



The English Oral Reading Fluency Test: Relationships to Comprehension and Test Takers' Attitudes

Thidawan Tunskul
Chulalongkorn University, Thailand
tcharoenpornsook@gmail.com

Chatraporn Piamsai
Chulalongkorn University, Thailand
pompom3@hotmail.com

Abstract

This study compared various measures used to assess oral reading fluency skills in relation to reading comprehension. The participants were 54 first year students from the Faculty of Political Science, Chulalongkorn University. An English Oral Reading Fluency (EORF) test and a set of comprehension questions were devised. Then, the scores of rate, accuracy and prosody were compared to investigate to what extent different oral reading fluency measures contributed to comprehension by using multiple regression analysis. The results revealed that only accuracy made a statistically significant unique contribution to comprehension. When focusing on the relationships of each oral reading fluency measure (rate, accuracy and prosody) with comprehension, it was found that there were significant positive moderate correlations between accuracy and comprehension, and prosody and comprehension. In addition, the study examined the test takers' attitudes toward the EORF test regarding their anxiety, attitudes and opinion. The findings indicated that even though some students had exhibited certain signs of anxiety from taking the EORF test, those who experienced no anxiety outnumbered them, and the majority of the test takers had positive attitudes and opinions toward the EORF test.

Introduction

In the words of Wolf (2007, p. 3), “we were never born to read”. Indeed, reading was invented only a few thousand years ago. Although humans are not born with reading skills, we are born with the capability to learn to read. Following one of the greatest interventions in history, we have rearranged the extraordinary organization of our brains which has expanded the ways of our thinking capabilities and altered the intellectual evolution of our species (Wolf, 2007). In modern societies, we, as fluent readers, read different types of texts throughout the day, such as the newspapers, flyers, ads, signs, e-mails and text-messages all around us, and in one way or another, we are often engaged in reading that is possibly rather demanding in educational, professional and occupational settings (Grabe, 2009). Also, we read both aloud and silently depending on the place and time and on our own preference, and there are moments and times we are compared in our reading no matter whether silent or loud – the most common example being in school (Baker & Luke, 1988). Reading skills, thus, are vital for everyone.

To be an efficient reader, one has to be able to read fluently. As cited by Reutzel and Cooter (2003), many researchers have asserted reading fluency as a significant goal in becoming a proficient strategic reader. Reading fluency is reported to significantly impact students' reading development (Konza, 2006; Taguchi, Takayasu-Maass & Gorsuch, 2004), and a range of fluency practices should be regarded in any reading curriculum to enhance automaticity skills (Grabe, 2009). Fluent reading is indicative of a confident and accurate reader (Konza, 2006). On the other hand, without fast and accurate word recognition skills and reading fluency, a good reading ability is nearly impossible (Taguchi et al., 2004). For L2 readers, Grabe (2009) indicates that fluency allows them to experience a much larger amount of L2 input in various functions and contexts, i.e., both inside and outside classrooms, which also allows L2 college students to read the huge amounts of material that are sometimes assigned weekly. Reading fluency, an essential component of competent reading comprehension abilities, is what good readers do continuously with the texts they encounter.

Although reading fluency can be assessed silently or orally, oral reading allows teachers to easily identify and provide instant feedback at the exact point where a student encounters a problem. Gibson (2008) mentions that oral reading or reading aloud can be used as a diagnostic tool which allows teachers to identify more persistent problems such as pronunciation and graphemic-phonemic connections and which is often used with the aim of comprehension. Also, reading aloud can help students practice and improve pronunciation (Gibson, 2008). Fundamentally, reading fluency refers to "the ability to read rapidly with ease and accuracy, and to read with appropriate expression and phrasing" (Grabe, 2009, p. 291). However, reading fluency may still not be a common phenomenon in Thailand as reading fluency is predominantly associated with first language reading; only accuracy in reading aloud in various genres, i.e. news, advertisements and poems, is set as the achievement of the foreign language goal for grade 12 graduates by the Ministry of Education (2008). Accuracy alone, however, does not seem enough to characterize a proficient reader as other factors of oral reading such as reading rate and phrasing are also important (Reutzel & Cooter, 2003). Thus, the focus should rather be on reading fluency since its key components are accuracy, automaticity and prosody (Penner-Wilger, 2008).

Assessing fluency is a crucial step for smart and sensible fluency instruction (Opitz, 2007). However, oral reading has rarely been tested formally in classrooms in Thailand as its process is considered time consuming leading to doubts as to whether these graduates have in reality achieved the goal set by the Ministry of Education prior to entering into a university. However, this is not the only issue. The research regarding the assessment of oral reading fluency in L2 contexts remains very little (Fujita & Yamachita, 2014; Grabe, 2009.), and such research has never been conducted in the Thai context. Thus, to bridge the gap, the current study compared various measures used to assess oral reading fluency skills in relation to reading comprehension. The author also examined students' attitudes toward the EORF test as the EORF test has never been used before.

Objectives of this study

1. To compare to what extent different oral reading fluency measures (rate, accuracy and prosody) contribute to comprehension
2. To investigate students' attitudes toward an oral reading fluency test



Research Questions

1. What are the relative contributions of rate, accuracy and prosody to reading comprehension?
2. What are students' attitudes toward an oral reading fluency test?

Literature Review

Notions of Reading Fluency

Literally, fluency means “flowing” and it consists of several components (Wolfe & Nevills, 2004). In the reading context, it refers to the ability to read text accurately with speed and proper expression (National Institute of Child Health and Human Development [NICHD], 2000). Grabe (2009) defines reading fluency as the ability to read rapidly and accurately with ease and appropriate expression and phrasing. Besides focusing on its components, reading fluency has also been defined from different perspectives. Daly, Chafouleas and Skinner (2004), for example, define reading fluency as the number of correct words derived when a reader reads aloud a passage of connected text for one minute.

Looking closely at the process of reading, Allington and Franzen (2009) claim that the definition of reading fluency begins when the visual analysis system is triggered by seeing the written word; then the information is sent to the visual input lexicon. Once recognized as a word, it travels to the semantic system, continues to the phonological output lexicon to the phonemic level buffer, and finally comes out as speech. Since meaning is attached to the word or sentence, this route includes the semantic system. In relation to this meaning, the main feature of reading fluency is the ability to do at least two tasks: encoding and decoding.

Wolf and Katzir-Cohen (2001) define oral reading fluency in terms of readers' development. For beginning readers, reading fluency is the product of the initial development of accuracy and the consequent development of automaticity in the underlying sublexical processes, lexical processes, and their integration in single word reading and connected texts. Accordingly, these processes include perceptual, phonological, orthographic, and morphological processes at the letter, letter-pattern, and word-level, as well as semantic and syntactic processes at the word-level and connected text-level. After reading fluency is fully developed, it refers to a level of accuracy and rate where decoding is relatively effortless, where oral reading is smooth and accurate with correct prosody, and where attention can be allocated to comprehension.

Although reading fluency has been defined differently, Kuhn and Stahl (2003) state that there is a consensus on the key components of reading fluency which comprise: “(a) accuracy in decoding, (b) automaticity in word recognition, and (c) the appropriate use of prosodic features such as stress, pitch, and appropriate text phrasing” (p.5).

Theoretical Background and Key Components of Reading Fluency

Rasinski (2004) places emphasis on three dimensions of reading fluency which stress three elements. Each dimension stresses each element including the significance of

accuracy in word decoding, quick and automatic recognition of words in connected text, and expressive and meaningful interpretation of text. Also, he indicates that fluent readers decode words automatically and accurately with minimal or no use of their limited attention or conscious cognitive resources. While automaticity is a significant component of fluency, accuracy seems to be the top priority component in decoding because a reader has to be able to decode words accurately to a certain degree so as to comprehend a reading text. Besides automaticity and accuracy, prosody is believed to be one of the key components of oral reading fluency as mentioned in many research studies (e.g. Grabe, 2009; Kuhn & Stahl, 2003; L. S. Fuchs, D. Fuchs, Hosp, & Jerkin, 2001; NAEP, 2002; Penner-Wilger, 2008; Rasinski, 2004; Valencia et al., 2010).

Regarding automaticity, LaBerge and Samuels' (1974) automaticity model is possibly the most utilized as a conceptualized framework for oral reading fluency (Fuchs et al., 2001). LaBerge and Samuels (1974) refer to automaticity, or Automatic Information Processing, as the ability to rapidly perform a complex task without conscious effort. In their bottom-up serial-stage model of reading, the higher level processes require the completion of the lower level processes. Their Automatic Information Processing model of reading shows the brain has a limited capacity available for multi-tasking. Attention must be shifted from one job to another, and if a job (decoding) requires a large portion of the available attention capacity, attention left for another job (comprehending) is limited. The assumption is that if a reader can read automatically with little attention on the decoding process, the result is the improvement of his/her comprehension. As a result, they consider reading rate as a product of automaticity, which, regardless of the way it is calculated, has later been used to measure reading fluency in many research studies (e.g. Cucchiaroni, Strik, & Boves, 2000; Fuchs et al., 2001; Penner-Wilger, 2008; Samuels, 1979; Valencia et al., 2010).

Penner-Wilger (2008) defines accuracy as the ability to correctly generate a phonological representation of each word, either because it is part of the reader's sight-word vocabulary or it comes from reader's use of effortful decoding strategy such as sounding out the word. Grabe (2009) indicates that accuracy is strongly associated with word recognition as fluent word recognition must be rapid, automatic, complete and accurate at the same time. Regarding L2 readers, he claims that although the accuracy and completion of word retrieval cannot be expected, the absence of accuracy results in the degradation of comprehension. Also, he specifies that completely specified lexical entries and accuracy are necessary for fluency and advanced comprehension. Regarding assessing oral reading fluency, NAEP (2002) refers to accuracy as the degree to which a student's oral reading conforms to the letter-sound conventions of printed English.

The evidence of active interpretation and meaning construction can be found when readers embed appropriate elements in oral expression such as volume, tone, emphasis and phrasing (Rasinski, 2004). Levasseur, Macaruso, Palumbo, and Shankweiler (2006) indicate that to read a text with comprehension, one needs to process both individual words and to analyze their phrasal groupings. They claim that the ability above and beyond word recognition contributing to naturalness in reading aloud is the ability to supply the appropriate prosody. They define prosody as including the suprasegmental aspects of speech such as sentence pitch contours, stress rhythms and pauses at major syntactic breaks. Similarly, Penner-Wilger (2008) defines prosody as naturalness of reading including appropriate phrasing, expression, volume, stress and pitch. Consequently, one may be considered a dysfluent reader if one hesitates, stumbles



and occasionally makes errors in identifying words, as well as has problems in phrasing, emphasis and intonation while reading (Levasseur et al., 2006).

Rasinski, Blachowicz, and Lems (2012) mention that fluency builds on a foundation of oral language skills, phonemic awareness, familiarity with letter forms and efficient decoding skills. To be able to read the text aloud successfully, a reader has to recognize the words quickly and easily enough to be accurate, and be able to make sufficient sense of the meaning of the message to make it sound like language (Rasinski et al., 2012). Hence, English language learners who are able to read aloud fluently are those who can recognize words automatically (quickly and easily) and decode words accurately with appropriate prosody. Consequently, to assess oral reading fluency, the three elements of rate, accuracy and prosody should be considered

Reading Fluency and Comprehension

Fluency is viewed as a critical component of reading programs for the reason that it is associated with reading outcomes, including comprehension (Penner-Wilger, 2008). Fluency is essential for good comprehension and enjoyable reading (Blevins, 2002). It also establishes a connection from decoding skills to comprehension (Rasinski, 2004). In addition, the lack of basic skills or reading fluency is one of the causes of comprehension difficulty (Gunning, 2002). As reading fluency is believed to be relevant to comprehension, the relationship between reading fluency and comprehension has been examined by some researchers.

Fuchs et al.'s (2001) exploration has been cited in many research studies. In their study, they investigated many research studies concerning oral reading fluency as an indicator of overall reading competence. Then, they summarized several substantial studies and provided historical analysis regarding the incorporation of oral reading fluency into measurement approaches during the past century. In their research study, they gathered research studies including their own previous research study in which the Reading Comprehension subtest of the Stanford Achievement Test was used as the criterion measure to find the correlation with four other alternative measures: 1) question answering, 2) recall, 3) cloze (which are direct measures of reading comprehension) and 4) oral reading fluency. Participants were middle and junior high school-disabled students. Words read correctly per minute (wcpm: the number of the total words read minus the errors, i.e. omissions, repetitions, substitutions, and mispronunciations) was used to score student's oral reading fluency. The students read two of the 400-word passages aloud for 2 minutes each. As the results showed the correlations from the four alternative measures to be .82, .70, .72 and .91 respectively, they concluded that oral reading fluency (.91) was a better means of assessment to predict comprehension than the direct measurements of question answering, recall, and cloze.

Valencia et al. (2010) compared multiple models including a measure of wcpm at 1 and 3 minutes, and measures of individual and combined reading fluency indicators, i.e., rate, prosody, accuracy and comprehension to assess the oral reading fluency of students in grades 2, 4 and 6. They used three models of oral reading fluency measures to predict students' reading comprehension performance from the reading comprehension section of the Iowa Test of Basic Skills Battery (ITBS). The three models of oral reading fluency measures are: 1) wcpm at 1 and 3 minutes, 2) wcpm and prosody at 1 and 3 minutes and 3) rate, accuracy and prosody. After analyzing oral reading data and

standardized comprehension test scores, they found that the designed assessments including multiple indicators of oral reading fluency provided a finer-grained understanding of oral reading fluency and fluency assessment, a stronger predictor of general comprehension. Moreover, they found that prosody provided a strong correlation to comprehension at all grades of 2, 4 and 6. Thus, they concluded that when students become more skilled readers, comprehension is possibly concerned less with rate and accuracy but more with other indicators of oral reading fluency, namely prosody.

In L2 contexts, Lems (2006) examined the relationship between reading comprehension and reading rate. The participants were 232 adult English language learners at a university in the United States. They read a passage orally for one minute. Then, reading rate was calculated as the number of words correctly read per minute (wcpm). Reading comprehension scores were derived from the standardized reading achievement tests. The results indicated that there was a significant positive weak correlation between reading rate and comprehension ($r = .256, p < .001$).

Fujita and Yamachita (2014) examined the relationship between the reading comprehension and reading rate of 148 Japanese high school EFL learners. Two types of tests were used to collect data: reading comprehension tests and reading rate tests. For reading comprehension tests, each test comprised five multiple choice questions. The participants were asked to read a total of six reading passages and answer the questions. Concerning the reading rate tests, the participants were asked to silently read two reading passages. Each time, they recorded their time. Then, they answered five multiple choice questions without rereading the passage. Reading rate scores were calculated as the average of the number of words read per minute (wpm) of the two passages. It was found that reading rate has a weak significant correlation with reading comprehension ($r = .24, p < .01, N = 127$).

According to Fujita and Yamachita's (2014) literature review, to measure reading rate, words read correctly per minute (wcpm) is normally used, and up until now, only a small number of empirical studies have investigated the relationship between reading rate and comprehension. Studies concerning the relationships between comprehension and accuracy or prosody and comprehension, however, are far fewer.

Methodology

Population and Sample

The selected population was 250 first year students from the Faculty of Political Science at Chulalongkorn University. The reason why this population suits the study is that oral reading fluency involves the same constructs as public speaking (Rasinski, 2004), one of the most significant skills for political science students. Also, English is incredibly important for students' future careers. Not only may the political science students gain the benefits from the test, but the diverse levels of proficiency, ranging from lower to upper intermediate proficiency, also help pinpoint the effectiveness of the test.

From the population, Cochran's formula was used to determine the sample size. At the confidence level of 90%, standard deviation (SD) of 0.5 and the level of precision at 10%, the determined sample size was 53 students. The purposive sampling technique was used to select the sample based on the Chulalongkorn University Test of English



Proficiency (CU-TEP) scores. Students with a range of proficiency levels from lower intermediate to upper intermediate were chosen. The main study involved 54 first year students majoring in Sociology and Public Administration, who enrolled in the Experiential English II course during the second semester of the academic year 2013. The test takers were both females and males who graduated from secondary schools, which means they studied and passed the required English courses according to the curriculum set by the Ministry of Education of Thailand. They also took and passed the Experiential English I course. Their English proficiency levels varied according to their personal experiences; for instance, some of them graduated from an English Program or a Bilingual Program or had previously taken short courses abroad.

Research Instruments

The following instruments were used in this study:

1. The English Oral Reading Fluency Test (EORF Test)

The EORF test purports to test students' English oral reading fluency skills. Selecting an appropriate reading passage is crucial for an oral reading fluency test. To create the reading passage, two factors – the degree of familiarity and the level of difficulty – are taken into account. According to the recommendations of Nation (2009), reading passages should be very familiar to the students. Thus, the passage was created based on authentic texts with some modifications by using the selected topic and related vocabulary from the students' textbook, English Unlimited. This textbook is used for the courses Experiential English I and II. The difficulty of the texts has mostly to do with the difficulty of the vocabulary. To ensure the level of difficulty, the reading passage was adjusted to have a similar reading ease number to the one from the textbook, which was assumedly appropriate for intermediate level students as claimed in the book. As the comprehension questions aim to test students' general comprehension rather than their memorization, the length of the reading passage and the number of the comprehension questions were also taken into account. Consequently, the reading passage was 263 words, and five comprehension questions were carefully written for the test. The formats of the comprehension items were multiple choices and short answers. As fluency assessments must have some degree of reliability and validity (Rasinski, 2004), to ensure the test and the measures provided valid and reliable results, a validation process and inter-rater reliability were used. To validate the test, the three crucial components of validity, appropriateness, and meaningfulness and usefulness (Wasanasomsithi, 2004) were considered. Five experts were asked to judge the test regarding the three components. Face validity (Wasanasomsithi, 2004) including the format of the reading text and the questions was also considered. The reading text and the questions were also checked to ensure that they were clear with the appropriate font size. A trial was conducted with the pilot group. Following this, the item difficulty index was calculated. Then, the test was revised and used to collect the data.

2. Measures

To measure students' oral reading fluency performance, three constructs – rate, accuracy and prosody – were the focus. In the L1 context, words correct per minute (wcpm) is frequently used to assess oral reading fluency. This takes into account both rate and accuracy as it is calculated by counting the number of words read correctly in one minute (or the total number of words read per minute minus the number of errors). In this study, to be able to distinguish the impact between reading speed and errors, rate was measured as the number of words read per minute (wpm) to provide “an unambiguous measure of rate” (Valencia et al., 2010, p. 275). Accuracy was calculated as the percentage of correct words of the total words read per minute. The three measures (rate, accuracy and prosody), therefore, were used as the three constructs of oral reading fluency.

Measures and the Constructs

Measures	Constructs
1. Rate	- The ability to read the text orally at appropriate speed
2. Accuracy	- The ability to read the words in the text orally with accuracy
3. Prosody	- The ability to read the text orally with appropriate phrasing
4. English reading comprehension	- The ability to comprehend the reading text and the comprehension questions - The ability to recall the main idea and important details of the story

To obtain rate, accuracy, prosody and comprehension scores, the four measures were used. Each measure is described in the following section.

2.1. Scoring

1. Rate (Speed) was measured as the number of the words students read per minute, disregarding errors, and calculated using the following formula: Rate equals $263 \frac{\text{(the length of the passage)}}{\text{the total time the student used in seconds}} \times 60$.

2. Accuracy was measured as the percentage of correct words of the total words read per minute. Mispronunciations, omissions, repetitions, substitutions and insertions were counted as errors, and calculated using the following formula: Accuracy equals $263 \frac{\text{(the length of the passage)} - \text{errors}}{263} \times 100$.

3. Prosody was measured by a 4-point scale rubric. The weighted rubric focused on the four aspects of phrasing, stress, intonation and pauses.



4. Comprehension: 0 indicated an incorrect response, 1 indicated a correct response.

To make sure that these measures were reliable and valid, validation was conducted by five experts in the field

3. Attitudes questionnaire

A questionnaire was created to investigate the attitudes of the students toward the oral reading fluency test. In taking into account the factors possibly affecting students' attitudes in taking the test, particular frameworks were selected for revision to suit the purposes of the questionnaire. These were: attitude/motivation test battery by Gardner (1985), Nist and Diehl's (1990) test anxiety questionnaire, and Student Opinion Scale items by Sundre (2007). To avoid mistranslation, the questionnaire was written in both English and Thai. Once finished, five experts were asked to judge the appropriateness of the questions to ensure that the questions were valid. After the final revision, the questionnaire was used with the sample.

Procedures

Historically, "reading rate" has been the focus in measuring oral reading fluency, and consequently, words per minute (wpm) has been normally used to assess students' oral reading fluency performance (Reutzel & Cooter, 2003). The teacher has to work with each student one on one using the tool called a running record. However, this procedure can be rather unpractical in English classes in Thailand due to the nature of the classes, with their large sizes and the time constraints involved. Subsequently, this study made use of a computer lab, which is generally accessible in many institutions in Thailand, alongside voice recording software. The use of these tools provided some benefits. Firstly, it is possible to assess a number of students at the same time. Secondly, it is recommended that the simplest and most useful way to collect reading fluency data is through the use of audio recordings because not only can we use them for later analysis but we also have a second chance to listen to the recording again in case we miss some elements of the reading (Reutzel & Cooter, 2003; M. D. Applegate, Quinn, & A. J. Applegate, 2008). Hence, it allows teachers to have flexible time to work on the students' recordings and to use different criteria or measures to assess and reassess different dimensions of reading fluency. Furthermore, it can be used as a reference for teachers to discuss and work further in finer detail with their students, and to keep track of the students' progress.

This study, thus, employed a computer lab and voice recording software. The English Oral Reading Fluency test consisted of one reading passage and five comprehension questions. The test takers had been informed in detail about the steps involved in taking the EORF test. After the reading passages were distributed, the test takers were asked to use the software to record their voices when reading a 250 word-long passage aloud until they finished. After their oral reading performances were audio-recorded, the reading passages were removed. Then, they were asked to answer the comprehension questions. Once they finished the test, they were asked to complete the attitude questionnaire.

To collect the scores, the rate was calculated according to the criteria in 2.1. *Measures and the Construct*. Since accuracy and prosody are considered subjective, there were two raters. One of the raters was the researcher, and the other was a native speaker, who has years of experience in teaching English and is currently working as a teacher at one of the most renowned public universities in Thailand. To collect the accuracy score, the script of the reading passage was used to note the errors of each student. The raters could listen to each recording more than once to make sure that all errors were noted. Then, the accuracy scores were calculated. For prosody, the raters scored each student on a prosody rubric sheet. To measure inter-rater reliability, Pearson product-moment correlation coefficient (r) was used.

Finally, multiple regression analysis was used to compare how rate, accuracy and prosody contributed to comprehension.

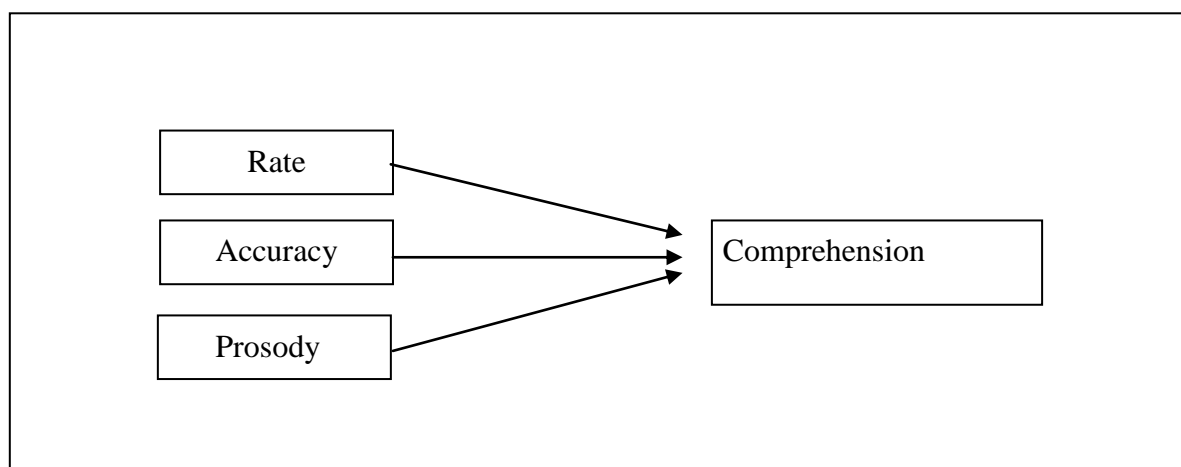
Data Analysis

Results

Examining the relative contributions of rate, accuracy and prosody to comprehension

Since multiple regression analysis was used, the issues of multicollinearity must be addressed due to the fact that an increase in multicollinearity may result in the reduction of the overall R^2 , confused estimation of the regression coefficients and negative effects of the statistical significance of coefficients (Hair, Black, Babin, & Anderson, 2010). The problems of multicollinearity can be seen if bivariate correlations are 0.7 or higher, yet, levels of multicollinearity can generally be accepted if tolerance values are less than .10 or VIF values are higher than 10 (Hair et al., 2010), which is the common cutoff value (Freund, Wilson, & Sa, 2006; Hair et al., 2010).

PICTURE 1. Multiple regression model: Examining how rate, accuracy and prosody contribute to comprehension



Regarding the multiple regression model, the independent variables were rate, accuracy and prosody, and the dependent variable was comprehension.



TABLE 1. Examining how rate, accuracy and prosody contribute to comprehension

Variables Entered	Regression Coefficients			Statistical Significance		Collinearity Statistics	
	B	Std. Error	Beta	t	Sig.(p)	Tolerance	VIF
(Constant)	-5.786	3.922		-1.475	.148		
Rate	-.001	.012	-.015	-.062	.951	.351	2.847
Accuracy	.099	.049	.430	2.018	.050	.446	2.244
Prosody	.007	.110	.018	.061	.951	.238	4.193

F = 3.11, R² = .19, Adjusted R² = .13, p = .037

According to TABLE 1, only accuracy made a statistically significant contribution to comprehension ($p=.05$), and for every 1-unit increase in accuracy, comprehension increased by .43 units (Beta =.43). For further discussion, the bivariate correlations of each oral reading fluency measure to comprehension were also determined.

TABLE 2. Bivariate correlations of each oral reading fluency measure to comprehension

	Rate (N = 54)	Accuracy (N = 54)	Prosody (N = 54)
Comprehension (N = 54)	.25	.44**	.33*
p (2-tailed)	.099	.003	.031

** p < 0.01 level (2-tailed). * p < 0.05 level (2-tailed).

TABLE 2 shows that there was no significant linear correlation between rate and comprehension ($r = .25$, $N=54$, $p = .099$). However, there were significant positive moderate correlations between accuracy and comprehension ($r = .44$, $N=54$, $p = .003$) and between prosody and comprehension ($r = .33$, $N=54$, $p = .031$).

Analyzing students' attitudes toward the test

The questionnaire consisted of three parts: 1. EORF Test Anxiety, 2. Attitude toward the EORF Test and 3. Student Opinion Scale Items. Each part examined different factors affecting students' attitudes toward the EORF test. The data derived from each part of the questionnaire were analyzed by using descriptive statistics, mean score and standard deviation (SD).

TABLE 3.1. Students' EORF Test Anxiety

Statements	1 Strongly disagree อย่างยิ่ง	2 Disagree ไม่เห็นด้วย	3 Not sure ไม่แน่ใจ	4 Agree เห็นด้วย	5 Strongly Agree อย่าง	Mean	SD.
1. I have visible signs of nervousness such as sweaty palms, shaky hands, and others right before the EORF test.	20 (37%)	18 (33%)	12 (22%)	4 (7%)	-	2.00	0.95
2. I have "butterflies" in my stomach before the EORF test.	28 (51%)	19 (36%)	6 (11%)	1 (2%)	-	1.63	0.76
3. I feel nauseous before the EORF test.	16 (30%)	38 (70%)	-	-	-	1.70	0.46
4. I read through the EORF test's comprehension questions and feel that I do not know any of the answers.	12 (22%)	17 (31%)	22 (41%)	2 (4%)	1 (2%)	2.31	0.93
5. I panic before and during the EORF test.	23 (43%)	18 (33%)	10 (19%)	2 (4%)	1 (2%)	1.89	0.96
6. My mind goes blank during the EORF test because I am not confident with my pronunciation.	14 (26%)	10 (19%)	18 (33%)	10 (19%)	2 (4%)	2.56	1.18
7. I come up with some answers only after the test.	12 (22%)	7 (13%)	22 (41%)	13 (24%)	-	2.67	1.08
8. I have trouble concentrating before the EORF test.	13 (24%)	14 (26%)	16 (30%)	8 (15%)	3 (6%)	2.52	1.18
9. I make mistakes on easy comprehension questions or put answers in the wrong places.	8 (15%)	13 (24%)	22 (41%)	11 (20%)	-	2.67	0.97
10. I have difficulty choosing the answers of the comprehension questions because I have focused too much on the pronunciation.	5 (9%)	5 (9%)	12 (22%)	22 (41%)	10 (19%)	3.5	1.18

*Percentages may not total 100 due to rounding.



The first section of the questionnaire determined whether students experienced a mild or severe case of EORF test anxiety. Regarding students' anxiety toward the EORF test, the results show that some students had exhibited certain signs of anxiety from taking the EORF test. However, the percentages of the students who experienced no anxiety were significantly higher than those of the students who experienced anxiety except for item 10. However, the result of item 10 is expected as focusing on pronouncing aloud the words in the text may draw the attention of the students away from comprehension (Applegate, et al., 2008).

TABLE 3.2. Students' Attitudes toward the EORF Test

Statements	1 Strongly disagree	2 Disagree	3 Not sure	4 Agree	5 Strongly Agree	Mean	SD.
1. This EORF test is meaningful.	-	-	2 (4%)	35 (65%)	17 (31%)	4.28	0.53
2. This EORF test is unenjoyable.	13 (24%)	12 (22%)	23 (43%)	6 (11%)	-	2.41	0.98
3. This EORF test is interesting.	-	4 (7%)	4 (7%)	32 (59%)	14 (26%)	4.04	0.80
4. This EORF test is complicated.	5 (9%)	25 (46%)	17 (31%)	7 (13%)	-	2.48	0.84
5. This EORF test is necessary.	-	-	11 (20%)	25 (46%)	18 (33%)	4.13	0.73
6. This EORF test is useless.	29 (54%)	20 (37%)	5 (9%)	-	-	1.56	0.66
7. This EORF test is educational.	-	1 (2%)	12 (22%)	29 (54%)	12 (22%)	3.96	0.73
8. This EORF test is difficult.	2 (4%)	19 (35%)	26 (48%)	5 (9%)	2 (4%)	2.74	0.83
9. This EORF test is unimportant.	19 (35%)	29 (54%)	6 (11%)	-	-	1.76	0.64
10. The instructions in this EORF test are clear	-	-	12 (22%)	28 (52%)	14 (26%)	4.04	0.70

*Percentages may not total 100 due to rounding.

The second section of the questionnaire assessed students' ideas and impressions about the EORF test. It contained both positive and negative items. The positive items were 1, 3, 5, 7 and 10. The negative items were 2, 4, 6, 8 and 9. After the scales of the negative items were reversed, it was obvious that the students had positive attitudes

toward the EORF test as almost all of them thought that the test was meaningful and the majority considered it enjoyable, interesting, necessary, useful, educational and important. Also, regarding the difficulty of the EORF test (items 4 and 8), even though a large number of the students were not sure whether the test was difficult or not, the number of the students who thought it was neither difficult nor complicated was much greater than those who thought it was difficult or complicated.

TABLE 3.3. Student Opinion Scale

Statements	1 Strongly disagree	2 Disagree	3 Not sure	4 Agree	5 Strongly Agree	Mean	SD.
1. Doing well on the oral reading fluency (EORF) test was important to me.	1 (2%)	1 (2%)	7 (13%)	34 (63%)	11 (20%)	3.98	0.76
2. I made a good deal of effort throughout this EORF test.	-	-	4 (7%)	34 (63%)	16 (30%)	4.22	0.57
3. I am not curious about how I did on this EORF test relative to others.	1 (2%)	1 (2%)	9 (17%)	29 (54%)	14 (26%)	4.00	0.82
4. I am not concerned about the score I receive on this EORF test.	1 (2%)	5 (9%)	14 (26%)	22 (41%)	12 (22%)	3.72	0.98
5. This EORF test was important to me	-	3 (6%)	23 (43%)	23 (43%)	5 (9%)	3.56	0.74
6. I gave this EORF test my best efforts.	-	-	10 (19%)	25 (46%)	19 (35%)	4.17	0.72
7. While taking this EORF test, I could have worked harder on it.	1 (2%)	2 (4%)	9 (17%)	26 (48%)	16 (30%)	4.00	0.89
8. I would like to know how well I did on this EORF test.	-	1 (2%)	12 (22%)	25 (46%)	16 (30%)	4.04	0.78
9. I did not give this EORF test my full attention while completing it.	10 (19%)	26 (48%)	13 (24%)	5 (9%)	-	2.24	0.87
10. While taking this EORF test, I was able to persist to the completion of the task.	1 (2%)	10 (19%)	10 (19%)	20 (37%)	13 (24%)	3.63	1.10

*Percentages may not total 100 due to rounding.



The last section of the questionnaire was adapted from Sundre's (2007) Student Opinion Scale. It scrutinized students' motivation by focusing on two aspects: Importance and Effort. Each aspect was composed of five items. Importance indicated how important doing well on the test was to the students. These items included 1, 3, 4, 5 and 8. Effort signified the perceived degree of work the students put into completing the test. These items included 2, 6, 7, 9 and 10. The negative items were 3, 4, 7 and 9.

Focusing on the Importance aspect, 3 (1, 5 and 8) of the 5 items (1, 3, 4, 5 and 6) show that the students thought doing well on the test was important to them. However, as the results of items 3 and 4 indicate that the majority of the students thought doing well on the test was unimportant to them, these will be discussed further. The focus of this section was on how important doing well on the test was to the students, but as item 3 states that students were not curious about how they did on this EORF test relative to others, it can be interpreted that the students did not want to compare themselves to others. Evidence to support this is that of the result of item 1 showing that 83% of the students thought that doing well on the test was important – a clear indication that most of the students thought that the test was important. Regarding item 4, the result shows that a number of the students were not concerned about the score they received on this EORF test, which could have arisen due to the fact that the students had been told prior to taking the test that the score on this test had nothing to do with the course they were taking. All in all, it can be concluded that the majority of the students thought that the test was important as they agreed that doing well on the EORF test was important and the test was important to them, and they would like to know how well they did on the test considering the results of items 1, 5 and 8.

Regarding Effort, the results reveal that the majority of the students had put effort into completing the EORF test (items 2, 6, 9 and 10) even though item 7 indicates that the majority of the students thought they could have worked harder on the test. The result of item 7 may suggest that the students didn't put 100% effort into the test. As Effort indicates 'the perceived degree of work', it can be concluded that the majority of the students thought they had put good effort into completing the test taking into account the results of the other items mentioned previously.

Discussion

The relationships between comprehension and each measure of oral reading fluency will be discussed. Focusing on the correlations between each oral reading fluency measure and comprehension, the results revealed that of all the three measures only rate had no significant linear relationship with comprehension ($r = .25$, $N=54$, $p = .099$), which does not conform to previous studies in L1 contexts. Fuchs et al. (2001) state that oral reading rate has a very strong positive correlation with passage comprehension ($r = .84$). However, the value of the Pearson correlation coefficient (r) from the present study is similar to prior research studies in EFL contexts. In the studies of Fujita and Yamashita (2014) and Lems (2006) with EFL students, as the samples were larger ($N = 127$ and $N= 232$ respectively), rate was found to have a significant weak positive correlation to comprehension ($r = .24$, $p < .01$; $r = .256$, $p < .001$ respectively). Accordingly, it's possible that while the relationship between rate and comprehension is rather strong in L1 contexts, it is weak in EFL contexts.

Regarding prosody and comprehension, it was found that prosody had significant positive moderate correlations to comprehension ($r = .33$, $p = .031$ respectively). However, it didn't make a significant contribution to comprehension. This finding contrasts with Valencia et al.'s (2010) study in L1 contexts where prosody consistently made a statistically significant contribution to comprehension across three different grade levels. They, thus, concluded that for more skilled readers, comprehension is possibly concerned more with prosody than rate and accuracy. In the current study, comprehension related more to prosody than rate, yet related most to accuracy. In addition to only a few empirical studies having been conducted on oral reading-rate fluency in L2 contexts (Fujita & Yamachita, 2014; Grabe, 2009), such research concerning prosody, in particular, can rarely be found. One possible reason is that assessing prosody is more complicated than assessing rate or accuracy (Valencia et al., 2010) as it requires a holistic rubric. It is, therefore, subjective. The use of the adapted rubric in the present study, however, resulted in strong reliability between the two raters ($r=.91$), which is similar to Valencia et al.'s (2010) report.

The results also reveal that accuracy had a significant positive moderate correlation to comprehension ($r = .44$, $p = .003$). Also, in using multiple regression analysis, after the data was carefully analyzed to avoid misinterpretation that may arise from problems of multicollinearity, it can be concluded that of all the three measures, only accuracy had a statistically significant contribution to comprehension. One possible assumption to explain why accuracy contributed to comprehension is that accuracy scores have to do with errors and errors possibly represent either carelessness or insufficient knowledge of vocabulary which can both affect comprehension. This assumption is supported by Grabe's (2009) assertion that accuracy is strongly associated with word recognition as fluent word recognition must be rapid, automatic, complete and accurate at the same time. Regarding L2 readers, he claims that the absence of accuracy results in the degradation of comprehension. On the contrary, completely specified lexical entries and accuracy are necessary for fluency and advanced comprehension.

The second research question focused on students' attitudes toward the EORF test. A holistic view of the result reveals the majority of the students had positive attitudes and opinions toward the EORF test. For example, the majority of the students perceived the EORF test as meaningful, interesting, necessary and educational. Regarding test anxiety, although some students had exhibited certain signs of anxiety from taking the EORF test, teachers should not be concerned as almost all of the items show that the number of the students who experienced no anxiety outnumbered those experiencing anxiety. In addition, some degree of anxiety may be healthy in helping the test takers stay focused (Nist & Diehl, 1990). Furthermore, it can be concluded that students' awareness of certain signs of test anxiety did not negatively affect students' attitudes and opinions, as evidenced from the first section of the questionnaire on Students' EORF Test Anxiety, which means that even though some students did identify themselves as experiencing certain symptoms of anxiety, the majority specified that they had positive attitudes toward the test in the latter sections on Students' Attitudes toward the EORF Test and Student Opinion Scale. The last part of the questionnaire, Student Opinion Scale, focused on students' motivation in two aspects (Importance and Effort). Despite some contrary results among certain items, it can be concluded that the majority of the students agreed that the test was important and they put great effort into finishing it. All in all, although the EORF test is new and requires students to perform oral and comprehension skills,



stake holders should have no concerns about adopting the test because the majority of the students expressed positive attitudes and opinions toward the test.

Conclusion and Implications

The present study compared oral reading fluency measures (rate, accuracy and prosody) in relation to comprehension. Firstly, the results of this study show that accuracy, calculated as the percentage of correct words of the total words read per minute, not only had the strongest correlation with comprehension of all the three measures, but also was the only measure that made a statistically significant unique contribution to comprehension. This finding suggests that accuracy, to some extent, can be used as an indicator of comprehension. Secondly, even though prosody didn't make a significant contribution to comprehension, it had a significant moderate correlation with comprehension. Thus, this variable should not be dismissed. However, more research studies concerning prosody in L2 contexts are needed for further discussion. Lastly, rate had no significant linear relationship with comprehension. Hence, reading rate and reading comprehension were shown to be different variables (Fujita & Yamashita, 2014). The findings also suggest that the relationship between oral reading fluency measures and comprehension in L2 contexts may be different from L1 contexts. Also, the results from the attitude questionnaire revealed that the majority of students had positive attitudes and opinions toward the EORF test.

This study is particularly important because teachers of English in Thailand are required by the Ministry of Education (2008) to make sure that by grade 12, their students are able to read aloud various genres of text accurately. However, the focus of oral reading should not be just accuracy. It should rather be on reading fluency in terms of the three components of rate, accuracy and prosody, as it would provide specificity and diagnostic information that are essential for effective instructional interventions (Valencia, et al., 2010). Oral reading fluency, therefore, should be set as the achievement goal for Thai EFL learners. The study, thus, benefits Thai EFL teachers as follows. Firstly, the setting can serve as a model as it made use of a computer lab which is present in most schools in Thailand, making assessment of large classes more practical. Secondly, the EORF test can be adopted for use with Thai EFL students as it was perceived to be meaningful, interesting, necessary and educational. In addition, EFL teachers can administer the EORF test and make use of the measures, rate, accuracy and prosody, as their validity and reliability are ensured. The EORF test can also be adjusted to suit students in different grade levels, who have different English proficiency levels by adjusting the difficulty of the reading text to be appropriate for these students. Besides, this study adds a new perspective to a growing body of research concerning oral reading fluency assessments in terms of the use of the English Oral Reading Fluency test and measures in the EFL context.

Recommendations for Future Work

More research studies in related areas are recommended as follows. First, replicated studies with larger and different groups of participants, for example, Thai middle school students who have lower proficiency levels, would also lead to new insights toward English oral reading fluency in Thai EFL contexts.



Second, studies on the English oral reading fluency instruction and practices in Thai EFL contexts are necessary as Thai students' English oral reading skills were set as a basic requirement by the Ministry of Education (2008), yet particular instruction and practices have never been officially implemented and integrated into the curriculum.

About the Author

Thidawan Tunskul is at present working as a part time teacher of English at Chulalongkorn University Language Institute. She holds a B.S. (Biotechnology) from Thammasat University, a M.A. in Social Sciences (Education) from Southern Oregon University, USA and is currently working on a Ph.D. in English as an International Language at Chulalongkorn University. Her current research interests revolve around oral reading fluency, oral reading assessment and EFL reading assessment. She can be reached at tcharoenpornsook@gmail.com.

Chatraporn Piamsai, Ph.D. is a lecturer at Chulalongkorn University Language Institute (CULI) and the English as an International Language (EIL) program where she currently serves as a Deputy Director. Throughout her career, she taught a wide range of courses, i.e. Business English Oral Communication, English for Economics, Foundation of English Language Assessment and Evaluation, and Language Assessment and Evaluation in English for Specific Purposes (ESP). Her interests include learners' use of learning strategies, different aspects of language assessment and evaluation in both general English and ESP, as well as the use of technology in English language teaching and learning.

References

- Allington, R., & Franzen, A.M. (2009). *Handbook of reading disability research*. New York: Routledge.
- Applegate, M.D., Quinn, K.B., & Applegate, A.J. (2008). *The critical reading inventory: Assessing students' reading and thinking* (2nd ed.). Upper Saddle River, NJ: Pearson Education.
- Baker, C. D., & Luke, A. (1988). *Towards a critical sociology of reading pedagogy: Congress papers*. Gold Coast, Queensland: John Benjamins Publishing.
- Blevins, W. (2002). *Building Fluency: Lessons and Strategies for Reading Success*. New York: Scholastic.
- Cucchiaroni, C., Strik, H., & Boves, L. (2000). Quantitative assessment of second language learners' fluency by means of automatic speech recognition technology. *The Journal of the Acoustical Society of America*, 107(2), 989-999.
- Daly, E. J., Chafouleas, S., & Skinner, C. H. (2005). *Interventions for reading problems: Designing and evaluating effective strategies*. New York: The Guilford Press.
- Freund, R. J., Wilson, W. J., & Sa, P. (2006). *Regression analysis: Statistical modeling of a response variable* (2nd ed.). California: Elsevier.
- Fuchs, L.S., Fuchs, D., Hosp, M.K., & Jerkins, J.R. (2001). Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis. *Scientific Studies of Reading*, 5(3), 239-256. Retrieved from http://www.tandfonline.com/doi/pdf/10.1207/S1532799XSSR0503_3



- Fujita, K., & Yamashita, J. (2014). The relations and comparisons between reading comprehension and reading rate of Japanese high school EFL learners. *The Reading Matrix*, 14 (2), 34-49.
- Gardner (1985). *Social psychology and second language learning: The role of attitudes and motivation*. London: Edward Arnold Publishers
- Gibson, S. (2008). Reading aloud: a useful learning tool? *ELT Journal*, 62 (1), 29-35. doi:10.1093/elt/ccmo75.
- Grabe, W. (2009). *Reading in a second language: Moving from theory to practice*. New York: Cambridge University Press.
- Gunning, T.G. (2002). *Assessing and correcting reading and writing difficulties*. Boston: Pearson Education.
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis* (7th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.
- Nation, I.S.P. (2009). *Teaching ESL/EFL reading and writing*. NY: Routledge.
- Konza, D. (2006). *Teaching children with reading difficulties*. Melbourne: Thomson Social Science Press.
- Kuhn, M. R., & Stahl, S. A. (2003). Fluency: A review of developmental and remedial practices. *Journal of Educational Psychology*, 95 (1), 3-21.
- LaBerge, D., & Samuels, S. J. (1974). Towards a theory of automatic information processing in reading. *Cognitive Psychology*, 6, 293-323.
- Lems, K. (2006). Reading fluency and comprehension in adult English language learners. In T.Rasinski, C. Blachowicz, & K. Lems (Eds.), *Fluency instruction: Research-based best practices* (pp. 231-252). NY: The Guilford Press.
- Levasseur, V. M., Macaruso, P., Palumbo, L.C., & Shankweiler, D. (2006). Syntactically cued text facilitates oral reading fluency in developing readers. *Applied Psycholinguistics*, 27(03), 423-445. Retrieved from <http://www.haskins.yale.edu/Reprints/HL1432.pdf>
- Ministry of Education. (2008). *The Basic Education Core Curriculum B.E. 2551 (A.D. 2008)*. Retrieved from <http://www.act.ac.th/document/1741.pdf>
- NAEP (National Assessment of Educational Progress). (2002). The Nation's Report Card Fourth-Grade Students Reading Aloud: NAEP 2002 Special Study of Oral Reading. U.S. Department of Education Institute of Education Sciences. NCES 2006-469. Retrieved from <http://nces.ed.gov/nationsreportcard/pdf/studies/2006469.pdf>
- National Institute of Child Health and Human Development. (2000). *Report of national reading panel. Teaching children to read: An evidence-based assessment of the scientific research on reading and its implications for reading instruction*. Retrieved Mar 9, 2004, from National Institute of the Child Health and Human Development web site: <http://www.nichd.nih.gov/publications/nrp/upload/report.pdf>
- Nist and Diehl (1990). *Test Anxiety Questionnaire*. Retrieved from <http://web.ccsu.edu/fye/teachingresources/.../test%20anxiety%20questionnaire.pdf>
- Opitz, M. F. (2007). *Don't speed. Read! 12 Steps to smart and sensible fluency instruction*. New York: Scholastic Inc.



- Penner-Wilger, M. (2008). *Reading fluency: A bridge from decoding to comprehension*. Retrieved Feb 12, 2012, from Autoskill International Inc web site: http://eps.schoolspecialty.com/downloads/other/acad-read/fluency_research.pdf
- Rasinski, T. V. (2004). *Assessing reading fluency*. Honolulu, HI: Pacific Resources for Education and Learning.
- Rasinski, T. V., Blachowicz, C., & Lems, K. (Eds.). (2012). *Fluency instruction research-based best practices* (2nd ed.). New York: The Guilford Press.
- Reutzel, D.R. & Cooter, R.B. (2003). *Strategies for reading assessment and instruction: helping every child succeed*. NJ: Pearson Education.
- Samuels, S. J. (1979). The method of repeated reading. *The reading Teacher*, 50 (5), 376-381.
- Sundre, D. L. (2007). The student opinion scale test manual: A measure of examinee motivation. *The Center for Assessment Research and Studies*.
- Tagushi, E., Takayasu-Mass, M., & Gorsuch, G.J. (2004). Developing reading fluency in EFL: how assisted repeated reading and extensive reading affect fluency development. *Reading in a Foreign Language*, 16(1539-0578), Retrieved from <http://nflrc.hawaii.edu/rfl/october2004/taguchi/taguchi.html>
- Valencia, S.W., Smith, A.T., Reece, A.M., Li, M., Wixson, K.K. & Newman, H. (2010). Oral reading fluency assessment: Issues of construct, criterion, and consequential validity. *Reading Research Quarterly*, 45 (3), 270-291.
- Wattanasomsithi, P. (2004). *Research in English applied linguistics: A course book*. Bangkok: Sumon Publishing.
- Wolf, M. (2007). *Proust and the squid: the story and science of the reading brain*. New York: Harper.
- Wolf, M. & Katzir-Cohen, T. (2001). Reading fluency and its intervention. *Scientific Studies of Reading*, 5(3), 211-239, Retrieved from <http://ase.tufts.edu/crlr/documents/2001SSR-ReadingFluency.pdf>
- Wolfe, P., & Nevills, P. (2004). *Building the reading brain, pre K-3*. California: Corwin Press.