroop interference was greatest in Kana words (mean =

15.375, SD = 5.995), followed by Kanji words (mean = 12.917, SD = 5.102), then English words (mean = 12.479, SD = 6.668). There was a significant difference in the means between the three interferences [$F(2, 141) = 3.297, p < .05$]. However, the stringent Scheffe's post hoc test showed just a tendency that the interference from Kana words was greater than that from English words (mean difference = 2.896, $p = .076$).

4.1.3.2 Relationships between Three Constructs

Pearson product-moment correlation coefficients were calculated between English articulating speed for phonological coding, English Stroop interference for lexical access and ACE for reading comprehension. The correlation matrix shows that ACE had a significant correlation with English articulating speed ($r = .438, p < .01$), but no significant correlation with English Stroop interference (Table 4.2). The regression analysis confirmed this result,

Table 4.1: Means of Color-Naming Time (sec.)

Response	Stimulus			
	Color patch	Japanese		English
		Kanji	Kana	
Japanese	23.188 (3.535)*	36.104 (5.058)	38.562 (6.408)	35.562 (5.787)
English	31.250 (6.207)	37.979 (6.019)	39.208 (6.748)	43.729 (7.405)

$n = 48$. *() = SD. Stroop interference: Kanji-Japanese = 12.917 (SD = 5.102), Kana-Japanese = 15.375 (SD = 5.995), English-English = 12.479 (SD = 6.668).

Table 4.2: Correlation Matrix for English Articulating Speed, English Stroop Interference and ACE

	(a)	(b)	(c)
(a) English articulating speed	-		
(b) English Stroop interference	.011	-	
(c) ACE	.438**	.014	-

** $p < .01$. $n = 48$.

Table 4.3: Means of English Articulating Speed and ACE
for Groups of Upper and Lower English Articulating Speed

	<u>English articulating speed</u>		<u>ACE</u>	
	Upper	Lower	Upper	Lower
n	17	16	17	16
Mean	6.998	4.874	11.412	8.750
SD	.367	.510	3.726	3.088

Table 4.4: Means of English Stroop Interference and ACE
for Groups of Upper and Lower English Stroop Interference

	<u>English Stroop interference</u>		<u>ACE</u>	
	Upper	Lower	Upper	Lower
n	16	15	16	15
Mean	20.000	5.067	10.500	9.933
SD	3.830	2.604	3.464	3.693

and revealed that English articulating speed explained 19.2% of the variance of ACE [$\beta = 1.577$, $t = 3.272$, $p < .01$; $R^2 = .192$; $F(2, 45) = 5.359$, $p < .01$].

4.1.3.3 Effects of Phonological Coding and Lexical Access

In order to examine how the efficiencies of phonological coding and lexical access affected reading comprehension, first, the participants who had T-scores above 55 and below 45 in both English articulating speed and English Stroop interference were assigned to upper and lower groups respectively. The means of English articulating speed and English Stroop interference for the upper and lower groups are shown in Tables 4.3 and 4.4.

Next, the means of ACE for reading comprehension were compared between the groups of upper and lower English articulating speed and English Stroop interference. The group of upper English articulating speed had a higher mean of ACE than the lower group (upper group = 11.412, lower group = 8.750), and this was statistically supported by the one-way factorial ANOVA [$F(1, 31) = 4.958$, $p < .05$]. However, there was no significant difference in the

means of ACE between the groups of upper and lower English Stroop interference [upper group = 10.500, lower group = 9.933; $F(1, 29) = .194$, ns].

4.1.4 Discussion

The first research question inquired about the relationships between the efficiencies of phonological coding and lexical access and reading comprehension for Japanese senior high school students. The results were: (a) the efficiency of phonological coding, as measured by English articulating speed, had a significant correlation with reading comprehension, explaining 19.2% of its variance; but (b) there was no significant correlation between the efficiency of lexical access, measured as English Stroop interference, and reading comprehension.

Result (a) confirms a significant relationship between the efficiency of phonological coding and reading comprehension. It underlines a critical role that word recognition in the sublexical route, i.e., phonological coding, plays in the reading processing, complying with L1 reading research (Castle, 1999; Gathercole & Baddeley, 1993; Grabe & Stroller, 2002; Snow, et al., 1998; Stanovich, 2000; Stanovich & Stanovich, 1999). The oral reading model explains that efficient phonological coding contributes to the reading processing not only by improving the word recognition processing but also by sparing the working memory resources for higher level processings such as parsing, proposition formation and comprehension.

Result (b) denies a role that the efficiency of lexical access plays in the reading processing, but the result requires caution. This is because the efficiency of lexical access should make a difference according to the oral reading model consisting of the DRC model for the word recognition component. Words accessed lexically through the sublexical route should take longer and consume more working memory resources than those directly accessed lexically in the lexical route as sight words.

It is possible that the Stroop tasks used in the experiment did not measure the efficiency of lexical access properly. One possibility is that the Stroop tasks may have measured the automaticity of lexical access, not the efficacy. Another is that the color words used as stimuli in the tasks were too easy and more difficult stimuli would have measured the efficiency more properly. Then, the relationship between the efficiency of lexical access and reading comprehension should be reexamined by adopting revised Stroop tasks with more difficult stimuli, e.g., color-associated words such as blood, ocean and forest, or by other measures of lexical access.

The second research question asked how the efficiencies of phonological coding and lexical access affected reading comprehension for Japanese senior high school students. The results were: (a) learners with more efficient phonological coding had a significantly better reading comprehension; but (b) the efficiency of lexical access had no significant effects on reading comprehension. These results are congruous to those for the first research question and confirm the favorable effect of efficient phonological coding and the little effect of efficient lexical access on reading comprehension for the participants.

4.1.5. Study Summary

A major finding of this study was that there was a significant relationship between the efficiency of phonological coding measured as English articulating speed and reading comprehension. Thus, a precondition of the assumption concerning letter-sound connection, which states that oral reading practice helps learners to establish the connection between letters and sounds, was fulfilled. This assumption should next require the examination of the effects of oral reading practice on letter-sound connection.

On the other hand, the relationship between the efficiency of lexical access in terms of Stroop interference and reading comprehension was refuted. This point should be

reexamined with revised Stroop tasks or other measures of the construct.

4.2 Study 2

Study 1 fulfilled a precondition of the assumption concerning letter-sound connection by confirming the significant relationship between the efficiency of phonological coding and reading comprehension. This study (Miyasako, 2004) sought to examine another precondition of the assumption concerning working memory, i.e., the relationship between the efficiency of working memory and reading comprehension.

According to Baddeley (2000 & 2003), working memory is composed of the central executive and its slave systems, i.e., phonological loop, visuo-spatial sketchpad and episodic buffer. The phonological loop, central executive and episodic buffer are directly or indirectly involved in oral reading and reading comprehension. The phonological loop, for the processing of linguistic information, phonologically codes written information and stores the representation for about two seconds without subvocal rehearsal. With regard to phonological coding, the first study showed that its efficiency predicted reading comprehension of Japanese senior high school students.

On the other hand, the central executive and episodic buffer, which used to be included in the executive, respectively manages the allotment, monitor and control of attention and stores information for processing and integration. These functions that the executive and buffer serve in the processing of language comprehension roughly correspond to the concept of working memory in a connectionist capacity theory of comprehension, Capacity Constrained Comprehension (Just & Carpenter, 1992) (see section 3.3.4).

Although there has been little research that investigated into the efficiencies of the executive and buffer, there have been many studies that measured the capacity of working memory in terms of Capacity Constrained Comprehension with RSTs (Daneman & Carpenter,

1980). A meta-study examining 77 studies concerning working memory concluded that working memory capacity as measured by the RST had a significant correlation with reading comprehension (Daneman & Merikle, 1996).

In this study, the efficiency of working memory means those of the central executive and episodic buffer, corresponding to the meaning as used in Capacity Constrained Comprehension. Since the efficiency of working memory means working memory capacity in terms of the processing volume of activated information, it is defined as working memory capacity. Thus, our concern in this study is expressed as the relationship between working memory capacity and reading comprehension of Japanese learners of English.

So far one study was conducted on this relationship. Kato (2003) reported a significant correlation between working memory capacity and reading comprehension for Japanese college students with upper-intermediate to advanced English proficiency studying in the UK. However, this finding cannot be projected onto ordinary Japanese learners of English because the college students represented just a small portion of Japanese learners who achieved higher proficiency of English. Therefore, we investigated into the relationship for Japanese senior high school students.

4.2.1 Purposes

The purposes of this study were to investigate into: (a) the relationship between working memory capacity and reading comprehension of Japanese senior high school students; and (b) whether the relationship is influenced by passage difficulty in the reading comprehension tests. Research questions of the investigations concerning Japanese senior high school students were addressed as: (1) would working memory capacity predict reading comprehension?; and (2) would passage difficulty in the reading comprehension tests affect the relationship between working memory capacity and reading comprehension?

4.2.2 Method

4.2.2.1 Participants

The participants were 83 third-year senior high school students in Okayama in the school year 2003. Our judgment of their English proficiency was in the range of upper-elementary to intermediate levels after their studying English as a foreign language for over five years.

4.2.2.2 Instruments

Two constructs in this study, i.e., reading comprehension and working memory capacity, were measured with the following instruments. The participants' reading comprehension was measured using two tests with different levels of passage difficulty. The more difficult measurement was the reading section (20 points for 20 items in 30 minutes) of the past version of ACE. The less difficult one was the reading section (12 points for 12 items in 20 minutes) of the past version of *Basic Assessment of Communicative English* (BACE) (ELPA). BACE was developed, based on Item Response Theory as were TOEFL and TOEIC, for lower English proficiency learners than ACE examinees, and was considered a valid measure of English proficiency as well as ACE.

Second, the RST devised by Daneman & Carpenter (1980) was adopted for measuring working memory capacities of the participants. In the RST, one reads aloud a set of 13- to 16-word sentences, and recalls the final word of each sentence at the end of the set. The same final words are not to appear. The number of sentences in a set increases from two to five or six as far as one can recall the final words correctly. The number of sets containing two to five or six sentences in a test is three or five. One's reading span is expressed in terms of the maximum number of sentences whose final words he or she can recall correctly in two out of three sets or three out of five sets. The RST measures working memory

capacity used both for reading sentences aloud and for storing the final words of the sentences simultaneously.

The standard procedure of the RST is as follows: (a) the examiner shows one card with a sentence on it; (b) the examinee reads the sentence aloud at his or her pace; (c) the examiner shows the next card soon after the last sentence is read; (d) the examiner and examinee repeat these steps until no sentences of the set are left; and (e) the examinee recalls the final words of the sentences, given the examiner's signal. These steps continue until the examinee can no longer recall the final words correctly.

In this experiment, two RSTs were conducted, i.e., silent RST (Daneman & Carpenter, 1980) and RST of ESL (Osaka & Osaka, 1994). The silent RST, a different kind of RST possessing a significant reliability with the RST ($r = .88, p < .01$), was adopted because of its feature allowing the test to be conducted to many participants concurrently, i.e., one has to read each sentence silently and answer if its content is true lest he or she should skip the silent reading. The RST of ESL was adopted for reliability purposes: (a) to check the reliability of the silent RST; and (b) to replace the silent RST in case it proves to be unreliable.

The silent RST was developed for the senior high school participants by using 8- to 11-word sentences mainly taken from authorized course books for junior high school students (Appendix C). The silent RST possessed the following features: (a) the number of sets was three; (b) the number of sentences in a set incremented from two to six; and (c) the participants' reading spans were measured as the maximum numbers of sentences whose final words they could perfectly recall in two out of three sets.

Although the standard procedure of the silent RST should conform to the RST, except that one reads each sentence silently and answers a question about it, several modifications were made on the procedure for the present silent RST. First, the participants took the test individually but concurrently in class. Second, they read silently each sentence on each page

of three booklets consisting of two- to six-sentence sets and circled T or F below the sentence judging its content, where true and false sentences were evenly rationed (Appendix D). Third, they recalled and wrote the final words of the sentences at the end of each set (Appendix D). Fourth, they were given about five minutes for completing each booklet, totally 15 to 20 minutes, without time regulation on reading each sentence silently and checking its content. The reason for these modifications was to develop a different kind of RST which could be administered to many students in one occasion so that even teacher-researchers lacking resources of time and money could measure their students' working memory capacities.

The second RST conducted in the experiment, i.e., the RST of ESL, was developed for measuring the working memory capacities of Japanese college students, which showed a significant reliability with the RST, CMU (Carnegie-Mellon University where Daneman and Carpenter taught) version ($r = .75, p < .01$) (Osaka & Osaka, 1994; Osaka, 1998). We gave this RST of ESL minor modifications in several sentences so that the participants would not have trouble understanding them (Appendix E). This test followed the standard procedure of the RST.

4.2.2.3 Procedure

ACE and the silent RST were administered to all the participants in regular 65-minute classes. ACE was first conducted in the prescribed 30 minutes and then the silent RST was conducted in roughly 15 to 20 minutes. Two teachers invigilated the silent RST so that the participants would not return to the finished pages. BACE was carried out to all the participants in the prescribed 20 minutes in other regular classes. The RST of ESL was administered to 24 volunteers out of the participants after school.

4.2.3 Results

4.2.3.1 Descriptive Statistics

The participants who took three measurements, i.e., ACE and BACE for reading comprehension and the silent RST for working memory capacity, were treated in the analyses, which reduced the number of the participants analyzed to 78. The RST of ESL was administered to 24 volunteers out of the 78 participants. Table 4.5 shows the means of ACE, BACE and the silent RST for the 78 participants and those of ACE, BACE, the silent RST and RST of ESL for the 24 volunteers.

Table 4.5: Means of ACE, BACE, Silent RST and RST of ESL

	ACE*		BACE**		Silent RST		RST of ESL
n	78	24	78	24	78	24	24
Mean	12.269	12.583	9.910	10.125	3.295	3.583	2.500
SD	3.709	3.599	2.429	1.484	1.340	1.248	.885

* $\alpha = .725$, ** $\alpha = .742$.

Table 4.6: Correlation Matrix between ACE, BACE, Silent RST and RST of ESL

	(a)	(b)	(c)	(d)
(a) ACE	-			
(b) BACE	.491*	-		
(c) Silent RST	.628**	.335	-	
(d) RST of ESL	.451*	.282	.512**	-

** $p < .01$, * $p < .05$. $n = 24$.

Table 4.7: Regression Analyses on ACE and BACE with Silent RST and RST of ESL

	ACE			BACE		
	β	t-value	R^2	β	t-value	R^2
Silent RST	1.155	2.772*	.394	.307	1.088	-
RST of ESL	.714	.904	-	.251	.630	-

ACE: $Y = 5.244 + 1.155X_1 + .714X_2$; $R^2 = .417$; $F(2, 21) = 7.497^{**}$, $n = 24$. BACE: not significant, $n = 24$. ** $p < .01$, * $p < .05$.

4.2.3.2 Relations between Working Memory Capacity and Reading Comprehension

In order to examine the relationships between ACE and BACE for reading comprehension and the silent RST and RST of ESL for working memory capacity, Pearson product-moment correlation coefficients were calculated. According to the correlation matrix (Table 4.6), ACE had significant correlations with BACE ($r = .491, p < .05$), the silent RST ($r = .628, p < .01$) and RST of ESL ($r = .451, p < .05$). In contrast, BACE had no significant correlations with the silent RST and RST of ESL. Although both ACE and BACE were reliable measures of the participants' reading comprehension (ACE's $\alpha = .725$, BACE's $\alpha = .742$), the reading comprehension test with more difficult passages, i.e., ACE, seems to have had a stronger relationship with the participants' working memory capacities. This result was supported by the regression analyses (Table 4.7). The silent RST was a significant predictor of ACE [$\beta = 1.155, t = 2.772, p < .05; R^2 = .394; F(2, 21) = 7.497, p < .01$]. The silent RST and RST of ESL together explained 18.0% of the variance of ACE, while the silent RST and RST of ESL independently explained 21.4% and 2.3% of the variance respectively. On the other hand, BACE had no significant predictor.

Second, ACE's correlations with the silent RST ($r = .628, p < .01$) and RST of ESL ($r = .451, p < .05$) were comparable to the result of a meta-study concerning the correlation between working memory capacity and global reading comprehension, where the correlations in 77 studies dispersed between .05 and .76, and the mean coefficient was .41 ($p < .05$) (Daneman & Merikle, 1996).

Third, two RSTs, i.e., the silent RST and RST of ESL, had a significant correlation ($r = .512, p < .01$). Although this coefficient was smaller than the favorable value, $r > .70$, in showing that the silent RST was a reliable measure of working memory capacity, the silent RST might have had a higher correlation with the RST, CMU version, e.g., a nearly favorable value, $r = .683 (.512 / .75)$, as the RST of ESL had a high correlation with the RST, CMU

version ($r = .75, p < .01$).

4.2.3.3 Effects of Working Memory Capacity

With a view to examining the effects of working memory capacity on reading comprehension, the participants were divided into upper, intermediate and lower groups according to their reading spans in the silent RST. The upper, intermediate and lower groups had their reading spans above three, at three and below three respectively (Daneman & Carpenter, 1980).

Table 4.8 shows the means of ACE, BACE and the silent RST for the groups of upper, intermediate and lower silent RST. The one-way factorial ANOVA for ACE showed that there was a significant difference in the means between the three silent RST groups [$F(2, 75) = 15.520, p < .01$]. The Scheffe's post hoc test revealed that the upper group had significantly higher means of ACE than the intermediate and lower groups (upper and intermediate groups: mean difference = 3.344, $p < .01$; upper and lower groups: mean

Table 4.8: Means of Silent RST, ACE and BACE
for Groups of Upper, Intermediate and Lower Silent RST

	Group	n	mean	SD
Silent RST	Upper	25	4.960	.841
	Intermediate	30	3.000	0
	Lower	23	1.870	.344
ACE	Upper	25	15.000	2.566
	Intermediate	30	11.700	3.313
	Lower	23	10.043	3.522
BCE	Upper	25	10.520	1.475
	Intermediate	30	10.567	1.695
	Lower	23	8.391	3.327

Upper, Intermediate and Lower represent the groups of upper, intermediate and lower silent RST.

difference = 4.957, $p < .01$). It seems that students with higher working memory capacities (higher capacity students) had better reading comprehension in the reading test with more difficult passages, i.e., ACE, than students with medium or lower working memory capacities (medium or lower capacity students).

The one-way factorial ANOVA for BACE showed that there was a significant difference in the means between the three silent RST groups [$F(2, 75) = 7.448, p < .01$]. The Scheffe's post hoc test revealed that the upper and intermediate groups had significantly higher means of BACE than the lower group (upper and lower groups: mean difference = 2.129, $p < .01$; intermediate and lower groups: mean difference = 2.175, $p < .01$). It seems that lower capacity students had poorer reading comprehension in the reading test with less difficult passages, i.e., BACE, than medium or higher capacity students.

4.2.4 Discussion

The first research question inquired about the correlation between working memory capacity and reading comprehension for Japanese senior high school students of English. The results were: (a) working memory capacity, as measured by the silent RST, had a significant correlation with reading comprehension, as measured by the reading test with more difficult passages, ACE ($r = .628, p < .01$); (b) working memory capacity, as measured by the RST of ESL, had a significant correlation with reading comprehension, as measured by ACE ($r = .451, p < .05$); (c) the silent RST and RST of ESL together explained 18.0% of the ACE variance and the silent RST and RST of ESL independently explained 21.4% and 2.3% of the variance respectively; and (d) working memory capacities, as measured by the silent RST and RST of ESL, had no significant correlations with reading comprehension, as measured by the reading test with less difficult passages, BACE.

The results answered the first research question as showing that there was a significant

correlation between working memory capacity and reading comprehension, as measured by an reading test with appropriately difficult passages, for Japanese senior high school students of English. This finding, coupled with Kato's (2003) finding supporting the correlation between the two constructs for upper-intermediate to advanced learners of English, can fulfill a precondition of the assumption about oral reading concerning working memory.

On the other hand, such a relationship was not seen between working memory capacity and the reading test with less difficult passages because of: (a) the characteristic of working memory that is likely to activate itself more when it is processing cognitively more demanding tasks (Osaka & Osaka, 1994; Osaka, 2002); and (b) the ceiling effect that the reading test, BACE, may have had. In other words, BACE, originally designed for first-year senior high school students, may have been too easy to activate the participants' working memory fully, and may have invited the ceiling effect with its mean value 10.125 for the full marks 12.

Another point that attracts our attention is that the two RSTs, which were moderately correlated ($r = .512$, $p < .01$), made a distinction in the correlations with ACE (silent RST = $.628$, $p < .01$; RST of ESL = $.451$, $p < .05$). Consequently, portions of the ACE variance that the silent RST and RST of ESL explained did not overlap fully. 18% of the variance that the silent RST and RST of ESL together explained seems to have been that of working memory capacities that the participants exercised in reading comprehension. This is because 18% of the variance, which means the correlation coefficient $.424$, is about the mean correlation coefficient in Daneman & Merikle's (1996) meta-study ($r = .41$, $p < .05$).

However, 21.4% and 2.3% of the ACE variance that the silent RST and RST of ESL uniquely explained respectively may be interpreted as showing that these tests measured something other than working memory capacities of the participants, which was possibly their reading comprehension. It is conceivable that the participants with better reading

comprehension skills consumed less working memory resources, sparing them for retaining words in the RSTs, especially in the silent RST where processing time for each sentence, i.e., silent reading plus content check, was not restricted. In future research, revisions of the silent RST should be made lest the participants should make use of word-retaining strategies that are unfavorable for gauging working memory capacities.

The second research question asked if passage difficulty in the reading comprehension tests affected the relationship between working memory capacity, as measured by the silent RST, and reading comprehension for Japanese senior high school students of English. The results were: (a) higher capacity students had significantly better reading comprehension in the reading test with more difficult passages than medium or lower capacity students; and (b) lower capacity students had significantly poorer reading comprehension in the reading test with less difficult passages than medium or higher capacity students.

Result (a) is congruous with the significant correlation between working memory capacity and reading comprehension. This result can be explained by the above-shown Capacity Constrained Comprehension (Just & Carpenter, 1992) as showing that the participants' working memory capacities were reflected in their reading comprehension. Since the participants' working memory resources were constrained, only higher capacity participants may have been able to continue processing into the higher level component, i.e., comprehension, in the test with more difficult passages without using up their resources. Medium or lower capacity participants seem to have used up their resources before reaching the component.

Result (b) was not expected from the correlation analysis. According to the analysis, which showed that the two RSTs had no significant correlations with reading comprehension as measured by the test with less difficult passages, the reading test was easy enough even for lower capacity participants to process without difficulty. However, this was not the case.

Even in the reading test designed for first-year students, lower capacity students seem to have consumed the working memory resources while engaged in lower level processings such as word recognition, parsing and proposition formation.

4.2.5 Study Summary

A primary finding of this study was that there was a significant correlation between working memory capacity and reading comprehension, as measured by the reading test with appropriately difficult passages, for Japanese senior high school students. Consequently, it fulfilled a precondition of the assumption about oral reading concerning working memory. Another was that higher and lower capacity students had significantly better and poorer reading comprehension respectively in the reading tests with more and less difficult passages. This result also confirmed the relationship between working memory capacity and reading comprehension.

4.3 Study 3

Studies 1 and 2 confirmed that the efficiency of phonological coding and working memory capacity could respectively predict reading comprehension of Japanese senior high school students. A question relevant to this concerns whether the efficiencies of phonological coding and working memory capacities of Japanese senior high school students improve as their chronological ages and length of English learning increase.

Our hypothesis concerning this question was that students would improve their efficiencies of phonological coding and working memory capacities in accordance with their maturity and length of English learning. There are two main reasons for this. First, it has been acknowledged in L1 reading that decoding skills, which play important roles in reading comprehension, can be developed through activities such as oral reading (Blum, et al., 1995;

Carver & Hoffman, 1981; Dixon-Krauss, 1995; Dowhower, 1987; Herman, 1985; Homan, et al., 1993; Labbo & Teale, 1990; Rasinski, et al., 1994; Tingstrom, et al., 1995; Weinstein & Cooke, 1992; Young, et al., 1996). Second, adolescents are still at developing stages of their working memory capacities (Siegel, 1994). In order to investigate into this question Miyasako & Takatsuka (forthcoming) conducted this study.

4.3.1 Purposes

The purposes of this study were to investigate into: (a) the efficiencies of phonological coding and working memory capacities for first- and third-year senior high school students; and (b) the relationships of these two constructs with reading comprehension among the first- and third-year students. Research questions of the investigations were addressed as: (1) would there be any differences in the efficiencies of phonological coding and working memory capacities between first- and third-year senior high school students?; (2) would there be any differences in the relationships of the efficiencies of phonological coding and working memory capacities with reading comprehension between first- and third-year senior high school students?

4.3.2 Method

4.3.2.1 Participants

The participants were totally 136 senior high school students in Okayama in the school year 2003. 40 first-year and 72 third-year students participated in this experiment and the data of 24 third-year students in Study 2 was also used. The 40 first-year, 72 third-year and 24 third-year students were named first-year group and third-year groups A and B respectively. All the participants belonged to the same school concurrently and the third-year groups A and B were at the same level of English reading comprehension as measured by ACE [group A:

mean = 11.972, SD = 3.560; group B: mean = 12.583, SD = 3.599; Mann-Whitney U = 785.500, ns, n = 96]. The participants' English proficiencies were judged to be in the range of elementary to intermediate levels after their studying English as a foreign language for over three to five years. There was a significant difference in reading comprehension as measured by BACE between the first-year and third-year students [first-year students: mean = 6.925, SD = 1.819; third-year students: mean = 9.969, SD = 2.080; Mann-Whitney U = 516.500, $p < .01$, n = 136].

4.3.2.2 Instruments

Three constructs of this study, i.e., the efficiency of phonological coding, working memory capacity and reading comprehension, were measured with the following instruments. First, the efficiency of phonological coding was measured as English articulating speed in the same way as in Study 1. The first-year group and third-year group A read aloud 40 familiar English words consisting of 116 syllables as fast as possible (Appendix A). The numbers of syllables that the participants articulated in two seconds were gauged. The formula for English articulating speed was as follows: English articulating speed = $116 \text{ (syllables in 40 words)} \times 2.0 / \text{time for articulating 40 words (sec.)}$.

Second, three RSTs were adopted for measuring working memory capacities of the first-year group and third-year group B. For the first-year group, we developed a RST for lower English proficiency senior high school students by using 6- and 7-word sentences mainly taken from authorized course books for junior high school students, which was named elementary RST (Appendix F). The elementary RST consisted of three sets each of two to six sentences, 60 sentences in total. The second RST that we used for the first-year group was the Japanese version of RST (Japanese RST) (Osaka & Osaka, 1994). This was mainly used to examine the reliability of the elementary RST. The third one for the third-year group

B was the RST of ESL. As shown in Study 2, minor modifications were given to several sentences in the RST of ESL so that the participants would not have trouble understanding them. All three RSTs observed the standard procedure for the scoring of the RST.

Third, we adopted two assessments of reading comprehension, i.e., the reading sections of the past versions of ACE and BACE, which were used in Studies 1 and 2. The more difficult ACE, designed mainly for second- and third-year students, was used for the third-year groups A and B, and the less difficult BACE, designed mainly for first-year students, was used for all the groups.

4.3.2.3 Procedure

First, the first-year group ($n = 40$) measured their English articulating speeds for the efficiency of phonological coding and took BACE for reading comprehension in this order in a regular 65-minute class. They also took the elementary RST and Japanese RST for working memory capacity individually after school. Second, the third-year group A ($n = 72$) measured their English articulating speeds and took two reading comprehension tests, i.e., ACE and BACE. These three measures were separately administered in regular classes. Both the first-year group and third-year group A measured their English articulating speeds with stopwatches by themselves. Third, the third-year group B ($n = 24$) took ACE and BACE separately in regular classes and the RST of ESL individually after school.

4.3.3 Results

4.3.3.1 Efficiency of Phonological Coding

Table 4.9 shows the descriptive statistics of English articulating speed for measuring the efficiencies of phonological coding of the first-year group and third-year group A. The mean values were about the same between the two groups (first-year group: mean = 8.081, SD =

1.819; third-year group A: mean = 8.106, SD = 1.656), which was statistically supported by the one-way factorial ANOVA [$F(1, 110) = .006, ns$]. It seems that the third-year students made hardly any progress in the efficiencies of phonological coding during the first two years of studying English.

4.3.3.2 Working Memory Capacity

Table 4.10 shows the descriptive statistics of the elementary RST and RST of ESL for working memory capacities of the first-year group and third-year group B respectively. First, the maximum values for the first- and third-year groups were 3 and 5 respectively. In the first-year group there were no high capacity students, above 3 in the reading span (Daneman & Carpenter, 1980). Second, the mean value was larger in the third-year group B than in the first-year group (first-year group: mean = 2.075, SD = .616; third-year group B: mean = 2.500, SD = .885). The one-way factorial ANOVA revealed that there was a significant difference in the means between the two groups [$F(1, 62) = 5.125, p < .05$]. It seems that the third-year students significantly improved their working memory capacities during the first two years of studying English.

Table 4.9: Descriptive Statistics of English Articulating Speed
for First-Year Group and Third-Year Group A

Group	n	Mean	SD	Max.	Min.
First-year	40	8.081	1.819	12.019	4.335
Third-year A	72	8.106	1.656	11.753	4.692

Table 4.10: Descriptive Statistics of Elementary RST
for First-Year Group and RST of ESL for Third-Year Group B

Group	n	Mean	SD	Max.	Min.
First-year	40	2.075	.616	3	1
Third-year B	24	2.500	.885	5	1

4.3.3.3 Relationships between Constructs for First-Year Group

Table 4.11 shows the means of English articulating speed, BACE, the elementary RST and Japanese RST and the correlations between them for the first-year group. English articulating speed had a significant correlation with BACE ($r = .655$, $p < .01$), suggesting a significant role of phonological coding in reading comprehension of the first-year students. This was supported by the regression analysis showing that the efficiency of phonological coding could explain 42.9% of the reading comprehension variance [$\beta = .792$, $t = 5.146$, $p < .01$; $R^2 = .429$; $F(3, 36) = 9.930$, $p < .01$].

In contrast, the elementary RST had no significant correlation with BACE, which did not comply with the relationship shown in a meta-study ($r = .41$, $p < .05$) (Daneman & Merikle, 1996). It seems that the first-year students did not use the working memory capacities in higher level processings, such as parsing, proposition formation and comprehension, as effectively as in decoding.

Next, the elementary RST had no significant correlation with English articulating speed, which confirmed that the RST did not measure the efficiency of phonological coding. Finally, although there was a significant correlation between the elementary RST and Japanese RST ($r = .465$, $p < .01$), the coefficient was smaller than a favorable value, $r > .70$, for showing the reliability of the elementary RST.

Table 4.11: Means of Constructs and their Correlation Matrix for First-Year Group

	Mean	SD	Correlation			
			(a)	(b)	(c)	(d)
(a) English articulating speed	8.081	1.819	-			
(b) BACE	6.925	2.235	.655**	-		
(c) Elementary RST	2.075	.616	.088	.209	-	
(d) Japanese RST	2.350	.622	.175	.167	.465**	-

** $p < .01$. $n = 40$.

4.3.3.4 Relationships between Constructs for Third-year Groups A and B

Table 4.12 shows the means of English articulating speed, ACE and BACE and the correlations between them for the third-year group A. English articulating speed had a significant correlation with ACE ($r = .273, p < .05$) but no significant correlation with BACE. This result suggested a ceiling effect of BACE. This test, designed for first-year students, may have been easy for third-year students with inefficient phonological coding. Similarly, another significant but moderate correlation between ACE and BACE ($r = .515, p < .01$) indicated the possibility of the ceiling effect of BACE.

Table 4.13 shows the means of the RST of ESL, ACE and BACE and the correlations between them for the third-year group B. The RST of ESL had a significant correlation with ACE ($r = .451, p < .05$) but no correlation with BACE. The former was valid, comparable to the result of a meta-study concerning the relationship between working memory capacity and global reading comprehension, with the mean coefficient being .41 ($p < .05$) (Daneman &

Table 4.12: Means of Constructs and their Correlation Matrix for Third-Year Group A

	Mean	SD	Correlation		
			(a)	(b)	(c)
(a) English articulating speed	8.106	1.656	-		
(b) ACE	11.972	3.560	.273*	-	
(c) BACE	9.917	2.250	.134	.515**	-

** $p < .01$, * $p < .05$. $n = 72$.

Table 4.13: Means of Constructs and their Correlation Matrix for Third-Year Group B

	Mean	SD	Correlation		
			(a)	(b)	(c)
(a) RST of ESL	2.500	.885	-		
(b) ACE	12.583	3.599	.451*	-	
(c) BACE	10.125	1.484	.282	.491*	-

* $p < .05$. $n = 24$.

Merikle, 1996). The latter suggested the ceiling effect of BACE as in the third-year group A. Another significant correlation between ACE and BACE ($r = .491, p < .05$) was close to that for the third-year group A ($r = .515, p < .01$), showing the consistency of ACE and BACE.

4.3.4 Discussion

The first research question inquired about differences in the efficiencies of phonological coding and working memory capacities between first- and third-year senior high school students. The results were: (a) there was no significant difference in the efficiencies of phonological coding, as measured by English articulating speed, between the first- and third-year students; and (b) the third-year students had significantly higher working memory capacities than the first-year students.

Result (a) was surprising in refuting our hypothesis that phonological coding of the third-year students would be more efficient than that of the first-year students. This result suggests that the third-year students did not improve their efficiencies of phonological coding during the first two years. It is possible that the students had highly developed their decoding skills before entering the senior high school. However, this possibility is rebutted by studies reporting that oral reading speeds of Japanese senior high school students with similar English proficiencies are about 70 and 90 wpm for first- and second-year students respectively (Miyasako, 2002; Miyasako & Takatsuka, 2005a), which reflects inefficient decoding skills. Then, the lack of teaching decoding skills including phonological coding may have been responsible for the result, which consequently may have led to the third-year students' underdeveloped reading comprehension skills. In this case, we should adopt the teaching of decoding skills such as oral reading practice, as recommended in L1 reading pedagogy (Blum, et al., 1995; Carver & Hoffman, 1981; Dixon-Krauss, 1995; Dowhower, 1987; Herman, 1985; Homan, et al., 1993; Labbo & Teale, 1990; Rasinski, et al., 1994;

Tingstrom, et al., 1995; Weinstein & Cooke, 1992; Young, et al., 1996).

Result (b) seems to show that the third-year students did improve their working memory capacities during the first two years. This result complies with Siegel's (1994) finding that adolescents are still at developing stages of their working memory capacities. In this case, we can possibly help students to expand their working memory capacities by introducing into reading and general English language pedagogy cognitively demanding activities, such as oral reading practice, which are more likely to activate working memory to a higher level (Osaka, et. al., 1999; Osaka, 2002).

The second research question asked about the relationships of the efficiencies of phonological coding and working memory capacities with reading comprehension for the first- and third-year senior high school students. The results were: (a) in both the first- and third-year students there were significant correlations between the efficiencies of phonological coding and reading comprehension, as measured respectively by BACE ($r = .655, p < .01$) and by ACE ($r = .273, p < .05$); and (b) in the first-year students there was no significant correlation between working memory capacities and reading comprehension, whereas in the third-year students there was a significant correlation between the two variables ($r = .451, p < .05$).

Although result (a) was consistent with the above result that the first- and third-year students had similar efficiencies of phonological coding, the two groups of students were distinctive in the scale of reading comprehension variances that the efficiency of phonological coding explained (first-year group = 42.9%, third-year group A = 7.5%). In addition, the third-year students had no significant correlation between the two variables when their reading comprehension was measured by BACE.

Since the efficiency of phonological coding was the primary predictor of the reading comprehension variance for the first-year students, it seems to have made a far greater

contribution to reading comprehension than syntactic parsing and other higher level processings. Probably, the first-year students were more dependent upon non-automatic phonological coding for lexical processing of information than the third-year students. They may also have possessed only unskilled strategies for higher level processings.

In contrast, the third-year students, having significantly better reading comprehension but about the same efficiencies of phonological coding, were supposedly more adept at syntactic parsing and other higher level processings than the first-year students. The third-year students may also have had information lexically accessed more directly than the first-year students, bypassing phonological coding, as are Japanese Kanji characters often processed (Rayner & Pollatsek, 1989).

Result (b) was in line with the above result that the third-year students had significantly higher working memory capacities than the first-year students. However, working memory capacities and reading comprehension of the third-year students were not significantly correlated when their reading comprehension was measured by the less difficult assessment, BACE. Since the correlation for the third-year students was significant only when their reading-comprehension measure was the more difficult ACE, it was confirmed that working memory was more likely to activate itself with a more cognitively loaded activity (Osaka & Osaka, 1994; Osaka, 2002).

On the other hand, the first-year students, using their working memory capacities mainly for lower level processings such as phonological coding, may not have had enough capacities left for other essential functions of working memory, i.e., syntactic parsing and other higher level processings such as comprehension.

4.3.5 Study Summary

Main findings of this study were: (a) students may not improve the efficiencies of

phonological coding during the first two years of senior high school if they are not taught decoding skills; (b) students may improve their working memory capacities during the first two years; (c) in first-year students, who are likely to depend more on phonological than lexical processing of information, there may be a higher correlation between the efficiency of phonological coding and reading comprehension; (d) in third-year students, who are likely to be more adept at higher level processing of information with higher working memory capacities, there may be a correlation between working memory capacity and reading comprehension.

4.4 Summary

Studies 1 and 2 confirmed the relationships of the efficiency of phonological coding and working memory capacity with reading comprehension for Japanese senior high school students. Consequently, preconditions for the assumptions about oral reading were fulfilled concerning letter-sound connection and working memory. Study 3 showed: (a) working memory capacities of Japanese senior high school students might improve, whereas their efficiencies of phonological coding might not improve because of the lack of teaching decoding skills; and (b) the efficiency of phonological coding might contribute to reading comprehension greatly for younger students with lower English proficiencies, whereas working memory capacity might contribute to reading comprehension more than the efficiency of phonological coding for older students with higher English proficiencies.

These findings suggest, concerning Japanese senior high school students: (a) the efficiency of phonological coding may be improved if activities that help to develop decoding skills such as oral reading are performed in English courses; and (b) working memory capacity may be improved more if cognitively loaded activities, which are likely to activate working memory such as oral reading, are performed in English courses. These suggestions

are in compliance with the assumptions about oral reading concerning letter-sound connection and working memory.

Since preconditions of the assumptions about oral reading have been fulfilled by now, we should take the next step toward examining effects of oral reading practice on the assumed functions, i.e. the improvement of letter-sound connection, vocabulary, grammar and working memory. Before that, however, it is necessary to investigate into the relationship between oral reading and reading comprehension if we seek to improve reading comprehension as well as the assumed factors through oral reading practice. Studies concerning this relationship are reported and discussed in the next chapter.

Chapter 5

Oral Reading and Reading Comprehension

In the last chapter we saw that preconditions for the assumptions about oral reading were fulfilled concerning letter-sound connection and working memory. It was confirmed that the efficiency of phonological coding and working memory capacity had significant relationships with reading comprehension for Japanese senior high school students. Also, it was suggested that oral reading practice should improve their efficiencies of phonological coding and working memory capacities.

However, before examining the effects of oral reading practice on the assumed functions, i.e., letter-sound connection, vocabulary, grammar and working memory, we should investigate into a relationship between oral reading and reading comprehension of Japanese learners. This is because our main goal is to improve their reading comprehension and overall reading proficiency through oral reading practice when the functions of oral reading practice are assumed. Hence, the significant relationship between oral reading and reading comprehension is another precondition for the main goal.

The present chapter reports and discusses two studies that investigated into relationships relevant to the pending relationship. Studies 1 and 2 examined the relationships between oral reading ability and English proficiency and between oral reading speed and reading comprehension respectively.

5.1 Study 1

This study is based on one of the three experiments conducted in Miyasako (2002) that explored relationships among factors relevant to oral reading such as oral reading ability and

English proficiency.

5.1.1 Purpose

The purpose of this study was to investigate into the relationship between oral reading ability and English proficiency of Japanese senior high school students. The research question addressed for this purpose was: what relationships would oral reading ability and its components, i.e., pronunciation, intonation, pause making and delivery, have with English proficiency and its components, i.e., vocabulary, grammar, reading and listening, for Japanese senior high school students?

5.1.2 Method

5.1.2.1 Participants

The participants were 40 first-year senior high school students in Okayama in the school year 2001. Our judgment of their English proficiency was in the range of elementary to pre-intermediate levels after their studying English as a foreign language for over three years.

5.1.2.2 Instruments

Oral reading ability and English proficiency of the participants were measured with the following instruments. Oral reading ability was analytically measured based on four criteria, which were pronunciation, intonation, pause making and delivery (Appendix G), and its full marks were 20 with 5 points for each component. The materials, A and B, were adopted from oral reading passages used in the past STEP pre-second grade examinations. The scoring was conducted by two Japanese EFL teachers with over 15 years teaching experience. The means of their scoring were the participants' scores for oral reading ability. Also, the participants' oral reading speeds (wpm) were measured by the evaluators.

English proficiency was gauged with the past STEP pre-second and third grade examinations (45 points for 45 items in 45 minutes). The test consisted of four sections, which were vocabulary, grammar, reading and listening sections. Specifics of the sections were: (a) the vocabulary section consisted of 10 items from the past STEP pre-second grade examinations; (b) the grammar section consisted of 10 items from the past STEP pre-second grade examinations; (c) the reading section consisted of 5 items concerning comprehension of a 300-word passage from the past STEP pre-second grade examination and 10 items concerning cloze procedure of a 250-word passage from the past STEP third grade examination; and (d) the listening section consisted of 5 items each from Listening sections 1 and 2 of the past STEP pre-second grade examination.

5.1.2.3 Procedure

The tests for measuring oral reading ability and English proficiency of the participants were administered in two regular English classes. In the measurement of oral reading ability, the participants individually read a passage aloud to the two evaluators soon after it was handed without being given time for reading it silently. Concurrently, the evaluators measured their oral reading speeds with stopwatches.

5.1.3 Results

5.1.3.1 Descriptive Statistics

In the data analyses 7 participants were excluded as invalid, which reduced the number of participants to 33. 2 participants did not take one of the tests and 5 participants had their oral reading ability scored with gaps more than 4 points between the two evaluators in the test with its full marks 20.

Table 5.1: Means of Oral Reading Ability

Criterion	Mean	SD	Spearman-Brown r
Pronunciation	2.80	.529	.886
Intonation	2.50	.625	.885
Pause making	3.03	.706	.836
Delivery	3.11	.622	.590
Oral reading ability	11.30	2.050	.866
Oral reading speed (wpm)	64.11	17.182	

n = 33.

Table 5.2: Means of English Proficiency

Section	k	Mean	SD	α
Vocabulary	10	3.76	1.768	.432
Grammar	10	3.76	1.921	.408
Reading	15	5.30	2.201	.491
Listening	10	4.67	2.300	.626
English proficiency	45	17.49	6.246	.813

n = 33.

Tables 5.1 and 5.2 show the descriptive statistics of oral reading ability and English proficiency of the participants. Since there was no significant effect of the oral reading passages on the scores of oral reading ability [$F(1, 31) = .617, ns$], the data were treated accordingly. There was no problem in the consistency of scoring oral reading ability between the two evaluators (Spearman-Brown $r = .866$). The mean oral reading speed was rather slow (mean = 64.11 wpm, SD = 17.182) and showed that the participants had not developed decoding skills.

The mean English proficiency was rather low (mean = 17.49, SD = 6.246) for the test with its full marks 45. This test seems to have been a little difficult for the participants. The test was reliable in measuring English proficiency ($\alpha = .813$), although each section did not have high reliability.

5.1.3.2 Correlations

Table 5.3 shows the correlations between oral reading ability and its components. All the correlations were significant and all the correlations of oral reading ability with its components were high ($.835 < r_s < .911$, $p < .01$). There were also high correlations between pronunciation and delivery ($r = .729$, $p < .01$), between intonation and pause making ($r = .814$, $p < .01$) and between pause making and delivery ($r = .741$, $p < .01$).

Table 5.4 shows the correlations between English proficiency and its components. All the correlations were significant and all the correlations of English proficiency with its components were high ($.724 < r_s < .792$, $p < .01$). However, there were no high correlations between the components ($.373 < r_s < .553$, $p < .05$).

Table 5.3: Correlation Matrix between Oral Reading Ability, Pronunciation, Intonation, Pause Making and Delivery

	(a)	(b)	(c)	(d)	(e)
(a) Pronunciation	-				
(b) Intonation	.685**	-			
(c) Pause making	.601**	.814**	-		
(d) Delivery	.729**	.695**	.741**	-	
(e) Oral reading ability	.835**	.911**	.900**	.837**	-

** $p < .01$. $n = 33$.

Table 5.4: Correlation Matrix between English Proficiency, Vocabulary, Grammar, Reading and Listening

	(a)	(b)	(c)	(d)	(e)
(a) Vocabulary	-				
(b) Grammar	.553**	-			
(c) Reading	.373*	.550**	-		
(d) Listening	.379*	.363*	.440**	-	
(e) English proficiency	.724**	.792**	.789**	.742**	-

** $p < .01$, * $p < .05$. $n = 33$.

Table 5.5: Correlation Matrix between Oral Reading Ability and English Proficiency

	Pronun- ciation	Into- nation	Pause making	Delivery	Oral reading ability
Vocabulary	.164	.353*	.319	.128	.290
Grammar	.336	.495**	.328	.190	.407*
Reading	.509**	.477**	.416*	.294	.488**
Listening	.342	.391*	.391*	.292	.463**
English proficiency	.455**	.564**	.484**	.306	.550**

**p < .01, *p < .05. n = 33.

Table 5.5 shows the correlations of oral reading ability and its components with English proficiency and its components. Oral reading ability had significant correlations with English proficiency ($r = .550, p < .01$), grammar ($r = .407, p < .05$), reading ($r = .488, p < .01$) and listening ($r = .463, p < .01$). English proficiency had significant correlations with pronunciation ($r = .455, p < .01$), intonation ($r = .564, p < .01$) and pause making ($r = .484, p < .01$). Moreover, there was a significantly high correlation between oral reading ability and speed ($r = .779, p < .01$).

Regression analyses were performed in order to examine what variables contributed more to oral reading ability and English proficiency of the participants. First, the simple regression analysis on oral reading ability with English proficiency showed that English proficiency could explain 30.2% of the variance of oral reading ability [$\beta = .174, t = 3.665, p < .01; R^2 = .302; F(1, 31) = 13.431, p < .01$], which also meant that oral reading ability could explain the same ratio of English proficiency variance. Second, the stepwise regression analysis on oral reading ability with the components of English proficiency showed that reading was the only significant predictor, explaining 23.9% of the variance of oral reading ability [$\beta = .439, t = 3.116, p < .01; R^2 = .239; F(1, 31) = 9.712, p < .01$], which also meant that oral reading ability could explain the same ratio of reading variance. Third, the stepwise regression analysis on English proficiency with the components of oral reading ability showed

that intonation was the only significant predictor, explaining 31.9% of the variance of English proficiency [$\beta = 5.640$, $t = 3.807$, $p < .01$; $R^2 = .319$; $F(1, 31) = 14.491$, $p < .01$], which also meant that English proficiency could explain the same ratio of intonation variance.

5.1.4 Discussion

The research question inquired about what relationships oral reading ability and its components have with English proficiency and its components for Japanese senior high school students. The results were: (a) oral reading ability had significant correlations not only with English proficiency but also with grammar, reading and listening; (b) English proficiency and reading could predict oral reading ability (30.2% and 23.9% respectively), and vice versa; and (c) intonation could predict English proficiency (31.9%), and vice versa.

Results (a) and (b) were consistent with an anecdote among English teachers that oral reading ability reflected English proficiency. Result (b) also confirmed an anecdotally asserted relationship between oral reading ability and reading proficiency (Morris, 1954; Oinoue, 1984). These results fulfilled a minimum precondition for our goal, which was to improve reading comprehension and overall reading proficiency of Japanese learners through oral reading practice, concerning the significant relationship between oral reading and reading comprehension.

Despite the correlation, the relationship was not causal. However, this non-causality does not hamper us from hypothesizing that reading comprehension and overall reading proficiency of Japanese learners improve if their oral reading ability improves. This is especially the case when significant relationships have been confirmed between reading comprehension and four factors assumed concerning the functions of oral reading practice, i.e., letter-sound connection, vocabulary, grammar and working memory.

With regard to result (b), there are two main reasons why reading, which consisted of

comprehension and cloze questions, was the only significant predictor of oral reading ability among the components of English proficiency. First, grammar and vocabulary are predictors of reading comprehension (Alderson, 2000; Bernhardt, 1991; Laufer, 1997; Read, 2000). Second, oral reading and silent reading are highly similar in the information processing mechanisms as shown in chapter 3.

Result (c) can be explained from the viewpoint of information processing. According to the oral reading model, oral reading with proper intonation requires completing the processing of a text from word recognition up to proposition formation, more preferably up to comprehension. Otherwise, the oral reading will supposedly reflect the extent to which processing of the text is completed with flaws in intonation, which was partially supported by the modest correlation between reading and intonation of the participants ($r = .477, p < .01$). In addition, learners with better comprehension of a text usually have higher English proficiencies, which was supported by the high correlation between reading and English proficiency of the participants ($r = .789, p < .01$). Therefore, it seems adequate that intonation was a primary predictor of the participants' English proficiencies.

On the other hand, there is a reason why the other components of oral reading ability were not predictors of English proficiency. This is because correlations between the independent variables, i.e., pronunciation, intonation and pause making, were rather high ($.601 < r_s < .814, p < .01$), which is called multicollinearity (Brown, 1988). It seems that four criteria for measuring oral reading ability were not fully discrete. In other words, the scoring may have been impressionistic. In future research the analytic criteria for measuring oral reading ability should be revised.

Next, there was another noticeable relationship that did not concern the research question. Although oral reading speed was slow (mean = 64.11 wpm, SD = 17.182), which indicates that the participants' decoding skills had not been developed, there was a

significantly high correlation between oral reading ability and oral reading speed ($r = .779$, $p < .01$). This relationship implied that there might also be a significant correlation between oral reading speed and reading comprehension. However, there was no significant correlation between oral reading speed and reading of the participants ($r = .251$, ns).

Nevertheless, the implication may not necessarily be refuted only by this insignificance for the following reasons. First, oral reading speed had a problem in reliability because it was measured just once. Second, the reading section of English proficiency was not reliable enough ($\alpha = .491$), although overall English proficiency was reliable ($\alpha = .813$). Thus, it is worth reexamining the relationship between oral reading speed and reading comprehension.

The problems of reliability and validity are not restricted to this relationship. Caution should be exercised concerning the above findings because of the reliability in each section of the English proficiency test, the validity of oral reading test, and the reliability of oral reading speed. Thus, findings of this study should be confirmed in better designed studies.

5.1.5 Study Summary

A primary finding of this study was that oral reading ability had significant correlations not only with English proficiency but also with grammar, reading and listening for Japanese senior high school students. Oral reading ability could predict English proficiency (30.2%) and reading (23.9%). Consequently, a minimum precondition for our goal, which is to improve reading comprehension and overall reading proficiency through oral reading practice for Japanese learners, was fulfilled.

Also, it was shown that oral reading ability had a high correlation with oral reading speed for Japanese senior high school students. This finding implied that oral reading speed might be correlated with reading comprehension, but the implication was not supported. Reexaminations of the relationship were suggested because of reliability problems in the

measurements.

5.2 Study 2

Study 1 confirmed a significant relationship between oral reading ability and reading proficiency for Japanese senior high school students and fulfilled a minimum precondition for our goal, which is to improve reading comprehension and overall reading proficiency through oral reading practice for Japanese learners. It also revealed a strong relationship between oral reading ability and oral reading speed, and implied that oral reading speed might have a significant correlation with reading comprehension. Although the insignificant correlation between the two variables did not support the implication, reexaminations of the relationship were suggested because of reliability problems in the measurements of oral reading speed and the reading section of English proficiency.

The problem in the measurement of oral reading speed lay in the single measurement. If oral reading speed is measured several times, this problem will be resolved. The other problem concerning the reading section of English proficiency was the low reliability among its testing items ($k = 15$, $\alpha = .491$). If a more reliable measure of reading proficiency is adopted, this problem will also be resolved.

With such reliable instruments the relationship between oral reading speed and reading comprehension was examined in a study that investigated into whether oral reading fluency and oral reading speed could be used as measuring tools for reading comprehension of Japanese senior high school students (Miyasako & Takatsuka, 2005b). Here, oral reading fluency, which was expressed as the number of words that were read aloud correctly in one minute, was recognized as a valid measure of reading fluency and comprehension in L1 (Fuchs, et al., 1993; Fuchs, et al., 1988; Jenkins, et al., 2003). Oral reading speed was expressed as the total number of words read orally in one minute.

This study reports the investigation into the relationships between oral reading speed and reading comprehension as well as between oral reading fluency and reading comprehension for Japanese senior high school students.

5.2.1 Purposes

The purposes of this study were: (a) to examine the relationship between oral reading fluency and reading comprehension of Japanese senior high school students; and (b) to reexamine the relationship between their oral reading speed and reading comprehension. Research questions addressed for the examinations concerning Japanese senior high school students were: (1) would there be any relationship between oral reading fluency and reading comprehension?; and (2) would there be any relationship between oral reading speed and reading comprehension?

5.2.2 Method

5.2.2.1 Participants

The participants were 39 second-year senior high school students in Okayama in the school year 2004. Our judgment of their English proficiency was in the range of upper-elementary to intermediate levels after their studying English as a foreign language for over four years.

5.2.2.2 Instruments

Oral reading fluency, oral reading speed and reading comprehension of the participants were measured with the following instruments. Oral reading fluency, which is expressed as the number of words that are read aloud correctly in a minute, has a high reliability ($r_s = .93 - .96$), inter-rater consistency and criterion-related validity with reading comprehension in L1.

The criteria for judging error words are omission, substitution, insertion, mispronunciation, repetition and hesitation longer than three seconds. One way for measuring oral reading fluency is to have learners read a passage with general content for 1 minute and to count the number of words that are read aloud correctly. Another is to have learners read a 400-word passage for 5 minutes and to compute the number of correctly read words per 1 minute (Fuchs, et al., 1993; Fuchs, et al., 1988; Jenkins, et al., 2003).

In the experiment, the participants read aloud a 250-word passage at about Flesch-Kincaid Grade Level 5 (Appendix H), taken from an authorized coursebook for third-year junior high school students, for about 2 minutes when given the direction “Read this passage at your own pace.” Their oral reading was recorded. The evaluators were two Japanese teachers of English with about 20 years teaching experience. They marked error words in each recorded oral reading for 1 minute, beginning with the second sentence, and counted the correctly read words. The evaluation adhered to the standard criteria for error words except that mispronunciation was applied only to words that hampered the evaluators’ understanding considerably.

Second, three types of oral reading speeds of the participants were measured: speed-focused, content-focused and comprehension-adjusted oral reading speeds. The reason for this lay in our assumption that what the participants were conscious of in reading the passage aloud and how much they could understand it might influence the relationship between their oral reading speed and reading comprehension.

The directions given to the participants for each type of oral reading were: (a) to read a passage aloud fast for speed-focused oral reading speed; (b) to read a passage aloud trying to understand its content for content-focused oral reading speed; and (c) to answer questions about the passage content following (b) for comprehension-adjusted oral reading speed.

The participants concurrently read a 200-word passage at about Flesch-Kincaid Grade

Level 5 (Appendix I) when given the direction to begin. When they finished reading the passage aloud, the participants logged their oral reading time by looking at the time shown on the blackboard every 5 seconds. With these data the participants' oral reading speeds (wpm) were calculated. In the calculation of comprehension-adjusted oral reading speed, the participants' content-focused oral reading speeds were multiplied by the rates of correct answers in the comprehension questions (Appendix I).

Third, the participants' reading comprehension was measured with the reading section of ACE (300 points for 20 items in 30 minutes). Since this test was considered a valid measure of English proficiency, developed based on Item Response Theory as were TOEFL and TOEIC, it was improbable that a reliability problem such as seen in the reading section of English proficiency test in Study 1 would arise in this study.

5.2.2.3 Procedure

Oral reading fluency of the participants was measured twice with passages at about the same reading ease (Flesch-Kincaid Grade Level 5) after school. Three types of oral reading speeds were measured four times with passages at about the same reading ease (Flesch-Kincaid Grade Level 5) in regular English classes. These four-time measurements supposedly would dispel doubts on the reliabilities of oral reading speeds, which was a problem in Study 1. Reading comprehension was also measured in regular classes, observing the testing procedure of ACE.

5.2.3 Results

5.2.3.1 Descriptive Statistics

Table 5.6 shows the means of English proficiency as measured by ACE (900 points), reading comprehension as measured by the reading section of ACE (300 points) and oral

Table 5.6: Means of English Proficiency, Reading Comprehension and Oral Reading Fluency

	n	English proficiency	Reading comprehension	Oral reading fluency
Mean	39	460.744	159.846	86.103
SD	39	62.227	31.066	18.772

Table 5.7: Means of Three Types of Oral Reading Speeds

	n	Speed-focused	Content-focused	Comprehension-adjusted
Mean	39	135.174	128.524	102.258
SD	39	19.088	19.633	26.078

reading fluency (wpm) of the participants. Oral reading fluency, which was measured twice with two passages at about the same reading ease, had no problem in the inter-rater consistency (Spearman-Brown $r = .985$). The mean of its original oral reading speed, which was the number before error words were excluded, was 93.128 (SD = 18.138).

Table 5.7 shows the means of three types of oral reading speeds (wpm), which were measured four times with passages at about the same reading ease. For several participants who took the measurements only three times, the means of the three-time measurements were used.

One noticeable result was that there was not much difference in the means between speed-focused oral reading speed (mean = 135.174, SD = 19.088) and content-focused oral reading speed (mean = 128.524, SD = 19.633), which was supported by the one-way factorial ANOVA [$F(1, 76) = 2.300$, ns]. Another was that the mean of oral reading fluency (mean = 86.103, SD = 18.772) was smaller than those of three types of oral reading speeds [means = 102.258 (SD = 26.078), 128.524 (SD = 19.633) and 135.174 (SD = 19.088)]. According to the one-way factorial ANOVA, there was a significant difference between the four variables [$F(3, 152) = 45.853$, $p < .01$]. The Scheffe's post hoc test revealed significant differences in all the comparisons except between speed-focused and content-focused oral reading speeds (Table 5.8).

Table 5.8: Scheffe's Post Hoc Test between Oral Reading Fluency and Three Types of Oral Reading Speeds

Comparison	Mean difference	critical-value
Speed-focused vs. Content-focused	6.650	13.514
Speed-focused vs. Comprehension-adjusted	32.917**	13.514
Speed-focused vs. Oral reading fluency	49.072**	13.514
Content-focused vs. Comprehension-adjusted	26.267**	13.514
Content-focused vs. Oral reading fluency	42.422**	13.514
Comprehension-adjusted vs. Oral reading fluency	16.155*	13.514

**p < .01, *p < .05. n = 39.

Table 5.9: Correlation Matrix between English Proficiency, Reading Comprehension, Oral Reading Fluency and Three Types of Oral Reading Speeds

	(a)	(b)	(c)	(d)	(e)	(f)
(a) English proficiency	-					
(b) Reading comprehension	.867**	-				
(c) Oral reading fluency	.602**	.482**	-			
(d) Speed-focused	.561**	.456**	.690**	-		
(e) Content-focused	.506**	.375*	.770**	.844**	-	
(f) Comprehension-adjusted	.629**	.479**	.736**	.750**	.821**	-

**p < .01, *p < .05. n = 39.

5.2.3.2 Correlations

Table 5.9 shows the correlations between English proficiency, reading comprehension, oral reading fluency and three types of oral reading speeds of the participants. There were significant correlations between all the variables and several relationships that required our attention.

First, the correlation between oral reading fluency and reading comprehension ($r = .482$, $p < .01$) was not as high as the recognized criterion-related validity of oral reading fluency, i.e., the correlation between the two variables, in L1 ($r_s = .70 - .95$) (Deno, 1985). Second, this correlation was not much higher than the correlations between three types of oral reading

speeds and reading comprehension ($r_s = .375 - .479, p < .05$). Third, the correlations between oral reading fluency and three types of oral reading speeds were high or relatively high ($r_s = .690 - .770, p < .01$). Fourth, the correlations of oral reading fluency and three types of oral reading speeds with English proficiency ($r_s = .506 - .629, p < .01$) were higher than the correlations with reading comprehension ($r_s = .375 - .482, p < .05$). Moreover, there was a very high correlation between oral reading fluency and its original oral reading speed ($r = .995, p < .01$).

5.2.4 Discussion

The first research question inquired about whether there would be any relationship between oral reading fluency and reading comprehension of Japanese senior high school students. The result was that the correlation between oral reading fluency and reading comprehension ($r = .482, p < .01$) was not as high as the criterion-related validity of oral reading fluency, i.e., the correlation between the two variables, recognized in L1 ($r_s = .70 - .95$) (Deno, 1985). It seems that oral reading fluency cannot be a valid measure of reading comprehension of Japanese senior high school students but can approximately indicate their reading comprehension. Moreover, since the correlation is comparable to the correlation between oral reading ability and reading in Study 1 ($r = .488, p < .01$), oral reading fluency may be used more practically than oral reading ability in judging learners' reading comprehension approximately.

With regard to why the correlation between oral reading fluency and reading comprehension was just moderate, there are two main reasons. One reason concerned the participants' word recognition processing. Although their phonological coding of words were not fully automatized, the participants cannot have had difficulty in decoding the oral reading passages at about Flesch-Kincaid Grade Level 5, where many of the words were their

sight words. Consequently, the efficiency of their phonological coding in reading unfamiliar words and pseudo-words aloud may not have been reflected in their oral reading fluency.

The other reason concerned the participants' comprehension processing. Since oral reading is a cognitive activity that usually involves understanding of a passage for L1 learners, oral reading without understanding, i.e., what is called parrot reading, does not often take place except for learners with disabilities. In other words, L1 learners are likely to reflect their understanding of a text as well as their decoding in their oral reading. Contrastively, Japanese learners do not reflect their understanding of a text in their oral reading as much as L1 learners because many learners with poor reading fluency cannot comprehend a text at their oral reading rates.

Limitations in the examination of the relationship between oral reading fluency and reading comprehension include that effects of variables such as passage difficulty and oral reading speed on oral reading fluency were not investigated into. Also, the measurement of oral reading fluency more than two times would have been more preferable from the viewpoint of reliability.

The second research question inquired about whether there would be any relationship between oral reading speed and reading comprehension of Japanese senior high school students. The results were: (a) there were significant correlations between three types of oral reading speeds and reading comprehension ($r_s = .375 - .479$, $p < .05$), which were almost as high as the correlation between oral reading fluency and reading comprehension ($r = .482$, $p < .01$); (b) there was a high correlation between oral reading fluency and its original oral reading speed ($r = .995$, $p < .01$); and (c) there were high or relatively high correlations between oral reading fluency and three types of oral reading speeds ($r_s = .690 - .770$, $p < .01$).

Result (a) confirmed a moderate relationship between oral reading speed and reading comprehension, which was implied but was not supported in Study 1. It also revealed that

the criterion-related validity of oral reading speed, i.e. the correlation between oral reading speed and reading comprehension, was almost as high as the validity of oral reading fluency. This was supported by results (b) and (c) showing that there was a strong or relatively strong relationship between oral reading fluency and oral reading speed. Therefore, it seems that oral reading speed as well as oral reading fluency cannot be a valid measure of reading comprehension of Japanese senior high school students but can approximately indicate their reading comprehension. Then, oral reading speed seems to be a more practical measure than oral reading fluency and oral reading ability, with a similar level of precision, for judging learners' reading comprehension approximately.

Other noticeable results concerning three types of oral reading speeds, i.e., speed-focused, content-focused and comprehension-adjusted oral reading speeds, were: (a) the correlations of oral reading fluency were higher with content-focused ($r = .770, p < .01$) and comprehension-adjusted ($r = .736, p < .01$) oral reading speeds than with speed-focused oral reading speed ($r = .690, p < .01$); and (b) the correlations of reading comprehension were higher with speed-focused ($r = .456, p < .01$) and comprehension-adjusted ($r = .479, p < .01$) oral reading speeds than with content-focused oral reading speed ($r = .375, p < .05$), and they were close to the correlation with oral reading fluency ($r = .482, p < .01$). In short, it was the comprehension-adjusted oral reading speed that had higher correlations both with oral reading fluency and reading comprehension.

The following explanation can be provided for this superiority of comprehension-adjusted oral reading. This experiment adopted three types of oral reading speeds, assuming that speed-focused oral reading speed and content-focused and comprehension-adjusted oral reading speeds would reflect the participants' decoding processing and comprehension processing respectively. Actually, however, there was no significant difference in the means between speed-focused (mean = 135.174 wpm) and

content-focused (mean = 128.524 wpm) oral reading speeds, because many of the participants, who were highly conscious of being tested, tried to read the passages aloud quickly even in the measurements of content-focused oral reading speed, under the time-measuring conditions. Consequently, comprehension-adjusted oral reading speed was not content-focused but speed-focused oral reading speed that was multiplied by the correct rate in the comprehension questions. Hence, comprehension-adjusted oral reading speed, which reflected both the decoding and comprehension processings comparatively well, had higher correlations with oral reading fluency and reading comprehension.

In conclusion, we may be able to use the following oral reading speeds more practically than oral reading fluency and oral reading ability as approximate indices of reading comprehension: speed-focused oral reading speed for the decoding component of reading comprehension and comprehension-adjusted oral reading speed for overall reading comprehension.

5.2.5 Study Summary

A primary finding of the present study was that oral reading fluency and oral reading speed had similar significant correlations with reading comprehension of Japanese senior high school students. This finding confirmed the relationship that Study 1 implied between oral reading speed and reading comprehension.

It was also shown that oral reading speed and oral reading fluency could similarly be approximate indicators of reading comprehension of Japanese senior high school students, but oral reading speed, especially comprehension-adjusted oral reading speed, would be a more practical measure than oral reading fluency and oral reading ability.

5.3 Summary

Study 1 confirmed a significant relationship between oral reading ability and reading proficiency of Japanese senior high school students, and fulfilled a minimum precondition for our goal, which was to improve reading comprehension and overall reading proficiency of Japanese learners through oral reading practice. It also showed that oral reading ability had significant relationships with oral reading speed as well as with English proficiency, grammar and listening, and implied that oral reading speed might have a significant relationship with reading comprehension.

Study 2 confirmed that reading comprehension had significant relationships not only with oral reading speed but also oral reading fluency for Japanese senior high school students. It also showed that the correlations of reading comprehension with oral reading speed, oral reading fluency and oral reading ability were similar in size, and that oral reading speed might be an approximate index of reading comprehension for Japanese senior high school students, with more practicality than oral reading fluency and oral reading ability and with similar measuring precision to them.

These findings imply that reading comprehension and overall reading proficiency of Japanese senior high school students may improve as their oral reading speed, oral reading fluency and oral reading ability improve. When this implication is integrated with the assumptions concerning functions of oral reading, it is hypothesized that oral reading practice improves reading comprehension and overall reading proficiency of Japanese learners by helping them: (a) to establish the connection between letters and sounds; (b) to expand vocabulary; (c) to acquire grammar through consciousness raising; and (d) to improve the efficiency of working memory.

It is natural that this hypothesis should be empirically examined. It should be investigated into how oral reading practice performs the assumed functions (a), (b), (c) and

(d), and how it affects reading comprehension, reading fluency and their relevant factors and abilities, for Japanese learners. Since studies began to be conducted concerning these questions, the following chapters present the empirical examinations.

Chapter 6

Effects of Oral Reading Practice on English Language Ability

In the last chapter it was confirmed that oral reading ability, oral reading fluency and oral reading speed had significant correlations with reading comprehension and reading proficiency for Japanese senior high school students. Consequently, a minimum precondition was fulfilled concerning our goal, which was to improve their reading comprehension and overall reading proficiency through oral reading practice.

This meant the completion of a series of our examinations on preconditions for the assumptions about oral reading and our goal. It has been confirmed by now that reading comprehension and reading proficiency have significant relationships with letter-sound connection, vocabulary, grammar, working memory, oral reading ability, oral reading fluency and oral reading speed for Japanese senior high school students. These relationships suggest that reading comprehension and overall reading proficiency of Japanese senior high school students should improve as the related variables improve. Therefore, it is hypothesized that oral reading practice improves reading comprehension and overall reading proficiency of Japanese senior high school students by helping them: (a) to establish the connection between letters and sounds; (b) to expand vocabulary; (c) to acquire grammar through consciousness raising; and (d) to improve the efficiency of working memory.

Effects of oral reading practice on the hypothesized and relevant variables should be empirically validated. So far a limited number of studies have been conducted concerning the effects on English language ability, reading and writing skills and their relevant factors (Kido, 1993; Komatsu, 2000; Miyasako, 2002 & 2005; Shinzawa, 2005; Suzuki, 1998; Watanabe, 1990).

The present chapter first provides a critical review of studies conducted by other researchers. Next, it reports our study that investigated into the effect of oral reading practice on English language ability of Japanese senior high school students, which is relevant to studies that examine the effect of oral reading practice on their reading comprehension and overall reading proficiency.

6.1 Review

This section critically reviews five studies that investigated into the effects of oral reading practice on English language ability and its relevant variables (Kido, 1993; Komatsu, 2000; Shinzawa, 2005; Suzuki, 1998; Watanabe, 1990) so that more empirical studies concerning the effects of oral reading practice may be conducted appropriately. Kido (1993) conducted a one-month study with pre- and post-test between-groups quasi-experimental design and examined the effect of oral reading practice and recitation on English writing ability of senior high school students. The experimental group ($n = 47$) read aloud model sentences that included grammatical or phrasal chunks in class and read them aloud until they could recite the sentences out of class. The control group ($n = 46$) received regular writing instruction. The participants' writing ability was measured with formal tests of the school such as mid-term and final tests. The result was that the experimental group had significantly higher means in the tests than the control group.

It seems that the treatment was effective in improving writing ability of Japanese senior high school students. Although it is not clear which was the main contribution to the result, oral reading practice or recitation, this finding implies that the combination of oral reading practice and recitation may improve their vocabulary and grammar. However, the finding and implication requires caution for the following reasons. First, writing ability was not defined. Second, amounts of the treatments were not equivalent between the experimental

and control groups. The experimental group performed oral reading practice and recitation out of class, whereas there was no mention of tasks for the control group out of class. Third, reliabilities and validities were not referred to concerning the measurements that the researcher devised.

Komatsu (2000) examined, in a one-shot study with between-groups quasi-experimental design, how the oral reading technique Read and Look-up affected the learning of target sentences, which included targeted structures of the lesson, for third-year junior high school students. The participants ($n = 48$) had about 10-minute oral reading practice of a 40-word dialog, where the dialog was read aloud over 10 times, after understanding its content. In the following 10-minute stage, the experimental group ($n = 23$) performed Read and Look-up and the control group ($n = 25$) performed silent reading and the role play. After the treatments, the participants' learning of the target sentences was measured by the degree to which they could say aloud the sentences correctly, given Japanese translation. The results were: (a) there was no significant difference in the mean learning of shorter sentences between the two groups; but (b) the experimental group learned longer sentences significantly more than the control group.

It seems that Read and Look-up was effective in the learning of longer sentences for junior high school students. This finding implies that Read and Look-up may be effective in their learning of grammatical and phrasal chunks. The finding should be confirmed by replication, and the longer-term effect of Read and Look-up and the effect of practicing Read and Look-up for a certain period should also be examined so that the effectiveness of this oral reading technique may be endorsed.

Watanabe (1990) conducted a four-week study with pre- and post-test between-groups quasi-experimental design and examined the effect of oral reading practice aimed at understanding texts according to word order on listening comprehension and reading

proficiency for second-year senior high school students. The experimental group ($n = 44$) had 35-minute regular teaching and 15-minute oral reading practice of the text with the frequency of 12 times, and the control group ($n = 45$) had 50-minute regular teaching. Oral reading practice for the experimental group consisted of two types: one type for having the participants learn segmental and super-segmental characteristics of English phonology and the other for improving their decoding skills. The results were: (a) there was no significant difference in the means of listening and reading comprehension between the two groups; and (b) the experimental group improved silent and oral reading speeds significantly more than the control group.

Watanabe concluded that oral reading practice aimed at understanding texts according to word order was effective in the improvement of the participants' reading fluency and proficiency because they improved silent and oral reading speeds without reading comprehension declining. This conclusion is justifiable because reading fluency, which Japanese learners of English are likely to lack, is a vital part of reading proficiency and the improvement of reading fluency may lead to that of reading comprehension. One limitation of this study lay in the measurements of listening and reading comprehension. Their reliabilities were not mentioned and a ceiling effect was seen in the data of the reading comprehension test.

Suzuki (1998) reported two studies with pre- and post-test between-groups quasi-experimental design that investigated into the effects of long-term oral reading practice on listening comprehension, reading fluency and English language ability for Japanese senior high school students. In one 10-month study, the first-year participants ($n = 64$) received the following oral reading practices in addition to the regular teaching. The experimental group ($n = 33$) had parallel reading, where the students read texts aloud simultaneously with the tape, with and without pauses as well as chorus reading, and the control group ($n = 31$) had only

chorus reading. Consequently, the experimental and control groups read the texts aloud 7 and 3 times respectively during the oral reading practices. The result was that the experimental group improved listening comprehension and reading fluency as measured by Reading Efficiency Index, which was wpm multiplied by the correct rate of comprehension questions, significantly more than the control group. In the other 2-year study, the second- and third-year experimental (n = 30) and control (n = 41) groups respectively received the same treatments as in the last study. The result was that the experimental group improved English language ability, as measured by nationwide sham tests for college entrance examinations and the self-marked scores of Standardized Preliminary Examinations for University (so-called Center Test), significantly more than the control group.

It seems that a long-term practice of parallel reading with and without pauses is effective in improving listening comprehension, reading fluency and English language ability for Japanese senior high school students. One merit of parallel oral reading is to increase the frequency of oral reading practice because one reads texts aloud concurrently with the model. The other may be to enhance the learning of phonology in the phonological loop of working memory by increasing the frequency of listening to authentic English. One limitation of these studies lay in that there was no reference to reliabilities of the measurements of listening comprehension, reading fluency and English language ability.

Shinzawa (2005) examined, in a study with between-groups quasi-experimental design, whether oral reading practice would improve English language ability of junior high school students. The experimental second-year group (n = 38) practiced oral reading for 10 to 15 minutes, using 30- to 71-word dialogs in the coursebook, in class for three and half months during the period from April to September, i.e., in the first term and the first half of September with a summer break intermission. The students were also required to practice oral reading of each dialog until they could recite it at home during the experiment. The other six control

groups received regular English teaching. The participants' English language ability was measured with two mid-term examinations and one final examination at the school. The result showed no significant mean differences in the three tests between the experimental and control groups.

However, Shinzawa concluded that this result did not necessarily deny the effect of oral reading practice on the improvement of English language ability, admitting that the treatment was not motivational enough to let the participants maintain a high frequency of oral reading practice. Then, another experiment should be conducted revising the following weaknesses. First, amounts of the treatments were not equivalent between the experimental and control groups. The control group should be given assignments that require the same length of time as the experimental group. Second, reliabilities and validities of the measurements were ignored. Valid measures should be adopted and their reliabilities should be shown.

Findings of the five studies, concerning the effects of oral reading practice, can be summarized as: (a) the effects on reading fluency, writing ability and English language ability of Japanese senior high school students were positive, which implied the positive effects on their reading comprehension and proficiency; (b) the effect on their listening comprehension was mixed; and (c) the effect of Read and Look-up on the learning of longer sentences for Japanese junior high school students was positive, whereas the effect of oral reading practice on their English language ability was negative. However, caution should be exercised in accepting these findings as they are, because of the following problems.

Problems in the experiments were seen mainly in the dependent variables, treatments and measurements. First, dependent variables were not always defined. Most of the undefined variables were understandable from the description of the measurements but they should have been given clear definitions. Second, the treatments were not equivalent in the amounts between the experimental and control groups in two studies. In these studies, the

experimental groups were assigned oral reading practice out of class, while there was no description of assignments out of class for the control groups. The experimental and control groups should have been given the same amounts of treatments to avoid contamination of the results. Third, no reference was made to reliabilities and validities of the measurements in any of the experiments. This problem was serious because most measurements of the dependent variables were devised by researchers. Researcher-devised measurements are likely to be judged unreliable when their reliabilities are not described. With regard to validity, when dependent variables were not rigidly defined, naturally validities of the measurements were not paid much attention to. These three weaknesses in the studies should be overcome in future research. Otherwise they may pose fatal problems on research findings.

6.2 Study

The review in the previous section showed, as far as Japanese senior high school students were concerned, that oral reading practice was effective in the improvement of their writing ability, reading fluency and English language ability. However, it is difficult to prove, with the scanty evidence, the effectiveness of oral reading practice in the improvement of the abilities of Japanese senior high school students, especially when the evidence comes from studies with methodological problems. It is necessary to confirm the findings in further studies with appropriate designs and methodologies. Moreover, the reviewed studies could not reveal but just suggested the positive effect of oral reading practice on reading comprehension and overall reading proficiency, based on the positive effects on reading fluency and English language ability. Hence, although the review may have been encouraging in revealing that positive findings began to be reported concerning the effects of oral reading practice, it also confirmed that empiricism in this field is just at a fledgling stage.

It is necessary to accelerate the growth of empiricism in the field in order to validate the oral reading hypothesis: oral reading practice improves reading comprehension and overall reading proficiency of Japanese senior high school students by helping them: (a) to establish the connection between letters and sounds; (b) to expand vocabulary; (c) to acquire grammar through consciousness raising; and (d) to improve the efficiency of working memory. We should conduct not only studies that examine the legitimacy of the hypothesis directly but also studies that have relevance to the hypothesis, which might be able to give us insights into our endeavors toward its validation.

One such study was one of the three studies in Miyasako (2002) that investigated into the effect of oral reading practice on the improvement of English language ability for Japanese senior high school students. The three-month study, with pre- and post-test between-groups quasi-experimental design, examined the effect of 15- to 20-minute oral reading practice in 65-minute classes on their English language ability. The experimental group (n = 36) had 40- to 45-minute teaching of English I, into which regular 65-minute teaching was condensed, and 15- to 20-minute oral reading practice 3 times a week, using the coursebook material that the participants had already studied before the experiment. The control group (n = 37), which was matched with the experimental group in English language ability, had regular teaching of English I for 65 minutes at the same frequency. The results were: (a) the experimental group improved their oral reading speed and oral reading ability significantly more than the control group; and (b) the experimental and control groups significantly improved their English language ability, whereas there was no significant difference in English language ability between the two groups.

The results can be valued as the effectiveness of oral reading practice. This is because the participants improved their oral reading speed and ability, which implied the improvement of their reading fluency and proficiency, without their English language ability declining in

comparison to the control group.

However, result (b) can be interpreted twofold. One interpretation is that oral reading practice was not effective in the improvement of English language ability because some factors that were common in the two groups seem to have been responsible for the similar significant improvement of English language ability. The other is that oral reading practice was effective in the improvement of English language ability because factors that were responsible for the similar improvement may have been different for the two groups and the factor for the experimental group may have been oral reading practice. The first interpretation may appear theoretically more valid for the comparative study but there are reasons that allow us to support the second interpretation.

First, the experimental group learned new materials in about one-third less time than the control group during the experiment. One reason for this was that the experimental group performed oral reading with the coursebook material that they had already studied before the experiment. The other was that the experimental group had to be taught new materials in about two-thirds of the class time so that they could spend the rest of class time performing oral reading. Second, the improvement of the control group may have been caused by the highly-demanding teacher for this group who gave more tests and assignments to the group than to the experimental group taught by another teacher, because of peer pressure irrelevant to this experiment. In short, these disadvantages of the experimental group may have been compensated by oral reading practice.

Since it is probable that the poor methodology and administration of the study were responsible for result (b), there is a possibility left that oral reading practice improved English language ability of the experimental group. Then, it is worth reexamining the possibility by investigating into who would have benefited from oral reading practice. The logic behind this is that if oral reading practice ever improved English language ability of the experimental

group, there should have been beneficiaries.

Thus, Miyasako (2005) investigated into possible beneficiaries of oral reading practice in the experimental group, exploring the effects of English language ability, oral reading ability and the amount of oral reading practice on the improvement of English language ability for the experimental group. This study reports and discusses the investigation.

6.2.1 Purposes

The purposes of this study that reexamined the experimental group in Miyasako's study (2002) were to investigate into: (a) whether oral reading practice improved English language ability of the Japanese senior high school students; and (b) what characteristics students who might have improved English language ability had concerning English language ability, oral reading ability and the amount of oral reading practice.

In order to accomplish the purposes research questions were addressed as: (1) who improved English language ability more, senior high school students with higher or lower English language ability?; (2) who improved English language ability more, senior high school students with higher or lower oral reading ability?; and (3) who improved English language ability more, senior high school students with a higher or lower amount of oral reading practice?

6.2.2 Method

This section first reviews the participants of the experimental group, instruments and oral reading practice in Miyasako (2002), and next shows the analyses made in the reexamination.

6.2.2.1 Participants

The participants of the experimental group in the three-month study (Miyasako, 2002) were 36 first-year students who had sporadically practiced oral reading in class at a senior high school in Okayama in the school year 2001. Our judgment of their English proficiency was in the range of elementary to pre-intermediate levels after their studying English as a foreign language for over three years.

6.2.2.2 Instruments

Oral reading ability, English language ability and the amount of oral reading practice of the participants were measured with the following instruments. Oral reading ability was evaluated, in the pre- and post-tests, with the same analytical measurement that was used in Study 1 of the previous chapter. Specifics of the tests were: (a) the oral reading materials were passages used in the past STEP pre-second grade examinations; (b) the evaluators were two Japanese EFL teachers with over 15 years teaching experience (Spearman-Brown consistency coefficients were .908 and .824 for the pre- and post-tests respectively); (c) the evaluating criteria were pronunciation, intonation, pause making and delivery, its full marks being 20 with 5 points for each component (Appendix G).

English language ability was gauged with standardized T-scores of Benesse Shinken Moshi. Two editions of the test were administered in October and January for the pre- and post-tests respectively. This nationwide test is arguably a valid measure of English language ability for senior high school students. For example, T-scores of the non-mark type Shinken Moshi in October, 2002 for mainly third year students had a significant correlation with their self-marked scores of Standardized Preliminary Examinations for University (so-called Center Test) in 2003, a supposedly valid measure of English language ability for university applicants ($r = .726$, $p < .01$, $n = 275$). Thus, Shinken Moshi is supposed to have functioned

as an acceptably valid measure of English language ability for the participants.

The amount of oral reading practice was measured based on the frequency of oral reading practice logged in the participants' oral reading journals, which were recorded from the onset to the end of winter vacation for about two and a half months. The amount was counted as the frequency with which the participants read aloud 150- to 200-word texts in the stages (d), (e) and (g) shown in section 6.2.2.3 below, whether in class or out of class.

6.2.2.3 Treatment

Oral reading was practiced for 15 to 20 minutes in the 65-minute course of English I three times a week for three months, which made the total amount of practice in class about 450 minutes. The reading material consisted of the first five lessons of the coursebook, *Spectrum English Course I* (Kirihara Shoten, 1998), which the students had already studied. The material was divided into twelve sections of 150- to 200-word texts, each of which was allotted a day, with twelve days making a cycle. Oral reading out of class was practiced on a voluntary basis.

The basic procedure in class was devised based on Kunihiro (1999 & 2000) as follows: (a) listen to the tape once without looking at the text; (b) listen to the tape once looking at the text; (c) read the text silently once checking comprehension with the translation; (d) read aloud each sentence of the text after the tape, i.e., paced reading, at least once; (e) read the text aloud simultaneously with the tape, i.e., parallel reading, at least once; (f) optionally try shadowing; and (g) read the text aloud at least twice.

In stages (d), (e) and (g) the participants individually read the text aloud as frequently as possible in the periods. Stages (a) to (c) were omitted after one month, and instead the time allotted for stages (d) and (e) was increased. In the middle of the third month, the students preferred new material to read aloud, and that was fulfilled by using some other lessons of the

coursebook. This procedure was adopted because it was compatible with our assumption about oral reading practice concerning the enhancement of phonological coding, which might consequently lead to other assumed functions, i.e., the development of grammar and vocabulary.

6.2.2.4 Analysis

The analyses were administered in the following manner. First, the participants were divided into upper, intermediate and lower groups based on their oral reading ability and English language ability as measured in the pre-tests and on their amount of oral reading practice as measured by the frequency recorded in their oral reading journals. The participants above 55 and below 45 as measured by T-scores of the pre-tests were respectively assigned to groups of upper and lower English language ability and oral reading ability. Similarly the participants with T-scores above 55 and below 44 in the oral reading frequency were respectively assigned to groups of upper and lower amount of oral reading practice.

One reason for adopting T-scores 55 and 45 as the criterion for grouping the participants was that the normal distribution, which Shinken Moshi had with about 400,000 examinees, should provide 31% of the population for the score above 55 and below 45 respectively. Another was that the findings of this study might be applicable to other senior high school students all over Japan with the same ranges of English language ability.

The reason for adopting T-score 44 instead of T-score 45 for the group of lower amount of oral reading practice was to make the data balanced. In the case of the lower group having the participants with their T-scores below 45, the numbers were 7 and 15 for the groups of upper and lower amount of oral reading practice respectively. In the adopted case of the lower group having those with their T-scores below 44, the numbers were 7 and 8 for the groups of upper and lower amount of oral reading practice respectively, which was

balanced.

Second, independent two-way repeated-measures ANOVAs were performed between the groups of upper and lower English language ability, oral reading ability and amount of oral reading practice. The analyses were performed to examine who improved English language ability during the experiment, students with higher or lower English language ability, oral reading ability and amount of oral reading practice.

6.2.3 Results

6.2.3.1 Descriptive Statistics

Table 6.1 shows the means of English language ability and oral reading ability for the participants in the pre-tests and the amount of oral reading practice for them in the oral

Table 6.1: Means of English Language Ability and Oral Reading Ability in Pre-Tests and Amount of Oral Reading Practice in Journal Record

Group	n	Score		T-score	
		Mean	SD	Mean	SD
English language ability*					
Upper	8			57.725	2.745
Lower	14			42.121	2.940
Whole	36			48.847	6.680
Oral reading ability**					
Upper	12	14.125	.711	59.100	3.700
Lower	8	9.125	1.382	32.763	7.275
Whole	36	12.014	2.009	48.000	10.600
Amount of oral reading practice					
Upper	7	291.714	100.023	67.008	12.742
Lower	8	100.875	2.475	42.697	.315
Whole	36	159.750	80.887	50.197	10.304

*English language ability as measured by T-scores was adopted. **T-scores of oral reading ability were calculated with the experimental and control groups (n = 73) in Miyasako (2002).

Table 6.2: Means of English Language Ability in Groups of Upper and Lower English Language Ability

Group	Test	n	Mean	SD
Upper	pre	8	57.725	2.745
	post	8	59.262	4.055
Lower	pre	14	42.121	2.940
	post	14	47.071	3.866

Table 6.3: Means of English Language Ability in Groups of Upper and Lower Oral Reading Ability

Group	Test	n	Mean	SD
Upper	pre	12	54.008	4.197
	post	12	53.808	6.313
Lower	pre	8	42.575	5.896
	post	8	48.237	5.535

reading journals. Noticeably, the SDs of the mean scores and T-scores for the group of lower amount of oral reading practice were distinctively small (score mean = 100.875, SD = 2.475; T-score mean = 42.697, SD = .315), compared with the values for the upper group (score mean = 291.714, SD = 100.023; T-score mean = 67.008, SD = 12.742). This is because most of the lower group students did not practice oral reading out of class, which made their mean amount of oral reading practice about 100, the base line.

6.2.3.2 English Language Ability

Table 6.2 shows the means of English language ability for the groups of upper and lower English language ability. The lower group (pre = 42.121, post = 47.071) gained more points than the upper group (pre = 57.725, post = 59.262) in the means of English language ability during the experiment. According to the 2 (English language ability) x 2 (period) repeated-measures ANOVA, there were significant main effects of English language ability [$F(1, 20) = 114.340, p < .01$] and period [$F(1, 20) = 16.412, p < .01$]. The interaction

between the two variables was also significant [$F(1, 20) = 4.541, p < .05$]. It seems that the group of lower English language ability improved their English language ability significantly more than the group of upper English language ability during the experiment.

6.2.3.3 Oral Reading Ability

Table 6.3 shows the means of English language ability for the groups of upper and lower oral reading ability. The upper group decreased in the means during the experiment (pre = 54.008, post = 53.808), but the lower group gained more than five points (pre = 42.575, post = 48.237). The 2 (oral reading ability) x 2 (period) repeated-measures ANOVA revealed significant main effects of oral reading ability [$F(1, 18) = 12.980, p < .01$] and period [$F(1, 18) = 10.088, p < .01$]. There was also a significant interaction between the variables [$F(1, 18) = 11.620, p < .01$]. It seemed that the group of lower oral reading ability improved their English language ability significantly more than the group of upper oral reading ability during the experiment.

6.2.3.4 Amount of Oral Reading Practice

Table 6.4 shows the means of English language ability for the groups of upper and lower amount of oral reading practice. The upper group (pre = 49.757, post = 55.429) increased in the means more than the lower group (pre = 46.775, post = 47.800) during the experiment. The 2 (the amount of oral reading practice) x 2 (period) repeated-measures ANOVA showed significance in the main effect of period [$F(1, 13) = 11.904, p < .01$] but no significance in the main effect of the amount of oral reading practice [$F(1, 13) = 2.809, ns$]. However, there was a significant interaction between the variables [$F(1, 13) = 5.731, p < .05$]. It seemed that the group of upper amount of oral reading practice improved their English language ability significantly more than the group of lower amount of oral reading practice.

Table 6.4: Means of English Language Ability in Groups of Upper and Lower Amount of Oral Reading Practice

Group	Test	n	Mean	SD
Upper	pre	7	49.757	8.415
	post	7	55.429	6.544
Lower	pre	8	46.775	5.095
	post	8	47.800	5.352

Table 6.5: Correlation Matrix between Variables

	(a)	(b)	(c)	(d)
(a) English language ability	-			
(b) Oral reading ability	.621**	-		
(c) Amount of oral reading practice	.093	-.261	-	
(d) Improvement of English language ability	-.451**	-.374*	.376*	-

**p < .01, *p < .05. n = 36.

6.2.3.5 Relationships between Variables

Pearson product-moment correlation coefficients were calculated for the whole group (Table 6.5) so that the relationships might be examined between the participants' English language ability, oral reading ability, amount of oral reading practice and improvement of English language ability. Here, the participants' improvement of English language ability was computed by subtracting their pre-test scores from their post-test scores (mean = 2.067, SD = 4.631, n = 36). The result was that the improvement of English language ability had significant negative correlations with English language ability ($r = -.451$, $p < .01$) and oral reading ability ($r = -.374$, $p < .05$), but a significant positive correlation with the amount of oral reading practice ($r = .376$, $p < .05$).

This result was confirmed by the stepwise regression analysis, showing that English language ability ($\beta = -.340$, $t = -3.556$, $p < .01$) and the amount of oral reading practice ($\beta = .024$, $t = 3.059$, $p < .01$) were significant predictors of the improvement of English language

Table 6.6: Regression Analysis on Improvement of English Language Ability

	β	t-value	R^2
English language ability	-.340	- 3.556**	.203
Amount of oral reading practice	.024	3.059**	.141

$$Y = 14.800 - .340 X_1 + .024 X_2; R^2 = .379; F(2, 33) = 10.076**, n = 36. \quad **p < .01.$$

ability. English language ability and the amount of oral reading practice uniquely explained 20.3% and 14.1% of the variance of the improvement of English language ability respectively (Table 6.6). The reason that oral reading ability, significantly correlated with the improvement of English language ability ($r = -.374, p < .05$), was not a significant predictor of the improvement of English language ability is considered to have lain in its multicollineality with English language ability ($r = .621, p < .01$). It seems that students with lower English language ability and with a higher amount of oral reading practice improved their English language ability during the experiment.

6.2.4 Discussion

The first, second and third research questions were: (1) who improved English language ability more, senior high school students with higher or lower English language ability?; (2) who improved English language ability more, students with higher or lower oral reading ability?; and (3) who improved English language ability more, students with a higher or lower amount of oral reading practice?

The results were: (a) students with lower English language ability improved their English language ability significantly more than students with higher English language ability; (b) students with lower oral reading ability improved their English language ability significantly more than students with higher oral reading ability; (c) students with a higher amount of oral reading practice improved their English language ability significantly more than students with a lower amount of oral reading practice; and (d) English language ability

and the amount of oral reading practice could uniquely predict the improvement of English language ability for the students (20.3% and 14.1% respectively). In short, the oral reading practice may have been effective for students with lower English language ability, with lower oral reading ability and with a higher amount of oral reading practice in improving their English language ability, and especially so for students with lower English ability and a higher amount of oral reading practice.

These findings can be accounted for by the assumed functions of oral reading: (a) to expand vocabulary through exposure to English; (b) to enhance grammar learning through consciousness raising; and (c) to improve the efficiency of phonological coding. First, students with lower English language ability must have expanded their vocabulary by reading the same passages aloud 8 to 24 times, which is more than a necessary amount of encounter for acquiring new lexical items, 5 to 16 times (Nation, 1990). According to Table 1, the mean amounts of oral reading practice in the groups of lower and upper amount of oral reading practice were 100.875 and 291.714 respectively. Since the oral reading material was composed of 12 sections, the mean amounts in reading aloud the whole passages for the lower and upper groups were 8.406 and 24.310 respectively. On the other hand, students with higher English language ability probably found far smaller numbers of unfamiliar lexical items in the material which had been covered in class before.

Second, students with lower English language ability may have also developed their grammar more than students with higher English language ability. While reading the same passages aloud repeatedly, the lower English language ability students may have noticed more gaps in grammatical constructions with their interlanguages and may have restructured them. In other words, the lower English language ability students may have had more to acquire about grammar from the same materials than the higher English language ability students.

Third, students with lower oral reading ability, who probably had not acquired a good

letter-sound association before the experiment, must have improved the efficiencies of their phonological processing of words. Consequently, the improved decoding may have enabled the students to spare their working memory capacities for higher level reading processings such as syntactic parsing, proposition formation and comprehension. In this case, the spared cognitive resources for the higher level processings may have contributed to the improvement of their English language ability. Meanwhile, students with higher oral reading ability may have had less to attain in the decoding of written words.

Moreover, the improvement of English language ability for students with a higher amount of oral reading practice may be taken for granted. It is natural that when students try to learn something, those who spend more time and energy on it should achieve better results.

So far, it has been shown that the findings can be explained mainly by the assumed functions of oral reading. Thus, it is now deduced, complying with Suzuki (1998), that the experimental group could improve their English language ability mainly through oral reading practice.

The findings provided us with the following implications concerning EFL pedagogy in Japan. First, we should appreciate the effectiveness of oral reading practice in developing English language ability for many junior and senior high school students. The reason for this lies in the fact that most of the lower English language ability students in this study supposedly belonged to the upper half of the whole first-year senior high school population nationwide, although the lower English language ability students were first-year senior high school students with English language ability below 45 as measured by the T-score of Benesse Shinken Moshi, which was developed mainly for academic senior high schools. Thus, the effectiveness of oral reading practice for the lower English language ability students should apply to other junior and senior high school students with similar or lower English language ability.

Second, we should assign oral reading a more central and systematic role in our daily instruction of English. Since oral reading has often been neglected or given only a minor role in class, it may be caught in the unfortunate situation where its sporadic practice in class results in its ineffectiveness and teachers' negative perception of it. It should not be disregarded that the improvement of English language ability for the lower level students was achieved in the three-month experiment.

Limitations of the study should be mentioned as well. First, the small sample size may have produced Type I errors in the analyses, i.e., errors mistakenly revealing that a difference is significant. Although significance at the level of .05 was adopted in this study, most of the possible Type I errors would have been evaded by the adoption of .01 level. However, this more stringent significance-level would have shown significant differences only in the improvement of English language ability between students with higher and lower oral reading ability. Thus, we may have to be cautious in accepting the findings of this study as they are.

Second, there were conditions unequal to some groups of students. Although the same oral reading material was used for all the participants, this treatment seems to have given students with lower English language ability and with lower oral reading ability advantages in the development of vocabulary and grammar. These students had more to learn about these components in the material than their counterparts. Also, students with a higher amount of oral reading practice clearly spent more time reading aloud out of class than students with a lower amount of oral reading practice.

These shortcomings do not invalidate all the findings of this study, but we should confirm the findings in better-designed studies, revising them: (a) by adopting a larger sample that can avoid Type I errors in the analyses; (b) by devising oral reading materials that can minimize inequality among the participants in the learning of vocabulary and grammar; and (c) by controlling the amount of oral reading practice. Moreover, future research on the

improvement of English language ability through oral reading practice should include investigating into probable beneficiaries of oral reading practice, appropriate oral reading materials and ways of motivating students to practice oral reading, reflecting learners' individual differences.

6.2.5 Study Summary

A primary finding of this study was that oral reading practice seemed effective for Japanese senior high school students with lower English language ability, with lower oral reading ability and with a higher amount of oral reading practice in improving their English language ability, and especially so for students with lower English ability and a higher amount of oral reading practice. An implication of the finding was that we should utilize oral reading practice in developing English language ability for many junior and senior high school students with lower English language ability.

6.3 Summary

The critical review revealed that positive effects of oral reading practice began to be reported concerning reading fluency, writing ability and English language ability of Japanese senior high school students. However, the positive effects on reading comprehension and overall reading proficiency were not empirically revealed but merely implied for Japanese junior and senior high school students. Also indicated were problems that the reviewed studies had mainly in the dependent variables, treatments and measurements.

The study showed that oral reading practice could help to improve English language ability of Japanese senior high school students with lower English language ability, with lower oral reading ability and with a higher amount of oral reading practice. This was especially the case with students with lower English ability and a higher amount of oral

reading practice. Consequently, it was suggested that we should utilize oral reading practice in developing English language ability for many junior and senior high school students with lower English language ability.

Another implication of the finding is that oral reading practice should also help to improve reading comprehension of Japanese senior high school students, especially so for students with lower English language ability. This is because reading comprehension is an essential component of English language ability. Then, we can interpret the finding, concerning the effectiveness of oral reading practice in the improvement of English language ability of senior high school students, as indirectly validating the oral reading hypothesis: oral reading practice improves reading comprehension and overall reading proficiency of Japanese senior high school students.

Now that the oral reading hypothesis is indirectly endorsed, a next step that we should take is to directly verify the effectiveness of oral reading practice in the improvement of reading comprehension and overall reading proficiency of Japanese senior high school students. Studies that pursued this are reported in the next chapter.

Chapter 7

Effects of Oral Reading Practice on Reading Comprehension

In the last chapter it was shown that oral reading practice could help to improve English language ability of Japanese senior high school students mainly with low English language ability. This finding implied that oral reading practice should also help to improve reading comprehension, which is an essential component of English language ability, of Japanese senior high school students with low English language ability. Therefore, this implication indirectly supported the oral reading hypothesis: oral reading practice improves reading comprehension and overall reading proficiency of Japanese senior high school students.

Given an indirect support, we should proceed to examine the hypothesis directly. The present chapter reports two studies that mainly investigated into the effects of oral reading practice on the improvement of reading fluency and comprehension for Japanese senior high school students.

7.1 Study 1

The study in the previous chapter was a reexamination conducted on the experimental group of a comparative study (Miyasako, 2002) because of its administrative and methodological problems. In other words, the experimental group was reexamined in pre- and post-test within-group design. The result was that the experimental group improved English language ability mainly through oral reading practice. Following the study that provided an indirect support for the oral reading hypothesis, a study with a similar design was conducted in order to primarily investigate into the effect of oral reading practice on the improvement of reading comprehension of Japanese senior high school students.

7.1.1 Purposes

The primary purpose of this study was to investigate into the effect of oral reading practice on reading comprehension of Japanese senior high school students. The secondary purpose was to explore: (a) more effective oral reading practice in the improvement of their reading comprehension; and (b) who would benefit more from oral reading practice.

However, oral reading practice constituted just about a third of English reading instruction in this study, the basic design of which was pre- and post-test within-group. This design allowed factors other than oral reading practice to contribute to the improvement of reading comprehension of the participants. Consequently, it was difficult to purely examine the effects of oral reading practice. Thus, it was decided to examine the effects of English reading instruction of which oral reading practice constituted about a third. This instruction was named 'reading instruction focused on oral reading'.

Research questions for the purposes were: (1) would reading instruction focused on oral reading improve reading comprehension of Japanese senior high school students?; (2) would three reading instructions focused on oral reading be similarly effective in improving their reading comprehension?; and (3) what reading proficiency should students have in order to benefit from reading instruction focused on oral reading?

7.1.2 Method

This experiment was conducted for six weeks in the school year 2004. The basic design of the experiment was pre- and post-test within-group for the first research question. Reading comprehension of the participants was compared between the pre- and post-tests. Moreover, 3 (treatment) x 3 (reading proficiency) x 2 (period) design was adopted for the second and third research questions. This design examined the interaction effect between treatment and reading proficiency. It also compared between the pre- and post-tests: (a) the

effects of three reading instructions focused on oral reading on reading comprehension for the second research question; and (b) the effects of three reading proficiency levels of the participants on reading comprehension for the third research question.

7.1.2.1 Participants

The participants were three classes of second-year senior high school students ($n = 111$) in Okayama. Our judgment of their English proficiency was in the range of elementary to pre-intermediate levels after their studying English as a foreign language for over four years.

In order to examine the second research question, the three classes of students were randomly assigned to three different reading instructions focused on oral reading, i.e., treatments A, B and C, which included different oral reading practices. The classes were named groups A, B and C respectively.

For the third research question, the participants were divided into three reading proficiency levels based on the scores of the reading section of BACE (ELPA), which was used for the pre-test. Participants with reading proficiency at the tenth-grade level (scores above 55), at the ninth-grade level (scores between 40 and 55) and below the ninth-grade level (scores below 40) were designated respectively as tenth-grade, ninth-grade and below-ninth-grade reading proficiency students.

7.1.2.2 Instruments

Reading comprehension of the participants was measured with the reading section (100 points for 12 items in 20 minutes) of BACE, which was a reliable and valid English proficiency measure based on Item Response Theory. The second edition of BACE 2003 and the first edition of BACE 2004 were used in the pre- and post-tests respectively.

7.1.2.3 Treatment

Groups A, B and C received respectively three different reading instructions focused on oral reading, i.e., treatments A, B and C, that included 15- to 20-minute oral reading practice twice a week in English II course. The oral reading material used throughout the treatments was parts of the authorized coursebook, *Power On English II* (Tokyo Shoseki, 2003), that the participants were studying and had already covered.

The instructional purpose was to improve the participants' reading comprehension by helping them: (a) to develop decoding skills; (b) to raise awareness of phrasal and grammatical chunks; and (c) to utilize working memory resources, spared by improved word recognition, for comprehension. This purpose was consistent with the assumed functions of oral reading practice based on the oral reading model.

Treatments A, B and C adopted the same procedure except for stage (d). The procedure consisted of the following stages (a) to (e): (a) listening to the model reading of a passage on CD, marking pauses; (b) questions and answers about the content; (c) explanation of grammar and vocabulary; (d) oral reading practice; and (e) consolidating tasks such as cloze procedure and passage reconstruction from jumbles. Moreover, optional oral reading was recommended to be performed out of class for 15 to 20 minutes on a daily basis.

Pause marking in stage (a) was used to raise the participants' awareness of grammatical and phrasal chunks, which would be helpful for oral reading in chunks. Stages (b), (c) and (e) were activities often used in the course English II. Another frequently used activity, translating a passage into Japanese, was excluded because it would not deserve the time it would take, but Japanese translation of the passage was distributed to the participants. The recommendation of oral reading practice out of class was made to help the students form a habit of oral reading.

Stage (d) of the treatments had the following different oral reading practices. In treatment A, stage (d) consisted of a variety of oral reading techniques, which were chorus reading, buzz reading, individual reading, paced reading, parallel reading, and Read and Look-up, plus weekly measurement of oral reading speed. In treatment B, the stage consisted of the same variety of oral reading techniques without measuring oral reading speed. In treatment C, the stage consisted of only chorus reading repeating after the model and buzz reading. The reason for adopting the three different oral reading practices was to examine how the participants' reading comprehension would be affected: (a) by the oral reading variations; and (b) by the regular measurement of oral reading speed.

One common characteristic of these oral reading practices was a similarity that they had with guided repeated reading, a widely recognized technique for improving L1 reading fluency and comprehension (National Institute of Child Health and Human Development, 2000a & 2000b). The similarity lay in that the oral reading practices had the participants repeat the same passage several times (3 to 7 times in guided repeated reading). However, they were different from guided repeated reading in that the oral reading practices had the participants read passages aloud after understanding them because the reading material was above their independent reading level, where the participants could read a text without teacher help (Gunderson, 1991). On the other hand, guided repeated reading has learners repeatedly read passages aloud or silently seeking to understand them.

7.1.3 Results

Table 7.1 and Figure 7.1 show the means of reading comprehension, as measured by the reading sections of BACE, for all the participants. The participants improved the means of reading comprehension (pre = 43.378, post = 47.270). The one-way repeated-measures

ANOVA showed a significant mean difference in reading comprehension between the pre- and post-tests [$F(1, 110) = 7.730, p < .01$]. It seems that reading instruction focused on oral reading helped to improve the participants' reading comprehension.

Table 7.2 shows the means of reading comprehension for tenth-grade, ninth-grade and below-ninth-grade reading proficiency students in Groups A, B and C. Since the 3 (reading proficiency) x 3 (treatment) x 2 (period) repeated-measures ANOVA showed that there was no significant interaction between reading proficiency and treatment [$F(4, 102) = 1.988, ns$], we decided to separately examine the effects of reading proficiency and treatment on the participants' reading comprehension. Another reason for this was that the samples were not balanced among the sub-divided groups.

Table 7.1: Means of Reading Comprehension for All Participants

	n	Mean	SD
Pre-test	111	43.378	13.329
Post-test	111	47.270	12.506

Figure 7.1: Means of Reading Comprehension for All Participants

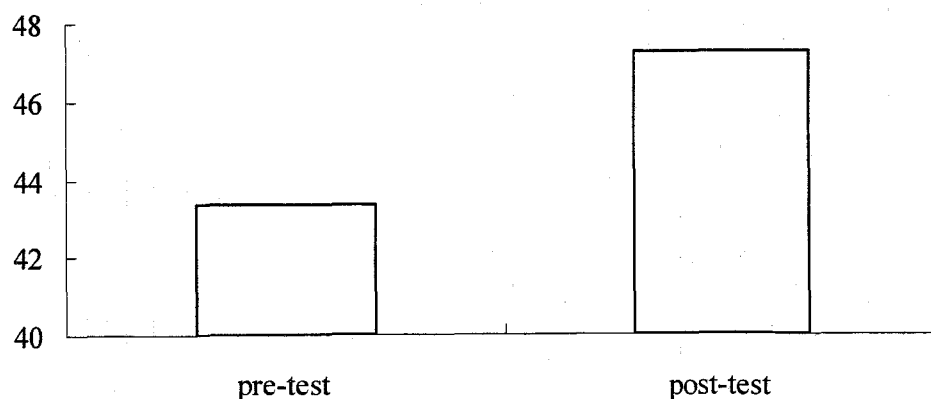


Table 7.2: Means of Reading Comprehension for 10th-Grade, 9th-Grade and Below-9th-Grade Reading Proficiency Students in Groups A, B and C

	n	Pre-test		Post-test	
		Mean	SD	Mean	SD
Group A: 10th-grade	12	69.417	5.775	50.333	10.560
9th-grade	9	47.778	2.635	52.667	11.673
Below-9th-grade	14	32.786	5.740	40.929	11.330
Group B: 10th-grade	12	60.417	5.775	54.417	7.925
9th-grade	13	46.615	2.987	43.385	12.224
Below-9th-grade	14	30.643	5.826	47.786	11.233
Group C: 10th-grade	4	59.750	2.500	61.250	19.956
9th-grade	13	46.538	2.402	46.077	9.032
Below-9th-grade	20	29.850	9.477	43.300	14.607

Table 7.3 and Figure 7.2 show the means of reading comprehension for groups A, B and C. Group C appears to have improved the means of reading comprehension more than the other groups (gains for groups A, B and C were 1.06, 3.23 and 7.27 respectively). However, although the 3 (treatment) x 2 (period) repeated-measures ANOVA showed a significant main effect for period [$F(1, 108) = 7.654, p < .01$], there was neither a significant main effect for treatment [$F(2, 108) = 1.884, ns$] nor a significant interaction between the variables [$F(2, 108) = 1.677, ns$]. It seems that groups A, B and C similarly improved their reading comprehension during the experiment.

Table 7.3: Means of Reading Comprehension for Groups A, B and C

	Test	n	Mean	SD
Group A	pre	35	46.114	13.081
	post	35	47.171	12.033
Group B	pre	39	45.128	13.265
	post	39	48.359	11.345
Group C	pre	37	38.946	12.834
	post	37	46.216	14.242

Figure 7.2: Means of Reading Comprehension for Groups A, B and C

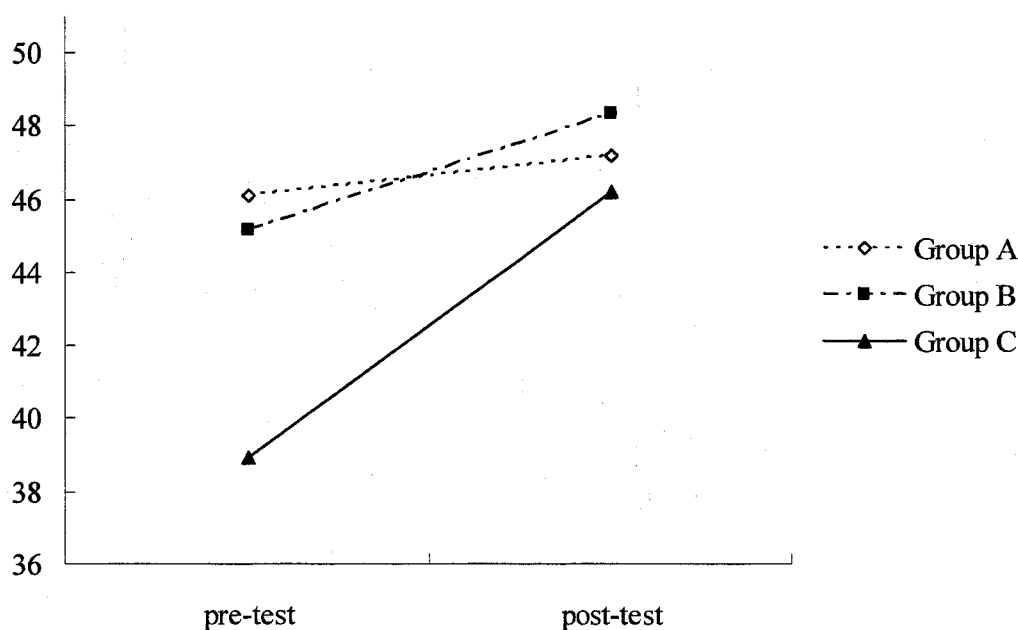


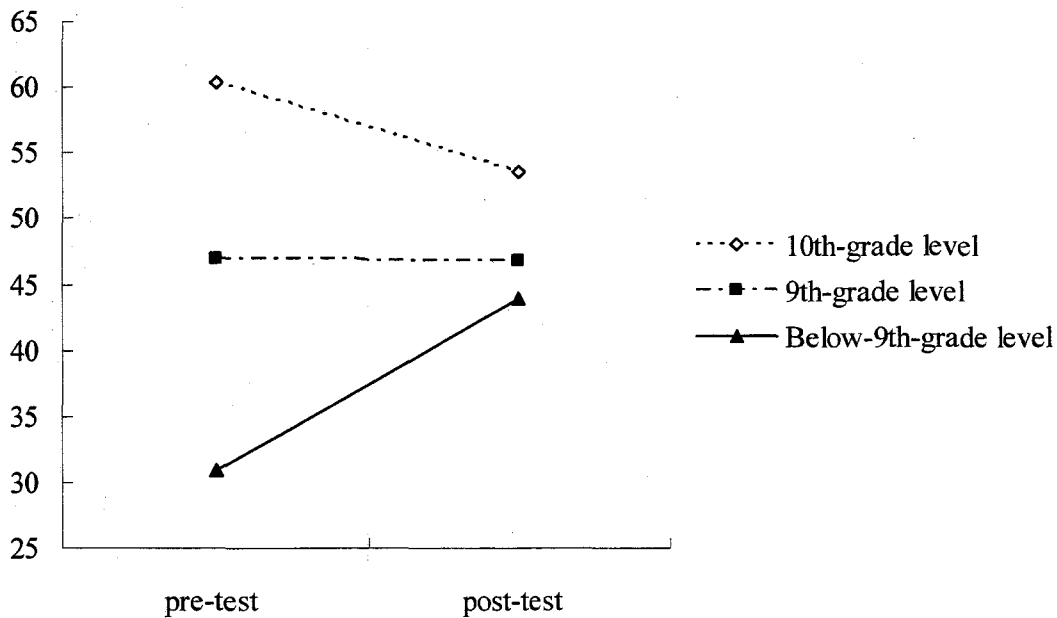
Table 7.4 and Figure 7.3 show the means of reading comprehension for the tenth-grade, ninth-grade and below-ninth-grade reading proficiency students. The below-ninth-grade reading proficiency students improved the mean scores of reading comprehension (pre = 30.938, post = 43.917), the ninth-grade reading proficiency students did not change in the scores (pre = 46.886, post = 46.771) and there was a decline in the scores of the tenth-grade reading proficiency students (pre = 60.321, post = 53.643). Accordingly, the 3 (reading proficiency) x 2 (period) repeated-measures ANOVA showed that there was a significant main effect for reading proficiency [$F(2, 108) = 67.363, p < .01$] and a near significant main effect for period [$F(1, 108) = 2.984, p = .087$]. There was also a significant interaction between the variables [$F(2, 108) = 25.403, p < .01$].

Furthermore, the independent 2 (reading proficiency) x 2 (period) repeated-measures ANOVA was conducted on reading comprehension of the below-ninth-grade and ninth-grade reading proficiency students. The result was that the below-ninth-grade reading proficiency

Table 7.4: Means of Reading Comprehension for 10th-Grade, 9th-Grade and Below-9th-Grade Reading Proficiency Students

Reading proficiency	Test	n	Mean	SD
10th-grade	pre	28	60.321	5.285
	post	28	53.643	11.357
9th-grade	pre	35	46.886	2.665
	post	35	46.771	11.285
Below-9th-grade	pre	48	30.938	7.507
	post	48	43.917	12.804

Figure 7.3: Means of Reading Comprehension for 10th-Grade, 9th-Grade and Below-9th-Grade Reading Proficiency Students



students improved their reading comprehension significantly more than the ninth-grade and tenth-grade reading proficiency students [interaction effect: $F(1, 74) = 22.187, p < .01$]. On the other hand, the independent two-way repeated-measures ANOVA on reading comprehension of the tenth-grade and ninth-grade reading proficiency students showed that the tenth-grade reading proficiency students suffered a decline in reading comprehension

significantly more than the ninth-grade and below-ninth-grade reading proficiency students [interaction effect: $F(1, 61) = 5.471, p < .05$]. It seems that students with below-ninth-grade reading proficiency were beneficiaries of the reading instruction focused on oral reading.

7.1.4 Discussion

The first research question was: would reading instruction focused on oral reading improve reading comprehension of Japanese senior high school students? The result was that reading instruction focused on oral reading helped to significantly improve their reading comprehension during the experiment. Although the pre- and post-test within-group design for this research question may not permit us to identify the participants' improvement with the effect of reading instruction focused on oral reading, it seems that the instruction mainly contributed to the improvement because it was the main formal English instruction that they received during the period. Then, our interest, which is the primary purpose of this study, lies in how much oral reading practice, which constituted about a third of the instruction plus voluntary oral reading practice out of class, was responsible for the participants' improvement. This question is discussed below with the other research questions.

The second research question was: would three reading instructions focused on oral reading be similarly effective in improving reading comprehension of Japanese senior high school students? The result was that three reading instructions focused on oral reading helped to significantly improve their reading comprehension during the experiment, but there was no significant difference in the effects between the three reading instructions.

The interpretation of this result is not straightforward. This is because it is possible that the similar significant improvements were achieved by common variables in the regular part of teaching, which was the same in the three instructions. If this is not the case, the result can be interpreted as showing that the oral reading practices helped to improve the

participants' reading comprehension regardless of the variations of oral reading techniques and the measurement of oral reading speed. The possibility of this interpretation depends upon how much oral reading practice, in class and out of class, was responsible for the improvement of the participants, which is discussed below with the third research question.

The third research question was: what reading proficiency should Japanese senior high school students have in order to benefit from reading instruction focused on oral reading? The result was that students with below-ninth-grade reading proficiency improved their reading comprehension significantly more than students with higher reading proficiency during the experiment, whereas students with tenth-grade reading proficiency diminished their reading comprehension significantly more than students with lower reading proficiency during the experiment.

A primary reason why the below-ninth-grade reading proficiency students were beneficiaries of the instructions lies in that oral reading practice can improve decoding skills, especially letter-sound connection, that students with lower reading proficiency usually have not developed fully. This is one of the assumed functions of oral reading practice based on the oral reading model (see chapter 3) and has been recognized in L1 (Blum, et al., 1995; Carver & Hoffman, 1981; Dixon-Krauss, 1995; Dowhower, 1987; Herman, 1985; Homan, et al., 1993; Labbo & Teale, 1990; Rasinski, et al., 1994; Tingstrom, et al., 1995; Weinstein & Cooke, 1992; Young, et al., 1996).

One support for this account is that the improvement of decoding skills through oral reading practice does not require a long practicing period, according to the L1 studies, Miyasako (2002) and Watanabe (1990). Both studies reported the improvement of decoding skills in terms of oral reading speed in 3-month and 4-week treatments respectively. Thus, it is highly probable that the participants, especially those with underdeveloped decoding skills, improved them during this 6-week experiment.

Moreover, the merits of developing decoding skills include not only the faster word recognition, which is likely to lead to faster reading, but also sparing working memory resources for higher processings such as parsing, proposition formation and comprehension. It is possible that students with below-ninth-grade reading proficiency became able to comprehend passages better because they developed decoding skills and made more working memory resources available for higher level processings.

Although it is possible that a practice effect contributed to the improvement of the below-ninth-grade reading proficiency students, in spite of the adoption of two different editions of BACE in the pre- and post-tests, this possibility can be ignored. This is because the practice effect, if any, must have been shared not only by the below-ninth-grade but also by the ninth-grade and tenth-grade reading proficiency students.

So far, accounts have been provided concerning why oral reading practice is considered to have been a main contributor to the improvement of students with below-ninth-grade reading proficiency, but the question still remains: how much oral reading practice, which constituted about a third of the instruction plus voluntary oral reading out of class, was responsible for the improvement in reading comprehension of all the participants.

A key to answering the question is contained in the result of the improvement in reading comprehension of the tenth-grade and ninth-grade reading proficiency students, which made a clear contrast with that of the below-ninth-grade reading proficiency students. The tenth-grade and ninth-grade reading proficiency students could not improve their reading comprehension during the experiment.

It is improbable that the results were generated by the regular part of teaching that constituted about two-thirds of reading instructions focused on oral reading. This is because it was not the below-ninth-grade reading proficiency students but the tenth-grade and ninth-grade reading proficiency students who had enjoyed and benefited from regular English

teaching until the experiment, which made their reading proficiencies higher in the pre-test. Such a situation was preserved during the experiment for the regular part of teaching that mainly aimed at students with average and above average reading proficiency. Thus, it seems that variables which were not in the regular part of teaching were responsible for the nonimprovements of reading comprehension for students with tenth-grade and ninth-grade reading proficiency. Moreover, it is obvious that the above-mentioned practice effect was not responsible for the nonimprovements.

The corollary of this is that the oral reading practices were highly involved in the nonimprovements in reading comprehension of the tenth-grade and ninth-grade reading proficiency students. Since the tenth-grade and ninth-grade reading proficiency students had already developed their decoding skills more than the below-ninth-grade reading proficiency students, it is possible that many of the tenth-grade reading proficiency students with developed decoding skills could not gain much from the oral reading practices. Among the ninth-grade reading proficiency students, there may have been some who could develop their decoding skills through the oral reading practices and others who did not need to do so.

Although two of the three instructions adopted advanced oral reading techniques, i.e., parallel reading and Read and Look-up, the time spent for the techniques was limited and the students who performed them expressed difficulty. It seems that the tenth-grade and ninth-grade reading proficiency students did not gain much from performing the advanced oral reading techniques as well.

Based on the accounts, it seems that the tenth-grade and ninth-grade reading proficiency students could not improve their reading comprehension because they could not gain much in the oral reading practices. Furthermore, it was the ratios of the tenth-grade, ninth-grade and below-ninth-grade reading proficiency students in all the participants that played an important role in determining the effect of reading instructions focused on oral reading. The ratios

were 25.2% (28 out of 111), 31.5% (35 out of 111) and 43.2% (48 out of 111) for the tenth-grade, ninth-grade and below-ninth-grade reading proficiency students respectively. The higher ratio of the below-ninth-grade reading proficiency students played a vital role in determining the significance in the improvement of reading comprehension for all the participants.

Thus, the pending question, which is the primary purpose of this study, is now answered as showing that oral reading practice, which helped mainly to develop decoding skills of students with lower reading proficiency, was largely responsible for the improvement in reading comprehension of all the participants. This answer, which cannot be drawn from the pre- and post-test within-group design for the first research question, has been deduced by considering the effect of reading proficiency of the participants and the circumstances in which the experiment was conducted.

Accordingly, the other pending question, concerning the second research question, is now answered. Three oral reading practices similarly improved the participants' reading comprehension regardless of the variations of oral reading techniques and the measurement of oral reading speed. This deduction means that three oral reading practices were similar not only in the effectiveness of developing the participants' decoding skills but also in the ineffectiveness of developing their higher processing skills. Thus, it is required to explore other oral reading techniques that may be able to perform other functions of oral reading practice, mainly for students with developed decoding skills, to enhance the development of higher level processing skills as well as decoding skills.

One oral reading practice that aims at broadening vocabulary and developing grammar is oral reading focused on chunks (Miyasako, forthcoming). In this practice, learners are required to be always conscious of phrasal and grammatical chunks when they read passages aloud as well as listen to the model. Through the consciousness raising the learners may be

able to broaden vocabulary and develop grammar. They may also become able to process information in chunks. Consequently, the learners may be able to comprehend a text better with more phrasal expressions and better parsing.

Another may be oral reading aiming at recitation (Miyasako, forthcoming). This practice, with Read and Look-up as its main technique, aims at having learners acquire phrasal expressions and become conscious of grammar through memorizing sentences, which is a similar effect that can be expected in oral reading focused on chunks. Although concern may be aroused about the difficulty of performing Read and Look-up, as seen in two reading instructions focused on oral reading in this experiment, it can be managed by adjusting passage difficulty and by allocating more time to the oral reading technique.

Finally, a main limitation of this study lies in the pre- and post-group within-group design. Although findings of this study, at the center of which oral reading practice improved reading comprehension of mainly students with lower reading proficiency by developing their decoding skills, were deduced by considering the effect of reading proficiency of the participants and the circumstances in which the experiment was conducted, they should be confirmed in studies with pre- and post-group between-groups design. Then, the effectiveness of oral reading practice will be validated concerning the function of improving decoding.

7.1.5 Study Summary

A primary finding of this study was that reading instruction focused on oral reading could improve reading comprehension of mainly senior high school students with lower reading proficiency, and that oral reading practice which developed their decoding skills was a principal contributor to the improvement. A secondary finding was that there was no difference in the effectiveness of oral reading practices in the improvement of reading

comprehension for senior high school students. These findings should be confirmed in comparative studies.

7.2 Study 2

Study 1 showed that oral reading practice principally helped to improve reading comprehension of Japanese senior high school students who received reading instruction focused on oral reading. The oral reading practice exercised its decoding function and developed mainly decoding skills of lower reading proficiency students with underdeveloped decoding skills. Consequently, this finding supported the oral reading hypothesis mainly concerning its decoding function: oral reading practice improves reading comprehension and overall reading proficiency of Japanese senior high school students by helping them to establish the connection between letters and sounds.

However, the finding was not straightforwardly obtained but deduced by considering the effect of the participants' reading proficiency and the circumstances in which the experiment was conducted because the experimental design of the study was pre- and post-test within-group. No matter how valid the deduction may have been, the design was technically weak to prove the effectiveness of oral reading practice. It was required that the finding should be confirmed in comparative experiments, with a view to validating the oral reading hypothesis.

Thus, we conducted a comparative experiment with pre- and post-test between-groups design so that the effectiveness of oral reading practice might be confirmed in the improvement of reading comprehension for Japanese senior high school students. The experiment is reported and discussed in this study.

7.2.1 Purposes

The primary purpose of this study was to confirm, in a comparative experiment, the effectiveness of oral reading practice in the improvement of reading comprehension for Japanese senior high school students. The secondary purpose was to investigate into the effects of oral reading practice on the improvement of variables relevant to reading comprehension, i.e., reading fluency and the efficiency of phonological coding.

Research questions for the investigations were addressed as: (1) would oral reading practice improve reading comprehension of Japanese senior high school students?; (2) would oral reading practice improve their reading fluency?; and (3) would oral reading practice improve their efficiency of phonological coding?

7.2.2 Method

This experiment was conducted for six weeks in the school year 2005. The design of the experiment was pre- and post-test between-groups quasi-experimental.

7.2.2.1 Participants

The participants were two classes of first-year senior high school students ($n = 74$) in Okayama. Our judgment of their English proficiency was in the range of elementary to pre-intermediate levels after their studying English as a foreign language for over three years. The two classes of students were randomly assigned to an experimental group ($n = 38$) and a control group ($n = 36$). The experimental and control groups were matched in reading comprehension as measured by the reading section of BACE (ELPA), which was used for the pre-test [means were 49.184 and 48.361 for the experimental and control groups respectively; $F(1, 72) = .084, ns$].

7.2.2.2 Instruments

Reading comprehension, reading fluency and the efficiency of phonological coding of the participants were measured with the following instruments. Reading comprehension was measured with the same measure as in Study 1, i.e., the reading section (100 points for 12 items in 20 minutes) of BACE. The second edition of BACE 2004 and the first edition of BACE 2005 were used in the pre- and post-tests respectively.

Reading fluency was measured, in the pre- and post-tests, as reading rate and Reading Efficiency Index. The reading rate was calculated as the number of words that each participant could read silently in one minute, i.e., wpm. Reading Efficiency Index, defined as reading rate at which each participant could approximately understand a passage, was calculated by multiplying each participant's reading rate by his or her rate of correct answers in the comprehension questions about the passage. Since the numbers of comprehension questions were four, the formula for the index was: $(\text{wpm}) \times (\text{correct answers} + 1) / (4 + 1)$. The reason for adding 1 both to the numerator and denominator in the formula lay in our assumption that even participants with all the questions incorrect would have a little comprehension of the passages.

The participants read two passages separately, which were about 120- and 160-word long and at Flesch-Kincaid Grade Levels 4 to 5, when given the directions: (a) read the passage trying to understand it, and measure your silent reading time individually with stopwatches; and (b) answer comprehension questions about the passage without rereading it after logging your silent reading time. Based on the recorded silent reading time and comprehension scores, the rates and indices were calculated and the means of the two-time measurements were the participants' reading rates and Reading Efficiencies Indices respectively. Passages in the pre- and post-tests were different but similar in the length and reading ease (Appendix J).

The efficiency of phonological coding was measured as the naming speed of pseudowords of English, which were non-words of English in compliance with English orthographical and phonological rules. The participants read aloud 40 one-syllable pseudowords of English (Gathercole, et al., 2001) (Appendix K), individually measuring their naming time with stopwatches. With the recorded naming time, the efficiency of phonological coding was calculated as the number of syllables named in two seconds, which was about the maximum duration when phonological information is stored in the phonological loop of working memory without subvocal rehearsal. Although the same pseudowords were used in the pre- and post-tests, the layout of the words were randomly altered in the two tests.

7.2.2.3 Treatment

The experimental and control groups received 50-minute English instructions three times a week in the English I course that was taught by the same instructor. The two groups shared the regular teaching that constituted about two-thirds of the instructions. In the rest of the instructions, i.e., for 15 to 20 minutes, the experimental group performed oral reading and the control group performed listening tasks and tasks on vocabulary and grammar, which were tasks frequently used in the instruction of English I. Moreover, the groups were given assignments, which were oral reading practice for the experimental group and tasks on vocabulary and grammar for the control group, that required the groups to spend 15 to 20 minutes respectively. In short, the experimental and control groups were given English instruction focused on oral reading and regular English instruction respectively.

The regular teaching consisted of: (a) listening to the model reading of a passage on CD; (b) questions and answers about the content in Japanese; (c) explanation of grammar and vocabulary; and (d) translation of difficult sentences. The coursebook was *New Stream*

English I (Zoshindo, 2005). This was supposedly one of the procedures that were most commonly adopted in the instruction of English I. Tests were not administered except for the mid-term examination so that they would not destroy the internal validity of this study.

In the rest of the instruction, for 15 to 20 minutes, the experimental group practiced oral reading with the passage used in the regular teaching. The aim of oral reading practice was similar to that of Study 1, which was to improve the students' reading fluency and comprehension by helping them: (a) to develop decoding skills; (b) to raise awareness of phrasal and grammatical chunks; and (c) to utilize working memory resources, spared by improved word recognition, for comprehension.

However, since oral reading practice in Study 1 was effective only in functions (a) and (c), not in function (b), oral reading techniques and procedures were altered in this study as follows: (a) chorus reading after the instructor or the CD; (b) parallel reading with the CD; (c) Read and Look-up; and (d) buzz reading.

The students continued to practice each oral reading technique until the instructor judged that they would not have trouble in performing the next technique, usually once or twice in chorus reading and several times in parallel reading, which consumed less than half of the time that other oral reading techniques did. Chorus and parallel readings were used not only to develop the students' decoding skills but also to let them perform Read and Look-up without much difficulty, which was a problem for students who practiced the technique in Study 1. The students were required to be always aware of grammatical and phrasal chunks, which were marked with slashes, so that they could perform Read and Look-up smoothly. This was because Read and Look-up was assigned a key role in helping the students to expand vocabulary and to develop grammar, i.e., in exercising the above function (b) of oral reading practice. After Read and Look-up was performed two or three times, buzz reading served the function of consolidating oral reading practice. Moreover, the students were

given an assignment to practice oral reading, 10 to 15 times, so that they could perform Read and Look-up smoothly with the passage.

On the other hand, the control group performed listening tasks and tasks on vocabulary and grammar for the same duration as the oral reading practice for the experimental group. The aim of the tasks was approximately the same as that of the oral reading practice for the experimental group: to improve the students' reading fluency and comprehension. Reasons for adopting the tasks were: (a) the information processing mechanisms are quite similar between listening and reading; and (b) vocabulary and grammar are vital components of reading comprehension.

In the listening tasks, which were listed in the teachers' book of *New Stream English I*, the students were asked questions about the passage that they studied to consolidate their comprehension. In the tasks on vocabulary and grammar, which were in the supplementary book for the coursebook, the students practiced using vocabulary and grammar, in the fill-in-the-blank and multiple-choice formats, that appeared in the regular teaching. Moreover, the students were given an assignment to review and preview tasks on vocabulary and grammar in the supplementary book.

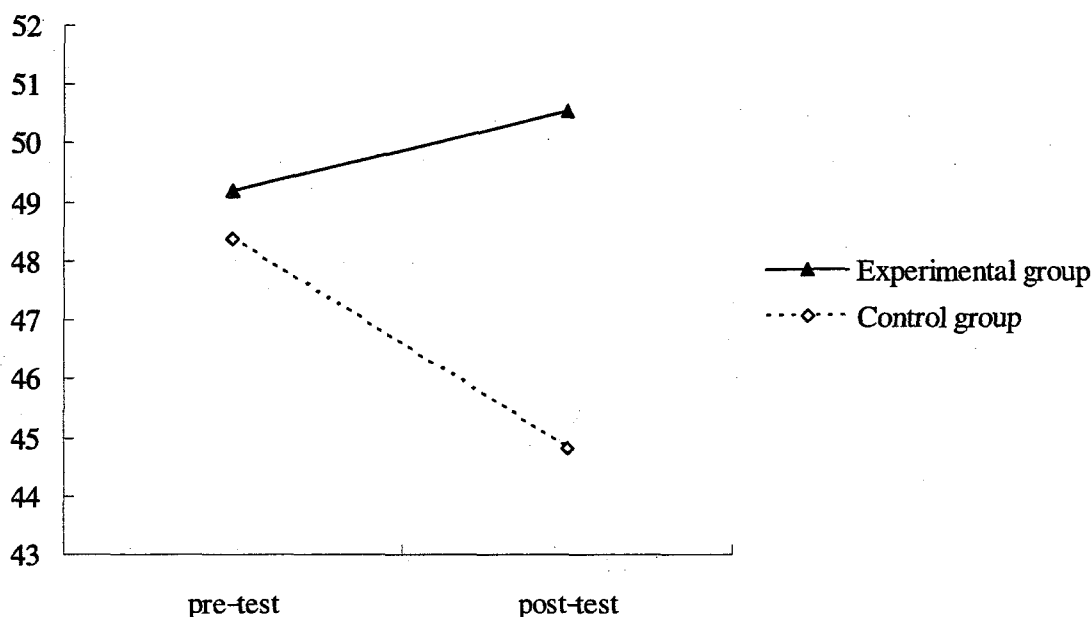
7.2.3 Results

Table 7.5 and Figure 7.4 show the means of reading comprehension, as measured by the reading sections of BACE, in the pre- and post-tests for the experimental and control group.

Table 7.5: Means of Reading Comprehension for Experimental and Control Groups

Group	Test	n	Mean	SD
Experimental	pre-test	38	49.184	12.802
	post-test	38	50.579	9.500
Control	pre-test	36	48.361	11.608
	post-test	36	44.806	10.326

Figure 7.4: Means of Reading Comprehension for Experimental and Control Groups



The experimental group had a slight gain in the means of reading comprehension (pre = 49.184, post = 50.579) but the control group had a decrease in the means (pre = 48.361, post = 44.806). Since the experimental and control groups were matched in reading comprehension in the pre-test [$F(1, 72) = .084, ns$], the means of reading comprehension in the post-test were compared between the two groups in order to examine the effects of the treatments on reading comprehension. The result showed a significant mean difference in reading comprehension in the post-test between the two groups [$F(1, 72) = 6.274, p < .05$]. It seems that the English instruction focused on oral reading was more effective than the regular English instruction in the improvement of the participants' reading comprehension.

Table 7.6 and Figure 7.5 show the means of reading rates (wpm) in the pre- and post-tests for the experimental and control groups. The measurement for reading fluency, which was calculated as the means of two-time measurements of the participants' reading rates, was reliable in terms of Spearman-Brown reliability coefficient (rs were .882 and .862

in the pre- and post-tests respectively).

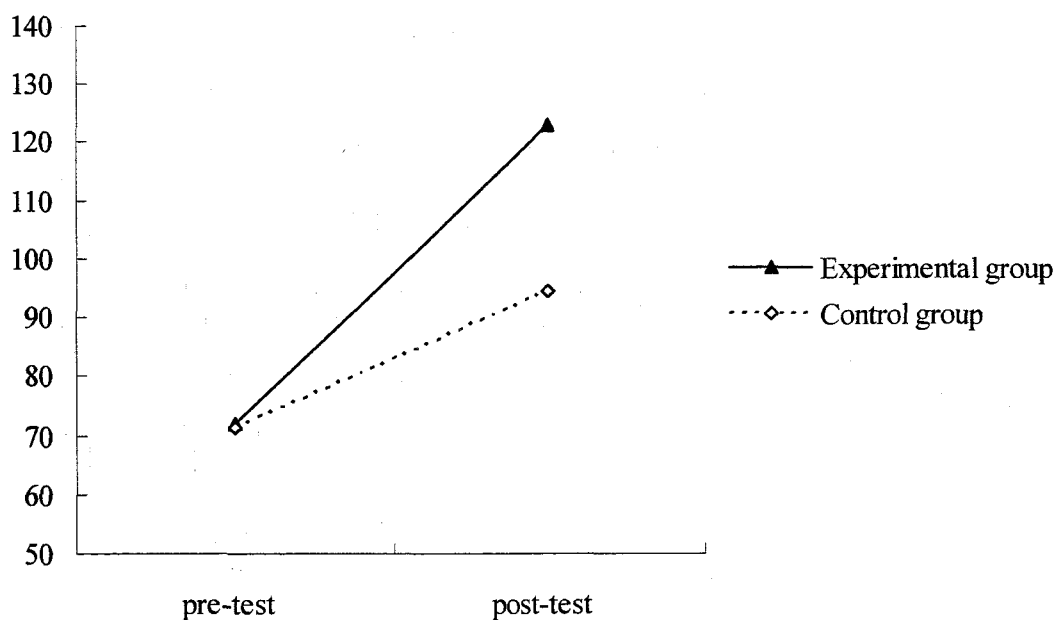
The experimental group had a greater gain in the mean reading rates (pre = 71.959, post = 123.009) than the control group (pre = 71.247, post = 94.385). The effects of the treatments on the reading rates were examined in the post-tests between the experimental and control groups, which were matched in the reading rates in the pre-test [F (1, 72) = .020, ns]. The result showed a significant mean difference in the reading rates in the post-test between the two groups [F (1, 72) = 21.509, p < .01]. It seems that the English instruction

Table 7.6: Means of Reading Rates for Experimental and Control Groups

Group	Test	n	Mean	SD
Experimental	pre-test	38	71.959	17.240
	post-test	38	123.009	25.866
Control	pre-test	36	71.247	21.635
	post-test	36	94.385	30.884

Spearman-Brown rs were .882 and .862 in the pre- and post-tests respectively.

Figure 7.5: Means of Reading Rates for Experimental and Control Groups



focused on oral reading was more effective than the regular English instruction in the improvement of the participants' reading rates.

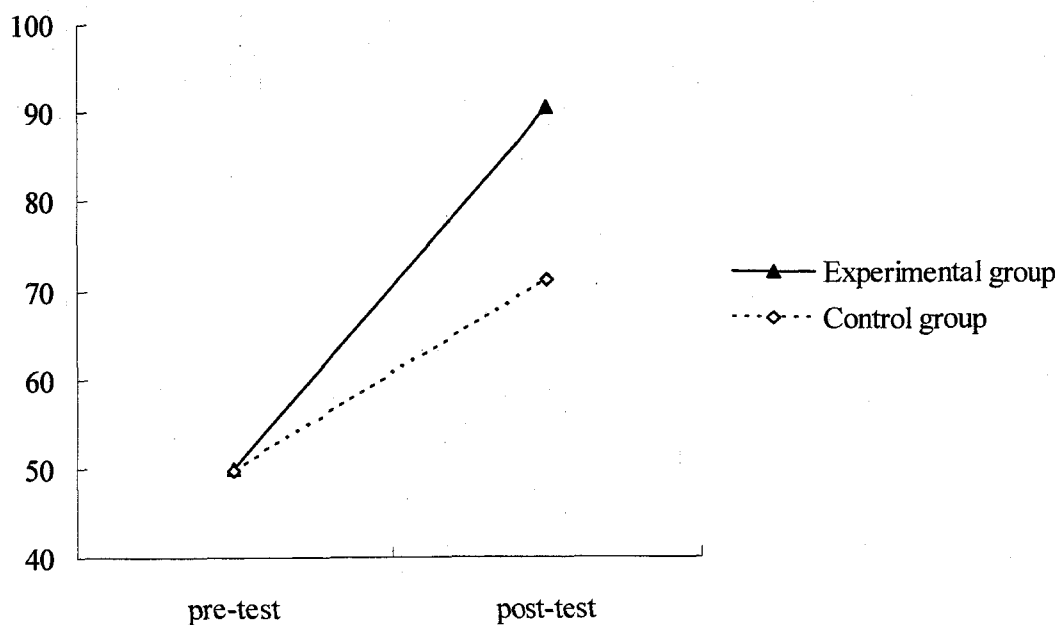
Table 7.7 and Figure 7.6 show the means of Reading Efficiency Indices in the pre- and post-tests for the experimental and control groups. Although the measurements were not fully reliable in terms of Spearman-Brown reliability coefficient (rs were .713 and .658 in the pre- and post-tests respectively), the reliabilities were not so low as to ruin the examination of the effects of the treatments on reading fluency.

Table 7.7: Means of Reading Efficiency Indices for Experimental and Control Groups

Group	Test	n	Mean	SD
Experimental	pre-test	38	49.898	17.833
	post-test	38	90.687	21.012
Control	pre-test	36	49.828	22.306
	post-test	36	71.179	20.499

Spearman-Brown rs were .713 and .658 in the pre- and post-tests respectively.

Figure 7.6: Means of Reading Efficiency Indices for Experimental and Control Groups



The experimental group had a larger gain in the means of Reading Efficiency Indices (pre = 49.898, post = 90.687) than the control group (pre = 49.828, post = 71.179). We compared the effects of the treatments on Reading Efficiency Indices in the post-test between the experimental and control groups, which were matched in the indices in the pre-test [F (1, 72) = .0002, ns]. The result was that there was a significant mean difference in Reading Efficiency Indices in the post-test between the two groups [F (1, 72) = 16.318, $p < .01$]. It seems that the English instruction focused on oral reading was more effective than the regular English instruction in the improvement of the participants' Reading Efficiency Indices.

Table 7.8: Means of Efficiency of Phonological Coding for Experimental and Control Groups

Group	Test	n	Mean	SD
Experimental	pre-test	38	1.502	.250
	post-test	38	2.250	.464
Control	pre-test	36	1.549	.439
	post-test	36	1.816	.513

Figure 7.7: Means of Efficiency of Phonological Coding for Experimental and Control Groups

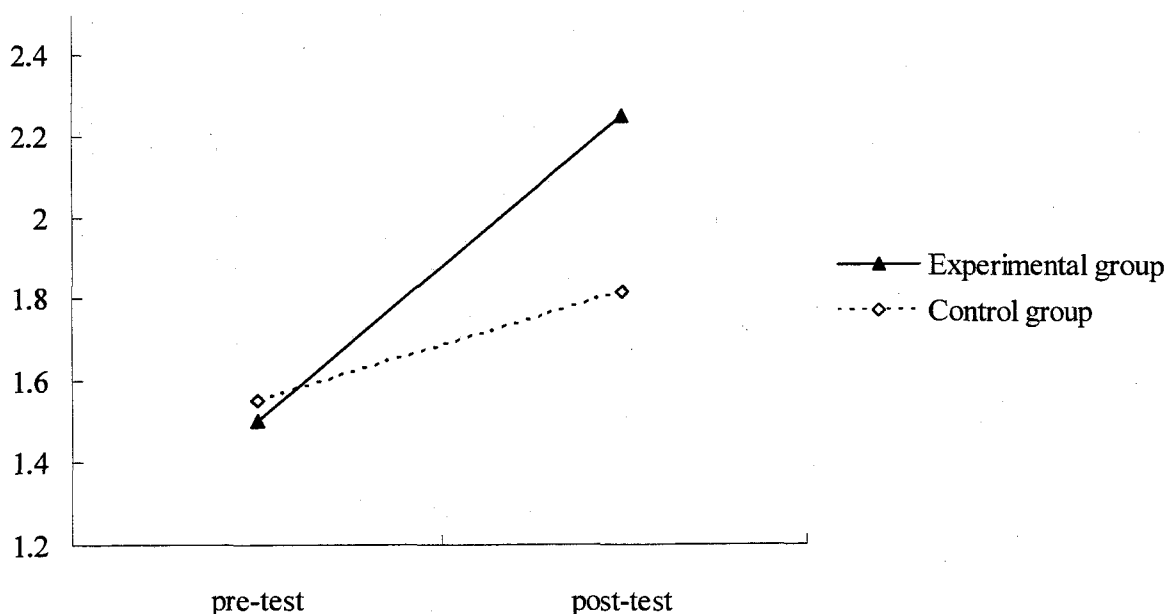


Table 7.8 and Figure 7.7 show the means of the efficiencies of phonological coding in the pre- and post-tests for the experimental and control groups. A single measurement was adopted here because naming pseudowords of English would not be affected by factors such as frequency, familiarity and meaning of words.

There was a larger increase in the mean efficiencies of phonological coding for the experimental group (pre = 1.502, post = 2.250) than for the control group (pre = 1.549, post = 1.816). We compared the mean efficiencies of phonological coding in the post-test between the experimental and control groups, which were matched in the efficiencies in the pre-test [$F(1, 72) = .334, ns$], so that we could examine the effects of the treatments on the efficiencies. The result showed a significant mean difference in the efficiencies of phonological coding in the post-test between the two groups [$F(1, 72) = 14.596, p < .01$]. It seems that the English instruction focused on oral reading could improve the participants' efficiencies of phonological coding more than the regular English instruction.

7.2.4 Discussion

The first research question was: would oral reading practice improve reading comprehension of Japanese senior high school students? The result was that English instruction focused on oral reading improved their reading comprehension significantly more than regular English instruction. Thus, oral reading practice was effective in the improvement of their reading comprehension. This finding confirmed the positive effect of oral reading practice on reading comprehension of Japanese senior high school students, which had been just implied from the positive effects on English language ability and reading fluency. It also provided a rigid validation for the oral reading hypothesis: oral reading practice improves reading comprehension and overall reading proficiency of Japanese senior high school students.

One noticeable point concerning the result is that although the experimental group achieved a slight improvement in reading comprehension, the nonimprovement in reading comprehension of the control group contributed greatly to the difference in the improvement between the two groups. This suggests that the common regular teaching for the experimental and control groups, which constituted about two-thirds of the instructions, was not effective. Then, since the procedure of the regular teaching was among the most commonly implemented ones in the instruction of English I, it seems vital that activities in the procedure should be replaced by more effective ones. With such activities, the experimental group would have achieved a greater improvement in reading comprehension.

The second research question was: would oral reading practice improve reading fluency of Japanese senior high school students? The result was that English instruction focused on oral reading improved their reading fluency, as measured by their reading rates and Reading Efficiency Indices, significantly more than regular English instruction. Therefore, oral reading practice was effective in the improvement of their reading fluency. This finding was consistent with studies reporting that oral reading practice improved reading fluency as measured by silent reading speed for second-year senior high school students (Watanabe, 1990) and by Reading Efficiency Index for first-year senior high school students (Suzuki, 1998). It confirmed the positive effect of oral reading practice on reading fluency as well as on reading comprehension for Japanese senior high school students.

Also, the finding helps to explain how the participants improved their reading comprehension through oral reading practice. Reading fluency helps to develop reading comprehension for the following reason. When one reads fluently using his or her decoding skills efficiently, he or she can spare the working memory resources for higher level processing, including comprehension. Moreover, reading fluency may allow one to have time to reread the text.

Furthermore, the finding reinforces the oral reading hypothesis concerning the improvement of overall reading proficiency, which requires the improvement of reading fluency as well as that of reading comprehension. Since it was shown that both reading fluency and comprehension could be improved through oral reading practice, the corollary of this is that overall reading proficiency should also be improved through oral reading practice. Indeed, Reading Efficiency Index can be regarded as a handy measure of reading proficiency because it is expressed as one's reading fluency that is adjusted by his or her reading comprehension.

The third research question was: would oral reading practice improve the efficiency of phonological coding of Japanese senior high school students? The result was that English instruction focused on oral reading improved their efficiencies of phonological coding significantly more than regular English instruction. Thus, oral reading practice was effective in the improvement of their efficiencies of phonological coding.

This finding was consistent with L1 studies acknowledging that oral reading practice had positive effects on the development of learners' decoding skills (Blum, et al., 1995; Carver & Hoffman, 1981; Dixon-Krauss, 1995; Dowhower, 1987; Herman, 1985; Homan, et al., 1993; Labbo & Teale, 1990; Rasinski, et al., 1994; Tingstrom, et al., 1995; Weinstein & Cooke, 1992; Young, et al., 1996). It also confirmed a finding, concerning Japanese learners, showing that oral reading practice improved the efficiency of phonological coding as measured by oral reading speed for senior high school students (Miyasako, 2002; Watanabe, 1990).

7.2.5 Study Summary

A primary finding of this study, with pre- and post-test between-groups quasi-experimental design, was that oral reading practice was effective in improving reading

comprehension, reading fluency and the efficiencies of phonological coding of Japanese senior high school students. This finding could provide a rigid validation for the oral reading hypothesis: oral reading practice improves reading comprehension and overall reading proficiency of Japanese senior high school students.

7.3 Summary

Study 1 showed that reading instruction focused on oral reading could improve reading comprehension of Japanese senior high school students mainly with lower reading proficiency. It was deduced that oral reading practice principally contributed to their improvement in reading comprehension by developing their decoding skills. However, since the study was pre- and post-test within-group designed, the finding was suggested to be reexamined in experiments with controls.

Study 2 confirmed the finding of Study 1, in the experiment with pre- and post-test between-groups design, showing that oral reading practice was effective in improving reading comprehension of Japanese senior high school students. Moreover, the study confirmed that oral reading practice was also effective in improving their reading fluency and efficiencies of phonological coding. Thus, it was endorsed that oral reading practice could improve reading fluency and comprehension and the efficiency of phonological coding for Japanese senior high school students.

The finding was consistent with the past research concerning the effects of oral reading practice on the improvement of reading fluency (Watanabe, 1990; Suzuki, 1998) and on the efficiency of phonological coding (Miyasako, 2002; Watanabe, 1990). More importantly, it confirmed the positive effect of oral reading practice on reading comprehension, which had not been empirically supported but had been merely implied. Furthermore, it could provide a rigid validation for the oral reading hypothesis: oral reading practice improves reading

comprehension and overall reading proficiency of Japanese senior high school students by helping them: (a) to establish the connection between letters and sounds; (b) to expand vocabulary; (c) to acquire grammar through consciousness raising; and (d) to improve the efficiency of working memory.

The finding should be reinforced not only in replicated studies but also in studies with different methodologies before it is fully validated as a main assertion of the oral reading hypothesis. Also required are empirical examinations concerning the improvement of overall reading proficiency and functions (b), (c) and (d) of oral reading practice, i.e., (b) to expand vocabulary; (c) to acquire grammar through consciousness raising; and (d) to improve the efficiency of working memory.

Chapter 8

Oral Reading Approach

The previous chapter finally confirmed that oral reading practice had positive effects on reading comprehension, reading fluency and the efficiency of phonological coding of Japanese senior high school students. Consequently, it provided an empirical support for the oral reading hypothesis: oral reading practice improves reading comprehension and overall reading proficiency of Japanese learners.

Following the support for the hypothesis, in this chapter, we propose an oral reading approach for the development of English proficiency and English communicative proficiency of Japanese learners. This oral reading approach is a materialization of the oral reading hypothesis and pedagogical implications from the findings that we have obtained in the present thesis.

8.1 Pedagogical Implications

The present thesis provides several pedagogical implications for general and reading instruction of English mainly at junior and senior high school. The first implication is a general one based on the oral reading hypothesis. Oral reading practice should be given a more important role to play in general and reading instruction of English at junior and senior high schools so that it can contribute to the development of English proficiency and English communicative proficiency of Japanese learners.

Second, oral reading practice should constitute an indispensable part of English instruction. Preferably, oral reading should be performed as a 15- to 20-minute component of a regular 50-minute session. This is a suggestion from three studies in chapters 6 and 7,

where general English and reading instructions focused on oral reading, with 15- to 20-minute oral reading practice, were effective in the improvement of English language ability, reading comprehension, reading fluency and the efficiency of phonological coding of senior high school students.

Third, oral reading practice should be utilized in developing English language ability and reading comprehension for many junior and senior high school students with low English language ability and reading comprehension. This is because senior high school students with lower English language ability and reading comprehension were the beneficiaries of general English and reading instructions focused on oral reading in two studies of chapters 6 and 7. The students could improve their English language ability and reading comprehension mainly because oral reading practice improved their word recognition skills.

Fourth, oral reading practice may increase working memory capacities of Japanese learners who are at developing stages of the capacities. Since oral reading is one of the cognitively loaded activities that are likely to activate working memory, oral reading practice is suggested to be used for enhancing the development of working memory capacity. This implication, despite being one of the assumptions about oral reading practice, is made because the assumption was indirectly supported in a study of chapter 4 that showed a significant difference in working memory capacities between the third- and first-year senior high school students.

Fifth, reading comprehension and overall reading proficiency of Japanese learners may improve as their oral reading speed, oral reading fluency and oral reading ability improve. This is because it was shown that reading comprehension had similar significant relationships with oral reading speed, oral reading fluency and oral reading ability for Japanese senior high school learners in two studies of chapter 5. Relevantly, oral reading speed, oral reading fluency and oral reading ability can be used as approximate measures of reading

comprehension of Japanese learners. Therefore, we can use the measures in formative and diagnostic evaluations of their reading comprehension.

8.2 Oral Reading Approach

When we assign such an essential role to oral reading practice in English instruction, we are taking an oral reading approach to ELT. This instruction is called so because it is primarily based on what this thesis has suggested and examined, as shown below, concerning the level of approach, which represents theoretical principles of a method (Richards & Rodgers, 2001). Our oral reading approach is explained elaborately concerning its theories, objectives, teacher and learner roles, activities and procedure.

8.2.1 Theories and Objectives

Our oral reading approach is based on the following theories of language and language learning. The oral reading approach, which is proposed for junior and senior high schools in Japan, naturally has the structural view of language, complying with the Course of Study that has adopted structural syllabuses. The approach seeks to develop threshold-level English competence or grammatical competence, through English instruction focused on oral reading, that is needed for the development of English communicative proficiency.

With respect to language learning, the oral reading approach is theoretically built on our oral reading model, four assumptions about oral reading and oral reading hypothesis. As the present thesis has shown above, the assumptions and hypothesis began to be empirically supported. Oral reading practice can improve decoding skills, reading comprehension and English language ability for Japanese learners mainly with low reading and English abilities. It may also expand vocabulary, enhance grammar acquisition and increase working memory capacity for Japanese learners.

Thus, the oral reading approach asserts, as its main objective, that oral reading practice should develop threshold-level English competence of Japanese learners and help to develop their English communicative proficiency. Other objectives concerning Japanese learners include: (a) to improve word recognition; (b) to expand vocabulary; (c) to enhance grammar acquisition; (d) to increase working memory capacity; and (e) to develop reading comprehension.

8.2.2 Teacher and Learner Roles

In the oral reading approach, functions that teachers perform include practice director, counselor and model. Teachers provide oral reading models, give directions and monitor learners so that oral reading can be practiced smoothly. They should also be: (a) role models who have the habit of performing oral reading; and (b) counselors when learners have problems in their oral reading and oral reading practice. Furthermore, they should teach metacognitive strategies concerning oral reading practice. The metacognitive strategies are those strategies which let learners obtain knowledge of oral reading and oral reading practice and regulate oral reading and oral reading practice, which is based on the definition that metacognition means knowledge upon cognition and regulation of cognition (Flavell, 1978).

Learners should diligently practice oral reading. However, they should not be passive but active performers who can use the metacognitive strategies effectively. Learners should not only monitor and evaluate their oral reading performances but also plan their oral reading practice out of class.

8.2.3 Materials

In the oral reading approach, passages taught in English courses are used for oral reading practice and they are usually coursebook materials. One reason for this is that

reading aloud the taught passages helps learners to deepen their understanding of the passages. Another is that it helps learners to acquire vocabulary and grammar in the passages by providing them with more exposure to the vocabulary and grammar. Moreover, it can save time allowing the introduction of new oral reading passages.

8.2.4 Activities

In the oral reading approach, instruction consists of mainly three parts: regular teaching, oral reading practice and communicative tasks. In the regular teaching, new material is introduced and new vocabulary and grammar are taught. Learners should understand the text in this part. However, the approach does not prescribe how the regular teaching is conducted so far as it is compact enough to spare time for the other parts. Instructors who supposedly know the learners and situation best can choose what is appropriate for them. One reason for this is that how the regular teaching is conducted does not affect the following oral reading practice much. Another is that a new approach should have such practicality as it allows instructors to partially maintain their teaching styles when inviting new practitioners.

In the oral reading practice, instructors should choose what matches their instructional aims out of oral reading techniques such as buzz reading, chorus reading, individual reading, paced reading, parallel reading and Read and Look-up. When the aims are to develop learners' decoding skills and reading fluency, the oral reading practice should include paced reading and parallel reading, although any oral reading can help to accomplish these. This is because the oral reading techniques provide learners with authentic aural input, which helps to improve their phonological awareness, for the development of their decoding skills. As a spin-off of this oral reading practice, learners' reading comprehension may improve because more efficient decoding can spare the working memory resources for higher level processings, such as parsing, proposition formation and comprehension.

When the aims are to develop vocabulary, grammar and reading comprehension, the oral reading practice should contain Read and Look-up. This technique raises learners' awareness of phrasal and grammatical chunks and enhances the acquisition of them. Since awareness or attention is vitally important for the acquisition of vocabulary and grammar (Ellis, 1997; Skehan, 1998), Read and Look-up should be more effective than other oral reading techniques in this respect. This technique also helps learners to establish the habit of understanding sentences in chunks, which may improve their proposition formation. Larger vocabulary, better grammar and proposition formation, not to mention decoding and working memory capacity, should contribute to the development of their reading comprehension.

These oral reading practices are supposedly conducive to learners' threshold-level English competence, which indirectly helps to develop their English communicative proficiency. However, communicative tasks began to be adopted in junior and senior high school coursebooks, aimed at developing "practical communication abilities" that the Course of Study for foreign languages addressed (2003). These tasks should be integrated with oral reading practice.

Communicative tasks in coursebooks are varied from controlled to open ones, such as pattern practices, which are not actually communicative, role plays, and information-gap tasks. Since they are usually designed to reflect vocabulary and grammar in the lesson, communicative tasks can use the preceding oral reading practice as its preparatory stage. The tasks would be performed more smoothly than those which follow no oral reading practice. This is another contribution of oral reading practice to the development of English communicative proficiency.

8.2.5 Procedures

A basic procedure of the oral reading approach is in the order of regular teaching, oral reading practice and communicative tasks. However, this is not a strict prescription for it. Instructors can choose procedures that work effectively for their learners, so far as oral reading is performed for 15-20 minutes as an essential part of the instruction. In one variation, oral reading practice can be performed at the beginning. One aim for this is to use oral reading practice for reviewing. Another is to check how much oral reading learners performed out of class. In this variation, all the time for oral reading practice should not be used at this stage and time should be left for another oral reading stage after the regular teaching.

In another variation, communicative tasks are performed soon after regular teaching and before oral reading practice. This procedure, which is an application of Willis' (1996) procedure for task-based learning, lets learners notice how difficult it is to conduct communicative tasks before they get used to the vocabulary and grammar that they learned in the regular teaching. The learners should also recognize the importance of oral reading practice. In the following oral reading practice, they must be more conscious of the grammar and vocabulary that the learners found difficult in the communicative tasks. After the oral reading, they may be given another chance to perform the communicative tasks.

Even in regular teaching, oral reading can be used. In this variation, learners repeat oral reading of a text several times so that they may understand it better. This is mainly aimed at those learners with undeveloped decoding skills who can understand a text better in oral reading that requires them to phonologically code the text attentively. This is an application of guided repeated reading which is a widely recognized technique for improving L1 reading fluency and comprehension (National Institute of Child Health and Human Development, 2000a & 2000b).

Although learners supposedly understand the text better in repeating oral reading several times, since there are certainly differences among their comprehension, their comprehension should be checked after the repeated oral reading. Learners with unsatisfactory comprehension should be compensated for the lack of it. Those who can understand the text easily in less oral reading should be advised to change the oral reading modes, from the mode for seeking comprehension to another for raising awareness of vocabulary and grammar.

Since the oral reading approach enjoys a variety of procedures, instructors can choose appropriate procedures for their learners. Adopters of this approach can also devise procedures that reflect its theoretical principles and objectives.

8.3 Summary

In this chapter, we provided pedagogical implications for general and reading instruction of English at junior and senior high schools. Next, based on the implications, we proposed our oral reading approach for the development of English proficiency and English communicative proficiency of Japanese learners.

The oral reading approach should be tried in English instruction at junior and senior high schools. The instruction which is conducted for a sufficient duration, perhaps a number of months, will show us its effects on English language ability, reading comprehension, vocabulary and grammar of the students through the teachers' observations and the students' perceptions. It will also show us problems of the approach and give us suggestions for its revision.

Moreover, it is necessary to conduct experiments to examine the effects of the oral reading approach empirically. We need to confirm the positive effects of general English and reading instructions focused on oral reading on English language ability and reading comprehension that were shown in the studies of chapters 6 and 7.

Finally, the oral reading approach invites suggestions and opinions including criticisms. We hope that the prototypical oral reading approach will be revised for the better and contribute to the betterment of ELT in Japan

Chapter 9

Conclusions

The final chapter reviews what has been presented and discussed in the preceding chapters and consolidates the significance of the present thesis. It also provides theoretical implications based on the review and consolidation. Finally, it reveals limitations of the present thesis and provides suggestions for future research.

9.1 Significance

The present thesis, first, set the focus on the effects of oral reading practice on reading comprehension and overall reading proficiency of Japanese learners. This was because the positive effects would mean that oral reading practice could help the development of English communicative proficiency of Japanese learners. Other purposes were set as: (a) to review studies concerning oral reading; (b) to construct a theoretical model of oral reading; (c) to make assumptions about oral reading practice based on the theoretical model; (d) to empirically examine questions relevant to the assumptions about oral reading practice; and (e) to suggest an oral reading approach for the development of English communicative proficiency of Japanese learners.

Second, a review was conducted of oral reading issues in ELT in Japan based on Miyasako's (under review) classification. The review highlighted one problem that many of the studies had in common, i.e., there were few rigid theoretical grounds, much less empirical grounds, to support their assertions. Since the componential processing view of reading (Grabe, 1999 & 2000; Grabe & Stoller, 2002) could explain many assertions in the studies, it was suggested that a model of oral reading should be constructed based on the componential

processing view so that a rigid theoretical foundation might be laid.

The review of oral reading issues had the following significance: (a) it was more comprehensive than those which had been conducted before; (b) it identified a common problem among the studies, i.e., the shortage of theoretical and empirical validation to support their assertions; and (c) it disclosed that many of the assertions could be explained by the componential processing view of reading.

Third, following the suggestion from the review, we proposed an oral reading model, which focused more on processing than production, for Japanese learners of English. The model adopted: (a) the componential processing view of reading; (b) the DRC model (Coltheart & Rastle, 1994; Ziegler, et al., 2000) for word recognition; and (c) Baddeley's (2000 & 2003) working memory. Main reasons for these adoptions were respectively: (a) the view could explain many anecdotal assertions concerning oral reading; (b) the sublexical route in the DRC model was indispensable for accounting for oral reading of Japanese learners; and (c) the phonological loop of Baddeley's working memory was compatible with the sublexical route.

Based on the oral reading model, we made four assumptions about oral reading practice. The assumptions concerned the functions that oral reading practice should perform in helping to improve reading comprehension and overall reading proficiency of Japanese learners. The assumptions stated that oral reading practice would help them: (a) to establish the connection between letters and sounds; (b) to expand vocabulary; (c) to acquire grammar through consciousness raising; and (d) to improve the efficiency of working memory. The assumptions were provided with theoretical validation.

The oral reading model had the following significance: (a) it was the first model that elaborated the oral reading processing of Japanese learners; (b) it could establish a rigid theoretical foundation for empirical studies concerning oral reading; and (c) it provided

grounds for the four assumptions about oral reading.

Fourth, we empirically examined preconditions for the assumptions about oral reading practice: reading comprehension and overall reading proficiency should have significant relationships with letter-sound connection, vocabulary, grammar and working memory. The first study primarily investigated into the relationship between reading comprehension and the efficiency of phonological coding for Japanese senior high school students. The result showed a significant correlation between them. Consequently, the relationship between reading comprehension and the efficiency of phonological coding fulfilled a precondition for the assumption concerning letter-sound connection.

The second study investigated into the relationship between working memory capacity and reading comprehension of Japanese senior high school students. The result was that there was a significant correlation between their working memory capacities and reading comprehension. Consequently, it fulfilled a precondition for the assumption concerning working memory.

The third study explored a relevant question: whether the efficiencies of phonological coding and working memory capacities of Japanese senior high school students improve as their chronological ages and length of English learning increase. It compared the efficiency of phonological coding and working memory capacity between first- and third-year senior high school students. The result was that there was no significant difference in the efficiency of phonological coding between the first- and third-year students, whereas there was a significant difference in working memory capacity between them. Consequently, we deduced: (a) the lack of teaching decoding skills was probably responsible for the similarity in their efficiencies of phonological coding; and (b) oral reading practice might help the improvement of their working memory capacities.

The significance of the first and second studies lay in that they provided empirical

grounds, however scanty they may have been, to support the assumptions about oral reading practice. The studies confirmed the relationships of reading comprehension with the efficiency of phonological coding and working memory capacity for Japanese learners, which had not been proven unlike the consented relationships of reading comprehension with vocabulary and grammar (Alderson, 2000; Bernhardt, 1991; Laufer, 1997; Read, 2000). The significance of the third study was in that it acknowledged a possibility of oral reading practice improving working memory capacity and a necessity for improving decoding skills through means such as oral reading practice.

Fifth, we examined relationships that were relevant to the relationship between oral reading ability and reading comprehension, which was a precondition for our goal: to utilize oral reading practice for improving reading comprehension and overall reading proficiency of Japanese learners. The first study investigated into the relationship of oral reading ability and its components with English proficiency and its components for Japanese senior high school students. The result was that oral reading ability had significant correlations not only with English proficiency but also with grammar, reading and listening. Consequently, the relationship between oral reading ability and reading proficiency fulfilled a minimum precondition of our goal.

The second study investigated into the relationships of reading comprehension with oral reading speed and fluency for Japanese senior high school students. The result was that oral reading speed and fluency had similar significant correlations with reading comprehension. It was shown that oral reading speed and fluency could both be approximate indicators of reading comprehension of Japanese senior high school students.

These findings suggested that reading comprehension and overall reading proficiency of Japanese senior high school students should improve as their oral reading ability, oral reading speed and oral reading fluency improve. Consequently, we proposed an oral reading

hypothesis: oral reading practice improves reading comprehension and overall reading proficiency of Japanese senior high school students by helping them: (a) to establish the connection between letters and sounds; (b) to expand vocabulary; (c) to acquire grammar through consciousness raising; and (d) to improve the efficiency of working memory.

The significance of the studies was to reveal the relationships not only between oral reading ability and reading proficiency but also between oral reading speed and fluency and reading comprehension for Japanese learners. This allowed us to make the oral reading hypothesis.

Sixth, we examined the oral reading hypothesis. We began the examination by critically reviewing five empirical studies that investigated into the effects of oral reading practice on various abilities of Japanese learners. Although the positive effects of oral reading practice were reported concerning English language ability and reading fluency of senior high school students, there were no reports of the positive effects on their reading comprehension and overall reading proficiency. Moreover, the studies had problems in the definitions of dependent variables, the amounts of treatments between the experimental and control groups and the reliabilities of measures.

Following the review, the first study explored who improved English language ability among Japanese senior high school students that received English instruction with oral reading practice. The result was that students with lower English language ability, with lower oral reading ability and with a higher amount of oral reading practice improved their English language ability, and especially so for students with lower English language ability and a higher amount of oral reading practice. This study, despite the pre- and post-test within-group design, specified those who benefited from oral reading practice. It suggested, indirectly supporting the oral reading hypothesis, that the beneficiaries of oral reading practice also improved their reading comprehension, a primary component of English language ability

of Japanese learners.

The second study, with pre- and post-test within-group design, investigated into the effect of reading instruction focused on oral reading on reading comprehension of Japanese senior high school students. The results were: (a) the instruction significantly improved their reading comprehension; and (b) students with lower reading proficiency improved reading comprehension significantly more than others. Circumstantially, it was identified that oral reading practice principally contributed to their improvement of reading comprehension.

The third study was a comparative experiment, aimed at confirming the finding of the second study. It examined the effects of oral reading practice on the efficiency of phonological coding, reading fluency and reading comprehension of Japanese senior high school students. The result was that there were significant improvements in their efficiencies of phonological coding, reading fluency and reading comprehension. Consequently, it supported the oral reading hypothesis: oral reading practice improves reading comprehension and overall reading proficiency of Japanese senior high school students.

The significance of the first study was in that it specified learners who could improve English language ability through oral reading practice. This specification allowed us to suggest that we should utilize oral reading practice in developing English language ability for many junior and senior high school students with lower English language ability. The significance of the second and third studies was in that they could empirically reveal the positive effect of oral reading practice on reading comprehension of Japanese senior high school students. This was the first empirical support for the oral reading hypothesis and could invite further examination of it.

Finally, we proposed an oral reading approach for the development of English proficiency and English communicative proficiency of Japanese learners. The approach materialized the oral reading hypothesis and pedagogical implications that we made based on

the findings of this thesis. The approach elaborated its theories, objectives, teacher and learner roles, activities and procedures. It was the first approach, in ELT in Japan, in which oral reading practice constituted the core.

9.2 Implications

Since pedagogical implications of the present thesis were realized as the oral reading approach in chapter 8, this section provides theoretical implications. First, ELT research in Japan should be conducted with more rigid theoretical foundations. Although we reviewed over a hundred papers and books relevant to oral reading in Japan, including ones that did not appear in this thesis, most of the assertions did not have theoretical grounds. This may be a major reason why oral reading has not been given an important role to play in ELT in Japan. This lack of theoretical foundations is also seen in the studies of other activities, such as translation and explicit grammar teaching, that are most frequently used in English courses at junior and senior high schools.

So far, the activities have been approved or disapproved anecdotally. They have also been frequently disapproved in the theoretical examinations that were conducted in the frameworks of imported methodologies such as Oral Approach (Audiolingual method) and Communicative Approach (Communicative Language Teaching). However, the activities have hardly been explained concerning mechanisms in which they perform their functions in the development of learners' English proficiency. Thus, we should stop advocating the activities anecdotally or denying them dogmatically. Instead, as the oral reading model was constituted and the assumptions about oral reading were made, we should seek to theoretically account for the mechanisms in which the activities perform their functions.

Second, ELT research in Japan should be conducted more empirically. The review of oral reading issues showed that substantial literature asserted the effectiveness of oral reading

and oral reading practice in developing various oral and written skills without empirical support. This lack of empirical support seems pervasive in the studies of other English teaching activities.

Some of the activities, such as pattern practices and communicative tasks, are theoretically well-grounded. However, pattern practices, which were refuted in respect of the stimulus-response theory, have hardly been empirically approved concerning the effectiveness in the improvement of English proficiency and communicative proficiency of Japanese learners. Neither have communicative tasks been empirically supported concerning the effectiveness, except that Takashima (2000), with his followers, reported the positive effects of form-focused communicative tasks on the enhancement of grammar acquisition. No matter how valid the rationales on which the activities are built may appear, the activities cannot constitute an essential part of English instruction until their effectiveness is empirically validated. Therefore, the theoretically rigid activities should be examined empirically concerning the effects on English proficiency and English communicative proficiency of Japanese learners. Even if they are proven ineffective, the result will contribute to the betterment of the rationales that support the activities.

Other activities, including the above-shown translation and explicit grammar teaching, are neither theoretically nor empirically well-founded. However, every activity should not necessarily have a theoretical foundation. If anecdotally supported activities are empirically validated concerning the effectiveness in the development of English proficiency and English communicative proficiency of Japanese learners, they will be widely used in English instruction. They may even be able to contribute to hypothesis formulations and help to lay the theoretical foundation. Thus, it is significant to empirically examine the activities with merely anecdotal evidence.

Finally, it is idealistic that every ELT research in Japan should have a rigid theoretical

foundation and empirical examinations. However, if we can replace anecdotal research with either theoretical or empirical research, we can contribute to the betterment of ELT in Japan. It is vitally important to inject rationalism and empiricism more deeply into ELT research in Japan.

9.3 Limitations

The present thesis had the following limitations. First, it proposed the first oral reading model that elaborated the mechanism of oral reading processing in Japanese learners. However, the model did not elaborate the mechanism of oral output production and contained a black box that generated oral production in it. Another limitation concerning the oral reading model lay in that the model had not been examined empirically although it was theoretically validated. Thus, the model should be empirically examined and be revised with the production processing being more sophisticated in future research.

Second, this thesis made assumptions about oral reading practice but they were limited to those which complied with the oral reading model and which might be involved in the development of reading comprehension and overall reading proficiency of Japanese learners. We should explore other functions that oral reading may perform so that oral reading may be given proper roles in ELT.

Third, five studies, in chapters 4 and 5, reported significant relationships of reading comprehension with the efficiency of phonological coding, working memory capacity and oral reading abilities for Japanese senior high school students. However, the studies did not have large samples or samples with wide variations, in terms of reading and English proficiency. Consequently, the findings may not be fully projected onto all senior high school learners of English. The findings should be confirmed in replication studies with larger samples consisting of learners with a variety of reading and English proficiencies.

Fourth, although the third study, in chapter 4, compared the efficiency of phonological coding and working memory capacity between first- and third-year students, this thesis did not directly examine the assumptions about oral reading. The questions concerning the assumptions are whether oral reading practice would: (a) improve the efficiencies of phonological coding of Japanese learners; (b) expand their vocabulary; (c) enhance their grammar acquisition; and (d) increase their working memory capacities. These questions should be investigated into in future research. The empirical validation of the assumptions would also reinforce the oral reading model that grounds the assumptions.

Fifth, three studies, in chapters 6 and 7, directly and indirectly supported the oral reading hypothesis, acknowledging the positive effects of oral reading practice on English language ability and reading comprehension of Japanese senior high school students. However, two of the studies were pre- and post-test within-group in design. Since the design could not technically identify that oral reading practice was principally responsible for the improvement of their English language ability and reading comprehension, the identification was made circumstantially. Admittedly, the last study, with a comparative design, confirmed the validity of the identification, but it is necessary that the oral reading hypothesis should receive more empirical support from studies with controls before it is fully acknowledged.

9.4 Future Research

In addition to the above limitations of the present thesis, there remain issues that we ought to investigate into in future research. Motivation is one such issue that plays a major role in education including ELT, and oral reading practice is no exception. Indeed, motivation may be one of the most important factors that determine the success or failure of oral reading practice. This is because motivation is highly involved in a necessary condition for effective oral reading practice, i.e., to continue oral reading practice purposefully and

attentively. Although we need appropriate means to boost learners' motivation for oral reading practice and to keep them motivated, oral reading research has not inquired into this topic. Thus, it is necessary that such topics concerning learners' motivation and oral reading practice should be explored in future research.

Another oral reading issue that has been neglected in research until recently is metacognition, which means knowledge upon cognition and regulation of cognition (Flavell, 1978). Pioneering studies extracted 51 questionnaire items concerning the metacognition of oral reading for Japanese senior high school students, which were their perceptions of oral reading strategies and oral reading strategy use, and revealed a significant relationship between their metacognition of oral reading and English language ability (Miyasako, 2002 & 2003; Miyasako & Takatsuka, 2005a). However, there are topics that we should inquire into before we provide learners with effective instruction in the metacognition of oral reading. The topics include: (a) oral reading strategies that good and poor oral readers use; (b) effective oral reading strategies; (c) when learners should use oral reading strategies to be most effective; (d) how learners plan, monitor and evaluate oral reading strategy use; (e) how instructors teach oral reading strategies; and (f) effects of the metacognition instruction. Future research should adopt these as topics to be examined.

Furthermore, future research should investigate into the oral reading approach that we proposed, aimed at developing threshold-level English proficiency of Japanese learners and helping to develop their English communicative proficiency. Since this approach is a tentative materialization of our goal, which is to utilize oral reading practice for the development of Japanese users of English, it should be scrutinized fully so that the approach may be revised to be a more effective one. As a first step, we should begin to examine the effectiveness of the tentative approach in English instruction for junior and senior high school students. The results would provide us with more questions that we should investigate into.

Finally, we hope that what is proposed and revealed in the present thesis, i.e., our oral reading model, assumptions about oral reading practice, oral reading hypothesis, empirical support for the hypothesis and oral reading approach, will make contributions to the further development of oral reading and reading research and to the development of Japanese learners with English communicative proficiency.

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Appendices

Appendix A: Words Used for Measuring Efficiency of Phonological Coding

1 Words Used in Measuring English Articulating Speed

someone, difficult, yesterday, communicate, airplane, grandfather, beautiful, question, hometown, computer, welcome, language, Christmas, newspaper, Spanish, international, remember, elephant, baseball, yourself, usually, vegetable, Japanese, Southeast, hamburger, important, American, birthplace, difference, Indonesia, dictionary, mountain, Halloween, restaurant, however, tomorrow, breakfast, overseas, understand, December

2 Words Used in Measuring Japanese Articulating Speed

名人, 動物園, 博物館, 連勝, 一般的, 冒険小説, 西洋医学, 記憶力, 剣道, 空想, フェスティバル, 結果, じゅうたん, 原子炉, ドイツ語, 心理学, 少額, 共産主義, 大統領, 奇数, 天然記念物, 将棋, 駐車場, 友愛, 同盟, 宇宙船, 太平洋, 焼き肉, 大衆の面前, 憎悪, オムライス, 競艇, ソーラン節, 地下鉄, 林業, 臓器移植, 満足, 脱力感, 肉体, 優勝

Appendix B: Stroop Task

The following is the English stimulus table that was used. The words in brackets show the ink colors of the stimuli. 48 items (8 rows x 6 columns) were printed horizontally on an A4 sheet.

red	yellow	green	blue	yellow	green	red	blue
(yellow)	(blue)	(red)	(green)	(blue)	(red)	(yellow)	(green)
green	blue	red	yellow	green	blue	yellow	red
(red)	(yellow)	(green)	(blue)	(yellow)	(green)	(red)	(blue)
				.			
				.			
				.			

Appendix C: Sentences Used in Silent RST

1 Examples

(1) Beckham plays soccer in the Premium League of France. In Spain soccer is more popular than volleyball. (2) Some people say French food is the best in the world. English is spoken by the largest number of people.

2 Two Sentences

(1) Kyoto has a lot of famous temples and shrines to see. Mt. Fuji is the second highest mountain in Asia. (2) The Shinano is longer than any other river in Japan. It takes over three days to go to Africa by plane. (3) Nara is famous for its beautiful places for tourists. There are many books to buy in the library.

3 Three Sentences

(1) In the library you don't have to pay to borrow books. You can make peanut butter with peanuts and butter. Soccer is the most popular sport in South America. (2) We can see a dragon on a cloudy day. On New Year's Day many people go to shrines. 100 years ago all Japanese people played Judo. (3) Americans take off their shoes when they go into houses. On Children's Day we usually give children chocolate. Bananas used to be more expensive than apples.

4 Four Sentences

(1) Many people think Japanese is the easiest language. In the 1970s the Beatles were very popular in Europe. Christmas is the day when Jesus Christ was born. In old days many Europeans hunted animals for food. (2) The tiger is often called the king of animals. Some musicians have begun to help poor people recently. Britain is not a member of the EU yet. Hawaii is closer to Japan than to Africa. (3) Oxford is the second largest city in Italy. Many people say English is an international language. There are plenty of pandas living in Africa today. Doctors and nurses take care of sick people.

5 Five Sentences

(1) An elephant is a big animal that eats fish. It is surprising that California produces much rice. French people always think they shouldn't make war. The number of people in the world is increasing. Sound can move almost as fast as light. (2) Matsui plays for the Yankees in the American League. If you want stamps, you should go to the bank. We need

to have passports to visit foreign countries. For good health it is necessary to get up late. Both Shizuoka and Uji are very famous for their tea. (3) For Japanese children trees are usually colored blue. Mother Teresa worked hard to help sick people. Many people don't eat breakfast to save money. Plants need much sunlight and water to grow well. In 1494 Columbus discovered America all by himself.

6 Six Sentences

(1) If you read many books, you are wasting your time. In South America everyone speaks English and Spanish. People used to believe that the earth was flat. The internet gives us much information all in English. Many people speak Chinese in Singapore and Malaysia. People have already stopped cutting trees in rain forests. (2) French as well as English is spoken in Canada. They had the 2002 Winter Olympic Games in LA. There are many more sheep than people in Australia. Edison is very famous because he invented the telephone. British people often call coffee with milk white coffee. Hideo Nomo used to play for the Buffaloes in Korea. (3) Japan is almost as large as the state of California. The original Disney Land is in New York City. Curry and rice is one of children's favorite foods. Sometimes frogs can be used in Chinese cooking. England and Scotland are two different countries in the UK. Newton discovered gravity when he saw oranges fall down.

Appendix D: Card Formats for Silent RST and RST of ESL

1 Silent RST

<p>Mt. Fuji is the second highest mountain in Asia.</p> <p>T / F</p>
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2 RST of ESL

The man gave the old woman a ride to the church.

3 Answering Sheet for Two-Sentence Set in Silent RST

Write down all the final words of the sentences that you can recall.

Appendix E: Sentences Used in RST of ESL

1 Examples

(1) Practicing typing is not very difficult. Music always provides us with pleasure and comfort. (2) Some people can see red apples in their dreams. The boy swam in the river this summer. (3) His health became worse after he married an angel. The audience became angry when the child was noisy.

2 Two Sentences

(1) The boys got together at the station at midnight. The lonely man's only friend was the white cat. (2) The student came to New York to enter college. The woman lived her life as a famous artist.

3 Three Sentences

(1) Now the people can no longer use their own language. The boy bought a new suit to attend the meeting. Due to the scandal, he lost his job and his wife. (2) The policeman saved the child from the accident. The old couple left the party without eating anything. The man gave the old woman a ride to the church. (3) The three men found it difficult to catch the monster. July fourth was the day the young man was born. The moon was the place he had always wanted to visit.

4 Four Sentences

(1) He overcame his handicap and succeeded as a writer. Due to the bad weather, the plane crashed into the mountain. The boy often went to the theater to see movies. Whenever Tom met Nancy, they had a fight. (2) The man finally made friends with the police dog. He wanted to visit an island with a big mountain. He had to sell five cars in only two days. The rich man fell in love with the beautiful woman. (3) He wanted to tell his girlfriend his dream. Since he really liked his hat, he always wore it. He began his wonderful career as a car racer. The time machine crashed and broke into pieces.

5 Five Sentences

(1) She saw a woman who was sitting behind the corner. The two men chased the car for different reasons. The children defended his home against the storm. A best selling writer was surprised by his fans. The man fell into the swimming pool from the window. (2) The two teachers met at the station for the first time. The French man married her to become an American. They had the courage to speak out in the ceremony. Fortunately, the millionaire invited them to his house. They returned his books without saying thank you. (3) They found the boy standing in front of the bank. Everybody thought that the boxer was very strong. She looked at the monkeys sitting in a tree. The men in that family are working in that hotel. The man invited five children to his chocolate factory.

6 Six Sentences

(1) The scientist panicked when he made a big mistake. The woman had strange ideas when she was dying. The young man listened to her beautiful voice. One day he talked to many people from foreign countries. In the 1960s, only rich people had television sets. She found her boyfriend's strange hobbies shocking. (2) He saw a woman who was talking with his friend. People used to spend more time on their jobs. In spite of the rain, the traffic was heavy there. This is a story about a teacher and her pupils. He had to go away for a day or two. I usually take an early train to get a good seat. (3) He decided to keep walking as long as he could. It was painful to stop using his own words. I said nothing, which made him much angrier. As a son of a famous actor, he had many problems. The man's dream was to have his own tennis court. The doctors had no drugs that could help the patients.

Appendix F: Words Used in Elementary RST

1 Examples

(1) That is six hundred and forty yen. I have some plans for next Sunday. (2) In Scotland they had their own money. His father and mother have interesting machines.

2 Two Sentences

(1) We can easily make plastic from oil. The parents and their children are happy. (2) There were four elephants in the zoo. She was the first Japanese woman pilot. (3) A writer went to a baseball game. This is as popular as the V-sign.

3 Three Sentences

(1) Plastic is usually lighter than glass. You can write on this little table. They like donuts better than chocolate. (2) She told her ideas to her parents. It is now 7:10 in the morning. We like traveling around the world. (3) Our friends visited an old art museum. She learned about Canada in a lesson. Some people stopped hunting and fishing.

4 Four Sentences

(1) That hard fight was ten hours long. Soccer players often communicate without words. You can understand the singer's ideas. Many people went to Paris last week. (2) Then you can recycle the cans. Mother Teresa worked hard to help people. Soon they changed our way of life. They began working to buy food. (3) He started Chinese language classes at

home. Japan and the UK are island nations. Please bring the tigers to our city. French teachers gave us some apple pies.

5 Five Sentences

(1) Please look at your Halloween pumpkin. Let's sit and wait for the boys. There is enough candy in the box. They can buy drinks in glass bottles. Many American children live in this area. (2) Yesterday I didn't understand the question. Some famous songs come from China. We know England is smaller than Japan. There is a candle in this dish. Her aunt and uncle are nice teachers. (3) They sometimes talk to people in Europe. Maybe you know Chaplin's silent movies. In 1947 Columbus first discovered America. In the US many people speak Spanish. That was a surprise to her father.

6 Six Sentences

(1) He bought a camera for his wife. We have to think of people first. He learned to read and write French. I like that song the best of all. It's a beautiful day here in Sydney. We often use gestures for communication. (2) There are many differences between them. The earth is larger than the moon. We can move our hands like this. She became a singer in her village. Ken like studying better than playing. There was a piano contest for children. (3) That is a season word for spring. The book is inside the seat pocket. Some rules are different in these countries. She knows wine is made from grapes. He wanted to go back to Africa. Put your baggage in front of you.

Appendix G: Four Criteria in Evaluating Oral Reading Ability

1 Pronunciation (5-point scale)

(5) the examinee can convey the message accurately without any problems in pronunciation or in accentuation; (4) the examinee can convey the message satisfactorily with a few problems in pronunciation or in accentuation; (3) the examinee can barely convey the message with some problems in pronunciation or in accentuation; (2) the examinee has some trouble in conveying the message with rather many problems in pronunciation or in accentuation; (1) the examinee has much trouble in conveying the message with many problems in pronunciation or in accentuation.

2 Intonation (5-point scale)

(5) the examinee can convey the message accurately without any problems in intonation; (4)

the examinee can convey the message satisfactorily with a few problems in intonation; (3) the examinee can barely convey the message with some problems in intonation; (2) the examinee has some trouble in conveying the message with rather many problems in intonation; (1) the examinee has much trouble in conveying the message with many problems in intonation.

3 Pause making (5-point scale)

(5) the examinee can convey the message accurately without any problems in making pauses; (4) the examinee can convey the message satisfactorily with a few problems in making pauses; (3) the examinee can barely convey the message with some problems in making pauses; (2) the examinee has some trouble in conveying the message with rather many problems in making pauses; (1) the examinee has much trouble in conveying the message with many problems in making pauses.

4 Delivery (5-point scale)

(5) the examinee can convey the message accurately without any problems in delivery; (4) the examinee can convey the message satisfactorily with a few problems in delivery; (3) the examinee can barely convey the message with some problems in delivery; (2) the examinee has some trouble in conveying the message with rather many problems in delivery; (1) the examinee has much trouble in conveying the message with many problems in delivery.

Appendix H: A Passage Used for Measuring Oral Reading Fluency

The earth is one of the nine planets moving around the sun. And it is the only planet that has air to breathe and water to drink. It is the only planet that has plants and animals living on it.

The earth looks blue and beautiful from space. But is it really a good and beautiful place to live today? Many plants and animals are dying out. The air, seas, and rivers are getting dirty.

Plants have been on the earth for more than three billion years. We need plants in order to live. Green plants give off oxygen. All animals must breathe oxygen. We shouldn't forget that.

Some animals eat plants. Other animals eat animals that eat plants. In the last 200 years, many kinds of animals have died out. People have killed animals for food. They have also killed animals for their horns or feathers. People have also destroyed animals' homes when they built houses and factories. If animals can't find a place to live, they die out.

Pollution is killing many animals, too. Rivers become dirty, and fish are poisoned. Birds that eat poisoned fish can't lay healthy eggs.

We are killing ourselves, too. When factories or cars use oil, gases go into the air. Sometimes the gases get into rain clouds, and then acid rain falls back to the earth. It does a lot of damage to plants.

We are now in great danger. We must do something to protect our world.

(246 words, Flesch-Kincaid Grade Level = 5.2)

[Based on Kunihiro (2000)]

Appendix I: A Passage Used for Measuring Oral Reading Speed

1 Passage

San Francisco is a city of many hills. Strong legs are needed to walk up and down these hills. Cars must have good engines and brakes. When we had no cars, cable cars were used to go up and down the hills. People still enjoy the few cable cars that are left in the city now.

San Francisco is famous for its fog. Because the air is warm and the water is cold, San Francisco often has bad fogs over the bay. When there was no bridge, it was not easy to go across the bay in fog by boat. But now a lot of people cross San Francisco Bay every day by bridges.

One of the great bridges over the bay is Golden Gate Bridge. It is so high that the world's largest ship can go under it. Golden Gate Bridge is painted red. This color can be seen through the fog that often covers the bay. Another bridge crosses the bay to the city of Oakland. It is called Bay Bridge and is the longest bridge in the world. Anyone who visits San Francisco will love this beautiful city.

(191 words, Flesch-Kincaid Grade Level = 4.9)

[Based on Abe (1984)]

2 Comprehension Questions (T / F)

(1) There are many hills in San Francisco. (2) We can go up the hills only by cable car. (3) Fog is made when the air is warm and the water is cold. (4) Golden Gate Bridge is the longest bridge in the world. (5) Bay Bridge crosses the bay to the city of Oakland.

Appendix J: Passages Used for Measuring Reading Fluency

1 Pre-Test A

1.1 Passage

How does a man go up a mountain without getting tired? The motto is: Go slow. Don't try to run up the mountain and be there before your friends. Take your time; breathe regularly, taking two steps while you breathe in and two more while you breathe out. Be careful to put the whole of your foot flat on the ground; you should feel the ground with it first, before you put your weight on it. Do not sit down every five minutes but miss a couple of steps now and then to look at the scenery. Only sit down when it's time for food or a refreshment. If you remember all this, you will go up a mountain easily.

(120 words; Flesch-Kincaid Grade Level = 4.3)

[Based on Abe (1984)]

1.2 Comprehension Questions (T / F)

(1) You should go slow when you go up a mountain. (2) You should run up the mountain before your friends. (3) Do not sit down every five minutes. (4) Sit down when you have food or a refreshment.

2 Pre-Test B

2.1 Passage

My name is Judy Newman. I am fourteen and I am an English girl. I live in Liverpool. Fireman, boxer, footballer, pilot and fisherman are jobs done only by men. Nursery school teacher, nurse and housewife are women's jobs. But sometimes we see men doing these jobs while their wives are out working.

I don't want my husband to stay at home because it is not the right job for him. A husband has to work outside. But if he likes, he may look after the children when he comes back from work.

Some people think that women who do housework need to be paid. But I don't think so. When they are staying at home, they are free to choose what they want to do, how they will make their plans for the day. So they don't have to be paid.

That is what I think of the problem but some other people may see it differently.

(158 words; Flesch-Kincaid Grade Level = 4.9)

[Based on Abe (1984)]

2.2 Comprehension Questions (T / F)

(1) Judy is a young girl. (2) Judy thinks that boxer and fisherman are men's jobs, but nurse and housewife are women's jobs. (3) Judy doesn't want her husband to stay home, because it is not right. (4) Judy thinks housewives should be paid.

3 Post-Test A

3.1 Passage

When Masao was studying English yesterday, he found a new sentence. He could not understand it at all. At once he asked his father for help. His father said, "I'm happy to see you work hard every day. You are as good at English as your sister. But listen to me, my son. When you are going to learn anything, you must study it for yourself. It's no good to ask someone for help before you have done your best. When you learn English, you often meet some new words or sentences. But study them for yourself in your dictionary. It will teach you all you want to know. One of the most important ways to learn English is to become friends with your dictionary."

(125 words; Flesch-Kincaid Grade Level = 4.9)

[Based on Abe (1984)]

3.2 Comprehension Questions (T / F)

(1) Masao did not understand an English sentence yesterday. (2) Masao asked his mother for help. (3) When you learn English, you meet new words or sentences. (4) You should become friends with your dictionary.

4 Post-Test B

4.1 Passage

We can see the moon in the sky at night. Long ago people had some dreams about the moon.

Some people thought there were animals on it, and some thought that people were living there. But there were no animals and no people on the moon, because the moon has no air and no water. It has some dark places called "seas", but they have no water in them. The surface of the moon is covered with rock. Because there is no air on the moon, it is very hot when the sun is shining. As soon as the sun goes down, the surface of the moon gets very cold.

Scientists have studied the moon for many years, and we have learned a lot of things

about it. Our idea of the moon is different from the ideas that people had many years ago. But even now we have dreams when we see a beautiful moon at night.

(158 words; Flesch-Kincaid Grade Level = 4.7)

[Based on Abe (1984)]

4.2 Comprehension Questions (T / F)

(1) The moon has some dark places called "seas," but they aren't seas as we have on the earth.

(2) It is very hot on the moon, because its surface is covered with rock. (3) Even now we have dreams about the moon as people had long ago. (4) It is said that there is something, a kind of animal on the moon.

Appendix K: Pseudowords Used for Measuring Efficiency of Phonological Coding

1 Pre-Test

barg, dort, jeel, ged, mun, peb, torm, peem, nart, lork, jup, gock, deet, cham, darp, gerp, jorl, lon, nam, lig, jick, gadge, chorg, tep, parn, mup, lod, joop, darch, charn, tudge, pim, neeb, lud, gell, goot, chool, dorge, mitch, pim

[Based on Gathercole, et al. (2001)]

2 Post-Test

chorg, tep, barg, dort, jeel, ged, lud, torm, peem, nart, joop, neeb, mun, gell, lork, jup, gock, deet, goot, chool, parn, mup, lod, jorl, lon, nam, pim, peb, jick, mitch, pim, darch, charn, tudge, cham, darp, gerp, gadge, lig, dorge

[Based on Gathercole, et al. (2001)]