



The Role of Oral Reading Fluency in ESL Reading Comprehension among Learners of Different First Language Backgrounds

Xiangying Jiang

West Virginia University

ABSTRACT

This study discusses the construct of oral reading fluency and examines its relationship to reading comprehension among adult English-as-a-Second-Language (ESL) learners of four first language (L1) backgrounds. One hundred and forty-nine adult learners of English with Arabic, Japanese, Spanish and Chinese language backgrounds participated in this study. The participants read a short passage aloud and completed the reading comprehension section of the TOEFL (Test of English as a Foreign Language). Oral reading fluency was measured through four componential elements: oral reading rate (word per minute/wpm), accuracy (word correct/wc), efficiency (word correct per minute/wcpm), and prosody. Stepwise regression analyses showed variations across language groups regarding the role of oral reading fluency in ESL reading comprehension. For participants of Chinese and Japanese L1 backgrounds, prosody was the only significant predictor of English reading comprehension, which accounted for 18% and 32% of its variance respectively. Oral reading efficiency (wcpm) was the only significant predictor for Arabic ESL learners, which accounted for about 46% of variance in English reading comprehension. For participants of Spanish background, both accuracy (wc) and rate (wpm) were significant predictors and together they accounted for a total of 65% of the variance in English reading comprehension. The results are discussed in relation to the orthographic depth hypothesis and orthographic distance between first language and English.

INTRODUCTION

Oral reading fluency has been widely accepted as a critical factor in English first language (L1) reading development and achievement (National Reading Panel, 2000). The focus of fluency on reading is not new in reading research; however, the role of oral reading fluency has been neglected in the past decades due to the popular assumption that “fluency was the immediate result of word recognition proficiency” (National Reading Panel, 2000, p. 3). Consequently, researchers had put greater emphasis towards the study of word recognition skills in children and largely ignored fluency itself. Recently, however, researchers have reconceptualized this aspect of reading performance and started to call for renewed awareness of the role of fluency in reading proficiency (Breznitz, 2006; Rasinski, 2003; Strecker et al., 1998).

As a result, oral reading fluency has gained new attention as an important element in students' overall reading abilities.

Despite the renewed attention in the field of reading research, the construct of fluency awaits further exploration and clarification. The field has not yet reached consensus on a definition of fluency (Kame'nui & Simmons, 2001; Pinnell et al., 1995; Reutzel & Hollingsworth, 1993), which complicates and impedes research and interpretations of empirical findings. As stated by Samuels (2006), "definitions are not trivial, ivory tower concerns that are of no importance—how we define a construct such as fluency determines and influences to a large degree how we will measure it" (p. 39).

This paper aims to provide a thorough review of the various definitions of fluency, explore the role of prosody in the construct of fluency, and examine the relationship among the key elements of fluency and their relationship to ESL reading comprehension.

REVIEW OF RESEARCH

Current Definitions of Fluency

Fluency has been variously described as "that level of reading competence at which textual material can be effortlessly, smoothly, and automatically understood" (Schreiber, 1980, p. 177), "the ability to read a text quickly, accurately, and with proper expression" (National Reading Panel, 2000, p. 3), and "the ability to read connected text rapidly, smoothly, effortlessly, and automatically with little conscious attention to the mechanics of reading such as decoding" (Meyer & Felton, 1999, p. 284). Hudson, Mercer, and Lane (2000) defines fluency as "accurate reading at a conversational rate with appropriate prosodic features (expression) and deep understanding" (p. 16).

Most definitions of oral reading fluency typically include speed/rate (words per minute) and accuracy (number of words correctly identified) as primary indicators, with a focus on the rapid and accurate word identification ability of the students. This conception of fluency draws its support from the theory of automaticity in reading (LaBerge & Samuels, 1974; Samuels, 1979). According to LaBerge and Samuels, fluency develops as readers move toward automatic decoding, enabling them to read more accurately and more rapidly. If readers have difficulty in recognizing individual words and have to pause to decode unfamiliar words, their ability in gaining the meaning of a text is hampered. If they proceed too slowly in the process of reading, their thoughts of the text (i.e., working memory) will be disrupted, which makes it more difficult to make connections among ideas within a text. This argument is also consistent with Perfetti's theory of verbal efficiency. As students develop automaticity in word recognition, more cognitive resources will be available for comprehending text (Perfetti, 1977, 1985, 1999; Perfetti & Hogaboam, 1975; Stanovich, 1980).

In addition to the elements of reading speed/rate and accuracy in the definition of reading fluency, most definitions also emphasize an aspect of continuous text expression or prosody—reading with expression. Reading with expression is also known as prosodic reading, "the ability to read in expressive rhythmic and melodic patterns" (Dowhower, 1991, p. 166). It is true that 'reading smoothly' does not mean the same thing as reading with expression; however, it can be interpreted as lack of choppiness in reading. Although reading with expression has been said to

be “a vague instructional phrase,” it has been “regarded as a necessary and defining feature of skilled fluent reading” (Dowhower, 1991, p. 165).

However, the above discussion of the definition/construct of oral reading fluency has been situated in L1 settings. The apparent lack of agreement on the importance of expressiveness in oral reading with L1 students makes us wonder what role expressive reading plays in adult second language (L2) reading. The importance of expressive/prosodic reading as an additional feature of oral reading fluency is one of the questions being explored in this study. However, ‘reading with expression’ is a restrictive term specifically related to the reading of narrative texts because research on L1 fluency development has often been with children at their early grades. As readers move to the upper elementary grades, their grade-level readings go beyond narrative texts. Instead of using the term ‘reading with expression,’ in this paper the term ‘prosody’ (or ‘prosodic reading’) has been adopted as a component of oral reading fluency in addition to reading rate and accuracy.

In sum, disagreements over definitions of oral reading fluency seem to center around whether or not certain aspects of fluency (e.g., speed, accuracy, and/or prosody) are included in the definition. Despite the lack of a unified view toward the fluency construct, there is a general agreement among reading researchers regarding the oral reading behaviors of non-fluent readers. According to Reutzel (1996), some of the ‘at-risk indicators’ for oral reading fluency of L1 readers are: (a) slow, labored pace; (b) poor flow or continuity indicated by pauses, false starters, regressions; and (c) poor phrasing evidenced by choppy reading, improper stress, and intonation.

In this paper, the definition of fluency includes four components: rate, accuracy, efficiency, and prosody. Rate is defined as words read per minute (wpm) and accuracy refers to the number of words read correctly (wc). A reader can be very fast but with many errors, which is probably more relevant for ESL learners than L1 speakers. For this reason, the component of efficiency was created to reflect the adjusted rate, i.e., words read correctly per minute (wcpm). The component of prosody is discussed further in the next section.

Prosody as a Component of Fluency

As a feature in oral reading fluency, prosody refers to “intonation, sound, and silence during oral flow and speech fluency” (Breznitz, 2006, p. 50). It provides clues to language expression and evidence for discourse comprehension. Similarly, Kuhn and Stahl (2003) argue that “prosody comprises a series of features including pitch or intonation, stress or loudness, and duration or timing” (p. 5).

Fluent reading requires recognition of the basic syntactic structure of the material being read and appropriate chunking of sentence structures into meaningful phrases. A variety of cues exist to guide readers in segmenting sentences into appropriate phrasal units. These cues include morphological, syntactic, semantic, pragmatic, and phonological signals (Schreiber, 1991). Although certain punctuation devices help signal some syntactic constructions, overall, written sentences lack consistent graphic cues to regularly mark off phrasal units. In oral reading, the proper use of prosody is signaled in appropriate segmentation of the syntactic structure and implies appropriate language processing of the propositional and syntactic structure of the sentence. A prosodic reader knows how to segment the text into meaningful units and relies on appropriate prosodic cues to exhibit their understanding of the syntax intended by the author. These prosodic features include “pauses, varied duration of those pauses, the raising and

lowering of pitch, lengthening of certain vowel sounds, and emphasis of certain words” (Dowhower, 1991, p. 166).

In the research of prosody in oral reading fluency, two approaches have been taken to measure prosody: subjective rating scales and spectrographic measures. The NAEP’s oral reading fluency¹ scale (Pinnell et al., 1995) is a subjective rating scale which has been well received by classroom teachers and researchers. The scale employs a four-point system developed to evaluate three main elements in oral reading: grouping or phrasing of words, adherence to author’s syntax or sentence structure, and expressiveness of the oral reading (Daane et al., 2005; Pinnell et al., 1995).

More recently, two other fluency rubrics have been developed by Klauda and Guthrie (2008) and Rasinski, Rikli, and Johnston (2009). The Multidimensional Fluency Scale developed by Rasinski, Rikli, and Johnston (2009) consists of three subscales to assess phrasing and expression, accuracy and smoothness, and pacing in prosodic reading. The fluency rubric developed by Klauda and Guthrie (2008) assesses five dimensions of prosodic reading: passage expressiveness, phrasing, pace, smoothness, and word expressiveness. Modern technologies have also been used to examine speech spectrographs using software programs that provide a more objective measure of prosodic reading by extracting information on pause patterns, pitch changes and other characteristics related to prosody in oral reading.

Relationship between Fluency and Comprehension

The development of oral reading fluency builds onto skills in word recognition and phonemic decoding. As stated by Breznitz (2006), “reading researchers agree that fluent reading is based primarily on the quality and rate of identification and recognition of the symbols and sounds of single and multiletter units” (p. 10). Some researchers (e.g., Torgesen et al., 1999) conceive reading fluency as mainly the by-product of rapid and accurate word recognition. However, in reading connected text, prosody has been said to be another important element in addition to speed and accuracy in word identification. Appropriate prosody in reading is said to enhance comprehension (Binder et al., 2012; Breznitz, 1990; Miller & Schwanenflugel, 2006; Ravid & Mashraki, 2007).

The link between fluency and comprehension has been well acknowledged, but it is still unclear how exactly fluency is linked to comprehension (Strecker et al., 1998). Some educators argue that fluency is a prerequisite for achieving comprehension and others think that comprehension fosters fluency. For example, Gough (1972) and Rumelhart (1977) considered oral reading fluency to be an outcome of decoding and comprehension; Breznitz (1987), however, asserted that fluent oral reading is a contributor to both decoding and comprehension (Strecker et al., 1998). Still others (e.g., Hudson et al., 2000; Samuels, 2006; Schreiber, 1980) claimed that comprehension should be one of the components of the fluency construct.

The recent interest in the relationship between oral reading fluency and reading comprehension has been how oral reading fluency predicts general reading competence and reading comprehension (Dowhower, 1987; Fuchs et al., 1988; Fuchs et al., 2001; Jenkins et al., 2003a, 2003b; Saiegh-Haddad, 2003; Shinn et al., 1992; Tan & Nicholson, 1997). In a number of studies, oral reading fluency was compared to more direct reading comprehension measures as an indicator of reading competence. Fuchs and colleagues have demonstrated that oral reading fluency correlates with standard reading comprehension measures at very high levels (Fuchs et

al., 2001; Jenkins et al., 2003a, 2003b). For example, Fuchs et al. (1988) found that oral reading fluency was more highly correlated to the reading comprehension subtest of the Stanford Achievement Test based on multiple-choice questions than reading comprehension tasks such as open-ended questions and cloze. Shinn et al. (1992) found that “CBM (Curriculum-Based Measurement) oral reading fluency provided a good index of reading proficiency, including comprehension” (p. 459). White (1995) also indicates a positive correlation between fluency level and comprehension. This line of research, however, has largely been restricted to English L1 beginning readers (most commonly seen between 2nd and 4th grades).

ESL students often encounter substantial difficulty comprehending materials that they read. One possible source of reading comprehension problems is the inability of some readers to access ideas in the text because of limited word recognition or inefficient reading processes. Previous L2 reading studies have reported variation in word recognition efficiency and reading rates that contributes to variation in reading efficiency even among fluent bilinguals (e.g., Favreau & Segalowitz, 1982; Koda, 1996, 1999; Muljani et al., 1998; Segalowitz et al., 1991). Saiegh-Haddad (2003) looked into the relationship between oral reading fluency and reading comprehension of Arabic and Hebrew speakers in their ESL reading. She found a strong relationship between oral reading fluency and reading comprehension in both native language groups.

Overall, relatively little research on the relationship between oral reading fluency and reading comprehension has been conducted with various L2 populations (Grabe, 2004, 2010). It is important to note that adult ESL learners are not a homogeneous group of language learners. Learners with different first language backgrounds may present a different answer to the question on the relationship between oral reading fluency and reading comprehension due to possible influence of first language processing skills on the reading of second language, especially the influence of first language orthographic features on lower-level processing skills such as word recognition.

The Influence of L1 Orthography on L2 Word Recognition

There are four major types of orthographies or writing systems: alphabetic, logographic, syllabic, and abjad. In alphabetic orthography, each letter roughly represents a phoneme of a spoken language. English is an alphabetic language. Like English, Spanish is also an alphabetic language but its orthography is considered more shallow/transparent than English due to higher degree of correspondence between phonemes and letters or graphemes. Orthographic depth refers to the degree of regularity in sound-symbol correspondence. The less regular the correspondence between sound and symbol, the deeper the orthography of a language is. Readers of relatively transparent orthographies recognize words more quickly and accurately than readers of deep orthographies. Chinese is a logographic language with an extremely deep orthography. Arabic orthography is known as abjad. Like an alphabetic orthography, each symbol in Arabic also represents a phoneme but the difference is that the phonemes are often consonants due to the omission of vowels in print. Japanese uses a combination of kana and kanji, in which kana is syllabic and kanji is logographic. Among Spanish, Chinese, Arabic, and Japanese, Spanish orthography is the shallowest and Chinese is the deepest. The depth of Arabic and Japanese falls within the range between Spanish and Chinese. In addition, the distances between the L1 orthography and English are also different. Readers with related L1 orthographic backgrounds

tend to have faster and more accurate recognition performance (e.g., Akamatsu, 1999; Fender, 2003; Koda, 1988, 1989; Muljani et al., 1998).

Based on the Orthographic Depth Hypothesis, native speakers in the shallow language rely easily on letter-to-sound correspondence as the major developmental path to L1 word recognition. In a deeper orthography, speakers must learn the opaque and complex letter-to-sound relationship through analogies with the known sight words. In the deepest orthography such as Chinese, speakers must learn the character-to-phoneme relation in each character individually, occasionally using phonetic radicals to aid the learning of its pronunciation. Due to the nature of orthographic variations among languages, L2 word recognition can be influenced by the distance between learners' L1 and L2. Cross-linguistic research has revealed that learners with related language backgrounds had advantage in word recognition when reading L2 over those without related language backgrounds (Koda, 1988, 1989; Muljani, Koda, & Moates, 1998). Since efficient word recognition is critical when it comes to fluency in reading and it can be influenced by L1 orthography, it is interesting to further exam the relative importance of the component measures of oral reading fluency for each of the L1 groups.

The goal of this study is to examine whether components of oral reading fluency may serve as indicators of general reading competence of adult ESL learners with four different first language backgrounds. Specifically, this study addresses the following research questions:

1. What are the relationships between components of oral reading fluency and ESL reading comprehension for learners of different first language backgrounds?
2. How important are the components of oral reading fluency in predicting ESL reading comprehension for learners of different first language backgrounds?

METHODOLOGY

Participants

A total of 149 ESL learners with Spanish, Arabic, Japanese and Chinese L1 backgrounds participated in this study, which included 33 Spanish, 39 Arabic, 40 Japanese, and 37 Chinese speakers. The reading proficiency of the learners represents a wide range, which included intermediate level learners studying English in an Intensive English program and international students studying at undergraduate and graduate programs.

Instruments and Procedures

Data collection took place in two sessions. In the first session, the participants took the TOEFL reading comprehension test under a proctored condition for 55 minutes and had 5 minutes to respond to a brief background survey. The reading comprehension section of a retired paper-based TOEFL test was used to assess reading comprehension in this study. The TOEFL Reading section is designed to assess English language learners' comprehension of academic reading materials. The test used for this study consisted of five reading passages, each of which is accompanied by multiple-choice comprehension items (50 items in total). The multiple-choice items were scored as right or wrong, with 1 point for each correct answer. The reliability of the reading test (Cronbach's alpha) was .87 for the present sample.

The second session took place in a computer lab, where each participant was asked to read a text aloud as fast as they could into a microphone connected to a computer. Their voice and the time taken to finish reading the text were recorded. The oral text reading task was designed to assess learners' fluency in reading a connected text. The reading passage was selected from an ESL reading textbook and is on the topic of child adoption. The text consisted of 245 words and was at the Flesch-Kincaid grade level of 8.0.

Scoring

Scores of oral reading rate (wpm), accuracy (wc), efficiency (wcpm), and prosody were obtained as measures for the multiple components of fluency. Since accuracy and prosody of oral reading involved human judgment, they were scored by human raters. All 149 recordings were double scored. The scoring of accuracy for passage reading was mainly based on native English pronunciation rules, but consistent foreign accents and dialectal variations were considered correct. Inter-rater agreement was examined by first calculating raters' agreement on each recording (out of the total of 245 items in the text) and then averaging it across 149 recordings. The average agreement between raters was 99% for accuracy rating.

For the scoring of prosody, the NAEP's oral reading fluency scale (Pinnell et al., 1995) was adopted for use with revisions. The original NAEP scale was designed to assess oral reading fluency of 4th-grade readers in their first language by reading a narrative text, so the criteria of whether the story is read with expressive interpretation seem relevant. Nevertheless, considering the participants of the current study as advanced and intermediate adult L2 learners, we adjusted the criterion on 'expressiveness of oral reading' to "whether there are variations in pitch and stress patterns and whether these variations exhibit the rhythmic aspect of oral language" in order to better capture variability more specific to ESL students when reading the types of text typical of academic content. The 4-level prosodic reading scale we adopted in this study is presented below. Highlighted in italics are the changes made to the original NAEP rubric.

Level 4 – Reads primarily in larger, meaningful phrase groups. Although some regressions, repetitions, and deviations from text may be present, these do not appear to detract from the overall structure of the text. Preservation of the author's syntax is consistent. *Variations in pitch (intonation) and stress patterns exhibit the rhythmic aspect of oral language.*

Level 3 – Reads primarily in three- or four-word phrase groups. Some smaller groups may be present. However, the majority of phrasing seems appropriate and preserves the syntax of the author. *There are variations in pitch (intonation) and stress patterns and the majority of these patterns sound appropriate.*

Level 2 – Reads primarily in two-word phrases with some three- or four-word groupings. Some word-by-word reading may be present. Word groups may seem awkward and unrelated to larger context of sentence or passage. *There are few variations in pitch (intonation) and stress patterns or the variations often sound inappropriate and awkward.*

Level 1 – Reads primarily word-by-word. Occasional two-word or three-word phrases may occur – but these are infrequent and/or they do not preserve meaningful syntax. *Reads in a monotone without variations in pitch or stress patterns.*

Two raters were trained to use the 4-level oral reading fluency scale introduced above. First, the raters had detailed discussions about how to interpret the scale. Second, the raters scored some practice samples individually and then compared scores. They discussed specific

issues and resolved discrepancies in the scores they assigned. As the raters reached good agreement about rating decisions, they graded all the recordings individually.

Inter-rater agreement for the rating of prosody was investigated in two ways. First, the exact match between raters was 79% and the rest 21% was in adjacent match². Second, Cohen's kappa, an index of classification agreement adjusted for agreement by chance, was .70, suggesting a substantial level of agreement³ (Landis and Koch 1977). Since the inter-rater reliability was acceptable for both accuracy and prosody, scores of one rater were used in the following analyses.

RESULTS

The descriptive statistics in Table 1 show means and standard deviations (in parentheses) of the measures for different L1 groups. One-Way ANOVA showed significant differences among the groups in all the measures, $F(3, 145) = 20.15, 8.91, 20.56, 12.10, 34.05$ respectively for reading rate (wpm), accuracy (wc), efficiency (wcpm), prosody, and reading comprehension ($p < .001$ in all the comparisons). Therefore, no overall analysis was conducted on combined groups to avoid spurious relationships. Instead, each L1 group was treated separately in the following analyses on the relationship between oral reading fluency and reading comprehension.

Table 1. Means and Standard Deviations

	Chinese	Japanese	Arabic	Spanish	Total
N	37	40	39	33	149
Oral reading rate (wpm)	137.50 (18.55)	122.68 (16.53)	120.72 (28.39)	154.52 (16.86)	132.90 (24.51)
Oral reading accuracy (wc, 0-245)	239.16 (3.53)	239.90 (3.26)	235.72 (7.15)	241.24 (4.13)	238.92 (5.18)
Oral reading efficiency (wcpm)	134.30 (18.80)	120.16 (16.57)	116.53 (29.03)	152.29 (18.03)	129.84 (25.19)
Oral reading prosody (1-4)	2.59 (0.76)	2.23 (0.80)	2.18 (0.88)	3.18 (0.68)	2.52 (0.87)
TOEFL reading comprehension (0-50)	39.81 (6.21)	24.73 (9.99)	23.72 (11.25)	38.91 (8.04)	31.35 (11.83)

One of the most important observations that can be made based on the descriptive statistics in Table 2 is that the reading comprehension ability of the groups represents two levels of proficiency. With an average score of near 80% on TOEFL reading comprehension, the Chinese and Spanish groups can be considered advanced English learners; on the other hand, the reading proficiency of the Arabic and Japanese groups is about intermediate level. Due to this

difference, comparative interpretations should be restrained to groups with comparable reading proficiencies although the purpose of the study was not to make statistical comparisons among groups.

The Pearson product-moment correlations among these measures are shown in Table 2 for all the groups. A few observations can be made based on the correlations. First, the

Table 2. Pearson Product-Moment Correlations among the Measures for All Groups

		Rate (wpm)	Accuracy (wc)	Efficiency (wcpm)	Prosody
Chinese	1. Oral reading rate (wpm)	--			
	2. Oral reading accuracy (wc)	.309	--		
	3. Oral reading efficiency (wcpm)	.995**	.404**	--	
	4. Oral reading prosody	.710**	.427**	.730**	--
	5. TOEFL reading comprehension	.442**	.256	.451**	.453**
Japanese	1. Oral reading rate (wpm)	--			
	2. Oral reading accuracy (wc)	.175	--		
	3. Oral reading efficiency (wcpm)	.996**	.266	--	
	4. Oral reading prosody	.717**	.401*	.741**	--
	5. TOEFL reading comprehension	.436**	.347*	.460**	.582**
Arabic	1. Oral reading rate (wpm)	--			
	2. Oral reading accuracy (wc)	.473**	--		
	3. Oral reading efficiency (wcpm)	.996**	.551**	--	
	4. Oral reading prosody	.885**	.503**	.890**	--
	5. TOEFL reading comprehension	.665**	.501**	.687**	.611**
Spanish	1. Oral reading rate (wpm)	--			
	2. Oral reading accuracy (wc)	.483**	--		
	3. Oral reading efficiency (wcpm)	.993**	.580**	--	
	4. Oral reading prosody	.651**	.782**	.708**	--

5. TOEFL reading comprehension	.659**	.745**	.709**	.703**
--------------------------------	--------	--------	--------	---------------

*: $p < .05$; **: $p < .01$ (two-tailed).

relationships between the components of oral reading fluency became stronger as the orthographies of the first languages become more transparent. For the Chinese group, the correlation coefficients between the fluency components were mostly at the level of 0.4 and no significant correlation was found between oral reading accuracy and reading comprehension.

However, the majority of the coefficients rose to the level of 0.7 for the Spanish group, with Japanese and Arabic groups in between. Second, prosody was the component of oral reading fluency which had the highest correlation with reading comprehension for both Chinese and Japanese groups, but the component which showed highest correlation with reading comprehension was efficiency (wcpm) for the Arabic group and accuracy (wc) for the Spanish group. Third, prosody was most highly correlated with reading efficiency (wcpm) for the Chinese, Japanese, and Arabic groups, but it was mostly highly correlated with accuracy (wc) for the Spanish.

In order to investigate the roles of the component features of oral reading fluency in ESL reading comprehension of the groups, stepwise regression analyses were conducted for each L1 group with the components of oral reading fluency (rate, accuracy, efficiency, and prosody) as predictors and L2 reading comprehension as dependent variable. Table 3 is the summary of the findings.

Table 3. Summary of Stepwise Regression Analyses for the L1 Groups

	Model	Predictors	B	Beta	R	R ²	Adjusted R ²	St. error
Chinese	1	Prosody	3.689	.453	.453	.205	.182	5.614
Japanese	1	Prosody	7.266	.582	.582	.339	.321	8.229
Arabic	1	Efficiency (wcpm)	.266	.687	.687	.471	.457	8.287
Spanish	1	Accuracy (wc)	1.45	.745	.745	.555	.541	5.450
	2	Accuracy (wc) Rate (wpm)	1.083 .186	.557 .390	.819	.671	.650	4.760

For the Chinese group, prosody was the only significant predictor, accounting for about 18% of variance in L2 reading comprehension. Like the Chinese group, prosody was also found to be the only significant predictor for the Japanese group, which accounted for about 32% of the variance in L2 reading comprehension. For the Arabic group, oral reading efficiency (wcpm) as the only significant predictor, which accounted for about 46% of the variance in L2 reading

comprehension. A two-model solution was generated for the Spanish group, in which oral reading accuracy (wc) and rate (wpm) were found to be significant predictors. Oral reading accuracy (wc) alone accounted for about 54% of variance in L2 reading comprehension. In addition to accuracy, oral reading rate (wpm) also made significant contributions. Together, the two variables accounted for 65% of variance in L2 reading comprehension.

DISCUSSION

The term ESL learners represent a group of people who learn English as a second language. However, there are many differences among language learners. One of the main differences is their first language background. The relationship between oral reading fluency and reading comprehension has been found to vary across first language groups. For the Chinese and Japanese groups, prosody was the only significant predictor of reading comprehension, although the percentages of variance it accounted for differed to some degree (18% for Chinese vs. 32% for Japanese). Results from the Arabic group showed that oral reading efficiency (wcpm) accounted for about 46% of variance in L2 reading comprehension. Unlike the other groups, accuracy (wc) and rate (wpm) were found to be more important predictors for the Spanish group and they accounted for a total of 65% of the variance in reading comprehension. The lack of consistency in the results warrants more careful investigations regarding the relative importance of the components of oral reading fluency in ESL reading comprehension.

Interestingly, the strength of the relationship between fluency and reading comprehension seems to correspond negatively with the level of orthographic depth of the learners' first language and its distance to English. As the level of orthographic depth and distance to English increases from Spanish, Arabic, Japanese, to Chinese, the relationship between oral reading fluency and reading comprehension becomes weaker as indicated by the percentage of variance in reading comprehension that was accounted for by fluency (decreasing from 65%, 46%, and 32% to 18%). In other words, the more closely related the learners' L1 and L2, the stronger the relationship between oral reading fluency and reading comprehension in second language reading. A possible explanation is that the closer the orthographic distance between L1 and L2, the more likely learners are able to transfer their L1 reading skills, word recognition and decoding skills in particular, into the reading of L2 (Koda, 1988, 1989; Muljani, Koda, & Moates, 1998).

As demonstrated in our early discussion, there is a lack of agreement on the importance of prosody in oral reading fluency in L1 research. Some researchers (e.g., Dowhower, 1991) argued that prosody was a necessary and defining feature in oral reading fluency and others (e.g., Torgesen et al., 2001) thought it was a vague instructional term and might not deserve much attention. Schwanenflugel, Hamilton, Kuhn, Wisenbaker, and Stahl (2004) also found that reading prosody adds minimal scaffolding effect for comprehension. The findings in this study demonstrated that prosody was the only significant predictor of reading comprehension for the Japanese and Chinese ESL learners, but not the Arabic or Spanish groups. Therefore, more research is needed before any definite answer can be obtained to settle this disagreement.

The different roles of oral reading fluency in the reading comprehension of the Chinese and Spanish ESL learners indicated interesting questions for future research. The two groups were at the same level of reading comprehension; however, the Spanish group was much more fluent in oral reading than the Chinese group, which indicates, the paths that the two groups took

to reach the same level of comprehension might have been different. The Chinese learners have to compensate for their relatively weaker word recognition skills, especially when automaticity and efficiency in word recognition are often seen as the precondition for good comprehension (LaBerge & Samuels, 1974; Perfetti, 1977, 1985, 1999; Perfetti & Hogaboam, 1975; Samuels, 1979; Stanovich, 1980).

One important methodological implication of the study is that the field of second language research should be more aware of first language differences among learners. Researchers are often encouraged to include participants with various L1 backgrounds to show sampling representativeness in quantitative research. However, this practice can distort and confound findings in studies such as this.

When interpreting the finding of this study, we need to keep in mind a few possible limitations to this research. First, the scoring of prosody with a four-point scale did not yield as much variability in the measure as the other measures in the study. Speech spectrograph might have advantage over subjective rating scales in the measurement of prosody for the reason that it can provide more objective, precise and variable data. Second, the sample sizes of the groups were quite small. Third, the reading proficiency of the participants varied across the L1 groups. It is important for future research to include participants at comparable reading proficiency levels among groups.

For many years, oral reading has been restricted to be an informal classroom assessment for first language children to evaluate the status of their reading development. Second language classroom teachers often refrain themselves from asking their students to read aloud, especially in Asian contexts (e.g., Taguchi, 1999). As one of the first studies to measure aspects of oral reading with adult ESL learners, this study demonstrates that oral reading fluency can serve as a contributing measure of L2 learners' reading comprehension, especially for learners whose first language orthography is not too distant from English. The weaker relationship between oral reading fluency and reading comprehension for Chinese learners of English does not mean that oral reading fluency is not important for them. On the contrary, if they were provided opportunities to improve their oral reading fluency, they might become more efficient and better readers. It is imperative that empirical studies be conducted to investigate how Chinese ESL learners benefit from fluency training.

Given the connection between fluency and comprehension, interventions to develop ESL learners' oral reading fluency are warranted. Rasinski (2003) introduces many instructional practices for fluency development such as supported reading, repeated reading, and performance reading, among which repeated reading has shown some promise in both L1 and L2 instructional contexts. Through repeated reading, a student has the opportunity to read the same passage over and over until a certain level of fluency is reached. In English L1 settings, interventional studies on repeated reading have demonstrated gains in reading rate, word recognition ability, comprehension (Chard, Vaughn, & Tyler, 2002; National Reading Panel, 2000; Therrien, 2004) and increases in prosodic reading (Dowhower, 1987). In English L2 settings, Taguchi, Gorsuch and colleagues conducted a series of studies on the training effect of repeated reading on reading rate and comprehension and their findings have generally been positive (Gorsuch & Taguchi, 2008; Taguchi, 1997; Taguchi & Gorsuch, 2002; Taguchi, Gorsuch & Sasamoto, 2006; Taguchi, Takayasu-Maass, & Gorsuch, 2004). However, to achieve this instructional goal, teachers should understand that fluency development is accomplished through a combination of practices. The

key is to create a set of consistent practices that blend in well with other reading goals and continue practice for an extended period of time (Grabe, 2010).

FOOTNOTES

¹The term ‘fluency’ by NAEP refers to the ‘ease’ or ‘naturalness’ of reading, which is synonymous to “expression” or “prosody” as one of the components of the overall construct of oral reading fluency.

²In the NAEP study, the fluency scoring reliability data showed that the percentage of exact agreement was 58%, percentage of exact + adjacent agreement was 98%, and reliability coefficient was .70.

³Cohen’s kappa between .61 and .80 is considered substantial (Landis & Koch, 1977).

Xiangying Jiang is Associate Professor of TESOL at West Virginia University. Her research focuses on second language reading and literacy, including topics on comprehension strategies, discourse structure, reading fluency, vocabulary, and the influence of first language literacy on second language literacy development.

Email: Xiangying.Jiang@mail.wvu.edu

REFERENCES

- Akamatsu, N. (1999). The effects of first language orthographic features on word recognition processing in English as a second language. *Reading and Writing: An Interdisciplinary Journal*, 11, 381-403.
- Binder, K. S., Tighe, E., Jiang, Y., Kaftanski, K., Qi, S., & Ardoin, S. P. (2012). Reading expressively and understanding thoroughly: An examination of prosody in adults with low literacy skills. *Reading and Writing: An Interdisciplinary Journal*, doi: 10.1007/s11145-012-9382-7
- Breznitz, Z. (1987). Increasing first graders’ reading accuracy and comprehension by accelerating their reading rates. *Journal of Educational Psychology*, 79, 236-242.
- Breznitz, Z. (1990). Vocalization and pauses in fast-paced reading. *Journal of General Psychology*, 117, 153-159.
- Breznitz, Z. (2006). *Fluency in reading: Synchronization of process*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Chard, D., Vaughn, S., & Tyler, B. (2002). A synthesis of research on effective interventions for building reading fluency with elementary students with learning disabilities. *Journal of Learning Disabilities*, 35, 386–406.
- Daane, M. C., Campbell, J. R., Grigg, W. S., Goodman, M. J., & Oranje, A. (2005). *Fourth grade students reading aloud: NAEP 2002 special study of oral reading (NCES 2006-469)*. Washington, DC: National Center for Education Statistics, U. S. Department of Education.

- Dowhower, S. L. (1987). Effects of repeated reading on second-grade transitional readers' fluency and comprehension. *Reading Research Quarterly*, 22, 389-406.
- Dowhower, S. L. (1991). Speaking of prosody: Fluency's unattended bedfellow. *Theory into Practice* 30, 165-175.
- Favreau, M., & Segalowitz, N. S. (1982). Second language reading in fluent bilinguals. *Applied Psycholinguistics*, 3, 329-341.
- Fender, M. (2003). English word recognition and word integration skills of native Arabic- and Japanese-speaking learners of English as a second language. *Applied Psycholinguistics*, 24, 289-315.
- Fuchs, L., Fuchs, D., Hosp, M., & Jenkins, J. (2001). Oral reading fluency as an indicator or reading competence: A theoretical, empirical, and historical analysis. *Scientific Studies of Reading*, 5, 239-256.
- Fuchs, L., Fuchs, D., & Maxwell, L. (1988). The validity of informal measures of reading comprehension. *Remedial and Special Education*, 9, 20-28.
- Gorsuch, G. J., & Taguchi, E. (2008). Repeated reading for developing reading fluency and reading comprehension: The case of EFL learners in Vietnam. *System*, 36, 253-278.
- Gough, P. B. (1972). One second of reading. In J. Kavanagh and I. Mattingly (Eds.), *Language by ear and by eye* (pp. 331-358). Cambridge, MA: MIT Press.
- Grabe, W. (2004). Reading fluency research and practice: A review. Unpublished manuscript. Princeton, NJ: Educational Testing Service.
- Grabe, W. (2010). Fluency in reading—thirty-five years later. *Reading in a Foreign Language*, 22, 71-83.
- Hudson, R. F., Mercer, C. D., & Lane, H. B. (2000). Exploring reading fluency: A paradigmatic overview. Unpublished manuscript. University of Florida, Gainesville.
- Jenkins, J., Fuchs, L., van den Broek, P., Espin, C., & Deno, S. (2003a). Sources of individual differences in reading comprehension and reading fluency. *Journal of Educational Psychology*, 95, 719-729.
- Jenkins, J., Fuchs, L., van den Broek, P., Espin, C., & Deno, S. (2003b). Accuracy and fluency in list and context reading of skilled and RD groups: Absolute and relative performance levels. *Learning Disabilities Research and Practice*, 18, 237-245.
- Kame'nui, E., & Simmons, D. (2001). The DNA of reading fluency. *Scientific Study of Reading*, 5, 203-210.
- Klauda, S. L., & Guthrie, J. T. (2008). Relationships of three components of reading fluency to reading comprehension. *Journal of Educational Psychology*, 100, 310-321.
- Koda, K. (1988). Cognitive process in second language reading: Transfer of L1 reading skills and strategies. *Second Language Research*, 4, 133-156.
- Koda, K. (1989). Effects of L1 orthographic representation on L2 phonological coding strategies. *Journal of Psycholinguistic Research*, 18, 201-222.
- Koda, K. (1996). L2 word recognition research: A critical review. *The Modern Language Journal*, 80, 450-460.
- Koda, K. (1999). Development of L2 intraword orthographic sensitivity and decoding skills. *The Modern Language Journal*, 83, 51-64.

- Kuhn, M. R., & Stahl, S. A. (2003). Fluency: A review of developmental and remedial practices. *Journal of Educational Psychology, 95*, 3-21.
- LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology, 6*, 293-323.
- Landis, J. R., & Koch, G. G. (1977). *Measurement of observer agreement for categorical data*. Biometrika.
- Meyer, M. S., & Felton, R. H. (1999). Repeated reading to enhance fluency: Old approaches and new directions. *Annals of Dyslexia, 49*, 283-306.
- Miller, J., & Schwanenflugel, P. J. (2006). Prosody of syntactically complex sentences in the oral reading of young children. *Journal of Educational Psychology, 98*, 839-853.
- Muljani, M., Koda, K., & Moates, D. (1998). Development of L2 word recognition: A connectionist approach. *Applied Psycholinguistics, 19*, 99-114.
- National Reading Panel (2000). *Teaching children to read: A n evidence-based assessment of the scientific research literature on reading and its implication for reading instruction*. Washington, D.C.: National Institute of Child Health and Human Development.
- Perfetti, C. A. (1977). Language comprehension and fast decoding: Some psycholinguistic prerequisites for skilled reading comprehension, In J. T. Guthrie (Ed.), *Cognition, curriculum, and comprehension* (pp. 20-41). Newark, DE: International Reading Association.
- Perfetti, C. A. (1985). *Reading ability*. New York: Oxford University Press.
- Perfetti, C. A. (1999). Comprehending written language: A blueprint of the reader. In C. Brown and P. Hagoot (Eds.), *The neurocognition of language* (pp. 167-208). New York: Oxford University Press.
- Perfetti, C. A., & Hogaboam, T. (1975). Relationship between single word decoding and reading comprehension skill. *Journal of Educational Psychology, 67*, 461-469.
- Pinnell, G. S., Pikulski, J. J., Wixson, K. K., Campbell, J. R., Gough, P. B., & Beatty, A. S. (1995). *Listening to children read aloud*. National Center for Education Statistics (Report No. 23-FR-04).
- Rasinski, T. (2003). *The fluent reader: Oral reading strategies for building word recognition, fluency, and comprehension*. New York: Scholastic.
- Rasinski, T., Rikli, A., & Johnston, S. (2009). Reading fluency: More than automaticity? More than a concern for the primary grades? *Literacy Research and Instruction, 48*, 350-361.
- Ravid, D., & Mashraki, Y. E. (2007). Prosodic reading, reading comprehension and morphological skills in Hebrew-speaking fourth graders. *Journal of Research in Reading, 30*, 140-156.
- Rumelhart, D. E. (1977). Toward an interactive model of reading. In S. Dornic (Ed.), *Attention and Performance* (Vol. 6, pp. 573-603). Hillsdale, NJ: Erlbaum.
- Reutzel, D. R. (1996). Developing At-risk Reader's Oral Reading Fluency. In L. Putman (Ed.), *How to become a better reader: Strategies for assessment and intervention* (pp. 241-254). Englewood Cliffs, NJ: Merrill.
- Reutzel, D. R., & Hollingsworth, P. M. (1993). Effects of fluency training on second graders' reading comprehension. *Journal of Educational Research, 86*, 325-331.
- Saiegh-Haddad, E. (2003). Bilingual oral reading fluency and reading comprehension: The case of Arabic/Hebrew (L1)-English (L2) readers. *Reading and Writing: An Interdisciplinary Journal, 16*, 717-736.

- Samuels, S. J. (1979). The method of repeated readings. *The Reading Teacher*, 32, 403-408.
- Samuels, S. J. (2006). Toward a model of reading fluency. In S. J. Samuels and A. E. Farstrup (Eds.), *What research has to say about fluency instruction* (pp. 24-46). Newark, DE: International Reading Association.
- Schreiber, P. A. (1980). On the acquisition of reading fluency. *Journal of Reading Behavior*, 12, 177-186.
- Schreiber, P. A. (1991). Understanding prosody's role in reading acquisition. *Theory into Practice*, 30 (3), 158-164.
- Schwanenflugel, P., Hamilton, M., Kuhn, M., Wisenbaker, J., & Stahl, S. (2004). Becoming a fluent reader: Reading skill and prosodic features in the oral reading of young readers. *Journal of Educational Psychology*, 96(1), 119-129.
- Segalowitz, N. S., Poulsen, C., & Komoda, M. (1991). Lower level components of reading skill in higher level bilinguals: Implications for reading instruction. *AILA Review*, 8, 15-30.
- Shinn, M. R., Knutson, N., Good, R. H., Tilly, W. D., & Collins, V. L. (1992). Curriculum-based measurement of oral reading fluency: A confirmatory analysis of its relation to reading. *School Psychology Review*, 21, 459-479.
- Stanovich, K. E. (1980). Effects of explicit teaching and peer tutoring on the reading achievement of learning disabled and low-performing students in regular classrooms. *Reading Research Quarterly*, 16, 32-71.
- Strecker, S. K., Roser, N. L., & Martinez, M. G. (1998). Toward understanding oral reading fluency. *National Reading Conference Yearbook*, 47, 295-310.
- Taguchi, E. (1997). The effects of repeated readings on the development of lower identification skills of FL readers. *Reading in a Foreign Language*, 11, 97-119.
- Taguchi, E. (1999). The effects of repeated readings on the development of lower identification skills of FL readers. *Reading in a Foreign Language*, 11, 97-119.
- Taguchi, E., & Gorsuch, G. J. (2002). Transfer effects of repeated EFL reading on reading new passages: A preliminary investigation. *Reading in a Foreign Language*, 14, 43-65.
- Taguchi, E., Gorsuch, G., & Sasamoto, E. (2006). Developing second and foreign language reading fluency and its effect on comprehension: A missing link. *The Reading Matrix*, 6(2), 1-17.
- Taguchi, E., Takayasu-Maass, M., & Gorsuch, G. (2004). Developing reading fluency in EFL: How assisted repeated reading and extensive reading affect fluency development. *Reading in a Foreign Language*, 16, 70-96.
- Tan, A., & Nicholson, T. (1997). Flashcards revisited: Training poor readers to read words faster improves their comprehension of text. *Journal of Educational Psychology*, 89, 276-288.
- Therrien, W. J. (2004). Fluency and comprehension gains as a result of repeated reading: A meta-analysis. *Remedial & Special Education*, 25, 252-261.
- Torgesen, J., Rashotte, C., & Alexander, A. (2001). Principles of fluency instruction in reading: Relationships with established empirical outcomes. In M. Wolf (Ed.), *Dyslexia, fluency, and the brain* (pp. 333-355). Timonium, MD: York Press.
- Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1999). *Tests of Word Reading Efficiency (TOWRE)*. Austin, TX: Pro-Ed.
- White, S. (1995). Listening to Children Read Aloud: Oral Fluency. *NAEP Facts*. Washington, DC: National Center for Education Statistics, U.S. Department of Education.