The Indicating Factors of Oral Reading Fluency of Monolingual and Bilingual Children in Egypt

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Abstract

This study examined oral reading fluency (ORF) of bilingual and monolingual students. The author selected a sample of 510 (258 males and 252 females) native Arabic-speaking sixth-graders (62 bilinguals and 448 monolinguals) in Egypt. The purposes were; (a) to examine oral reading rate, oral reading accuracy, prosody, and oral reading comprehension as indicating factors in ORF, and b) to investigate the impact of bilingual education on students' ORF in Arabic. Participants individually completed the author-developed Oral Reading Fluency Measure. Results indicated a very good fit between the proposed model and the observed data i.e., oral reading rate, oral reading accuracy, prosody, and oral reading comprehension are significant indicators of ORF. Interestingly, results revealed that the bilingual students performed better than their monolingual counterparts on oral reading rate, oral reading accuracy, and prosody but not on oral reading comprehension. The discussion concludes that (a) in addition to oral reading rate, oral reading accuracy, and prosody, oral reading comprehension is a significant indicating factor of ORF, (b) learning a second language, English, has a positive effect on ORF in the first language, Arabic, and (c) the nature of Arabic orthography is an indispensible factor when examining ORF in science of reading.

Keywords: oral reading fluency, oral reading comprehension, oral reading rate, oral reading accuracy, prosody, bilingual education, Arabic orthography

1. Introduction

It is well-established that fluency plays a critical role in improving overall reading competence (e.g., L. Fuchs, D. Fuchs, Hosp, & Jenkins, 2001; Rasinski, Rikli, & Johnston, 2009; Rasinski, Samuels, Hiebert, Petscher, & Feller, 2011). A review of the literature suggests that oral reading fluency (ORF) refers to reading text quickly, accurately, with good prosody, and with comprehension (e.g., Abdelbari, 2011; Hasbrouck & Tindal, 2006; Hudson, Lane, & Pullen, 2005; Hudson, Pullen, Lane, & Torgesen, 2008; Hussien, 2011; Kuhn, Schwanenflugel, & Meisineger, 2010; McKenna, 2002; McKenna & Stahi, 2003; McShane, 2005; Pikulski & Chard, 2005; Rasinski, 2004; Valencia et al., 2010). Previous research, usually in English, provides considerable knowledge about oral reading accuracy, oral reading rate and prosody as indicating variables in ORF. Much less is known, however, about oral reading comprehension as an indicating factor in ORF (University of Oregon, 2008). In addition, there is a rising interest in the last decade in ORF internationally, with respect to English. Much less attention, however, is dedicated to ORF of Arabic-speaking students (Abdelbari, 2011; Abu-Hajaj, 1999, 2006; Bilal, 2009; Fadal-Allah, 2004; Majawor, 1998). Furthermore, the public education in Egypt, the context of the current study, involves two types of schools mainly monolingual schools and fewer of bilingual schools. The purposes of the study were: (a) to examine oral reading rate, oral reading accuracy, prosody, and oral reading comprehension as indicating factors in ORF, and (b) to investigate the impact of bilingual education on students' ORF in Arabic.

1.1 The Orthography of Arabic

In this context, it is important to consider the nature of Arabic orthography since the majority of studies mentioned on ORF has been carried out in English. Arabic is a Semitic language that has unique characteristics. It consists of 28 letters and is read and written from right to left. Its letters are attached to one another and they take different appearances, though the main form is maintained, as a function of their connection to preceding or following letters. Additionally, 15 letters are companied by dots: one, two, or three that are written above or

below of a certain letter to distinguish between the letters that take the same form e.g., ب bā' /b/, ت tā' /t/, ث ṯā' /θ/ (Abu-Rabia & Taha, 2006; Dawood, 2000; Hussien, 2009, 2011). Furthermore, there are three short vowels that facilitate word recognition as they appear above and/or below the letters. In addition, there is a diacritical mark (sukūn) used as an indication of short vowels omission and another one called 'šadda' used as an indication of the lengthening of consonants (doubling the consonant in one letter). Sixth-grade students, as is the case of the current study, are expected to read without visible short vowels depending on context, but younger learners and beginners are introduced to reading through vowelized scripts that help them to read words accurately (Abu-Rabia, 1997, 1999, 2001; Abu-Rabia & Taha, 2006; Hussien, in press; Mahfoudhi, Everatt, & Elbeheri, 2011; Taibah & Haynes, 2011). The point here is that Arabic is a homographic orthography if introduced unvowelized (Abu-Rabia, 1997; Abu-Rabia & Siegel, 1995, 2003). Words with the same shape can have different pronunciations and meanings as a result of blending of consonants and vowels e.g., /science عِلْمُ/, /flag عَلَمُ/, /taught عَلَّمَ/, or /learned عَلِمَ/. Vowels, visible or deduced, are used by readers to get the unequivocal meanings and pronunciations of words. Thus, word recognition in Arabic is a cognitively demanding process that requires processing both letters and vowels and differentiating homographs, if text is unvowelized, which affects oral reading accuracy and comprehension (Abu-Rabia, 1997, 1999, 2001; Hussien, in press).

The other critical issue is that the degree of consistency of orthography, letters and sounds conformities, seems to influence reading skills (Abu-Hajaj, 2006; Furnes & Samuelsson, 2009; Georgiou, Parrila, & Papadopoulos, 2008; Goswami, Ziegler, & Richardson, 2005; Taibah & Haynes, 2011). Some orthographies are more consistent and have predictable letter-sound relations (e.g., Finnish, Norwegian, German) and hence reading skills can be acquired and improved faster than in less consistent orthographies (e.g., English, Danish, French) (Goswami et al., 2005; Lervag & Hulme, 2010; Seymour, Aro, & Erskine, 2003; Taibah & Haynes, 2011). In contrast to English, Arabic is a consistent orthography either in grapheme-phoneme correspondences or in phoneme-grapheme correspondences (Abu-Hajaj, 2006; Abu-Rabia, 1997, 2001; Mahfoudhi et al., 2011; Taibah & Haynes, 2011). Nevertheless, Arabic moves from transparency or being shallow to opacity or being deep. It is a shallow orthography when vowelized script is used and it is a deep orthography when text is introduced unvowelized (Abu-Rabia, 2000; Abu-Rabia & Siegel, 2003; Abu-Rabia & Taha, 2006; Mahfoudhi et al., 2011; Mohamed, Elbert, & Landerl, 2011). Additionally, Arabic is an alphabetic orthography with diglossia, mismatch between the colloquial spoken Arabic and literary Arabic, the language of school instruction and most printed media (Abu-Rabia, 2000; Maamouri, 1998; Tahan, Cline, & Messaoud-Galusi, 2011; Versteegh, 2001). The current study examined ORF through literary Arabic, the language of school instruction. To conclude, the unique characteristics of Arabic orthography should be considered in science of reading (Abu-Rabia, 1997, p. 66, 1998; Hussien, in press), and hence, the nature of Arabic orthography is an important factor in examining ORF in the current study.

1.2 Indicators of Oral Reading Fluency (ORF)

As mentioned above, the current study is concerned with examining oral reading rate, oral reading accuracy, prosody, and oral reading comprehension as indicating factors of ORF.

1.2.1 Oral Reading Rate (ORR)

Firstly, oral reading rate (ORR), in the current study, refers to the speed at which the child reads words aloud and this speed is measured by calculating the total number of actual words read per minute (Abu-Hajaj, 2006; Daane et al., 2005; Educational Testing Service [ETS], 1995; Harris & Sipay, 1980; National Institute for Literacy [NIFL], 2003). There is no single reason that explains how many words fluent student can read per minute. Many factors should be considered in this context e.g., the type of genre being read, students' purposes for reading, or the nature of language orthography (Abu-Hajaj, 2006; Fadal-Allah, 2004; Harris & Sipay, 1980; Hasbrouck & Tindal, 2006; Hussien, in press).

1.2.2 Oral Reading Accuracy (ORA)

Fluent students need accurate word recognition in order to get a proper comprehension of a text. ORA affects comprehension since less-accurate students make some errors and eventually derive insufficient textual information that results in poor or low comprehension (Spooner, Baddeley, & Gathercole, 2004). Furthermore, ORA in early years seems to predict the development of ORA in later years in the primary school (Oakhill & Cain, 2012). The current study examined ORA as the ratio of correct words to total possible words students read aloud according to the letter-sound correspondences in Arabic and it is calculated as follows: accuracy level = total words read − errors/total words read (Abdelbari, 2011; NIFL, 2003). The issue is how accurate fluent readers should be? Many researchers (e.g., Abdelbari, 2011; ETS, 1995; Harris & Sipay, 1980; Hussien, in press; McKenna & Stahi, 2003) used the reading levels, independent, instructional, and frustration level, to assess

students' oral reading accuracy. In the current study, fluent students read independently with 98%-100% accuracy. Less fluent students, who are likely to be frustrated, read with less than 90% accuracy. Students who read a text fluently but need some sort of support read at the instructional level with 90-97% accuracy. The author discussed these levels of accuracy considering the nature of Arabic orthography, mentioned above.

1.2.3 Prosody

In addition, ORR and ORA are necessary but not sufficient to ORF. Since, students may read words at rapid rate and accurately in isolation but may read the same words less fluently in connected texts (NIFL, 2003, p. 23). Prosody, in the current study, refers to reading connected texts smoothly and expressively by which children show that they comprehend what they read orally (Baker & Valencia, 2012; Miller & Schwanenflugel, 2008; Rasinski, 2004; McKenna & Stahi, 2003). Fluent students read with accurate prosody, and this can be judged by observing students while they read orally according to certain rubrics. Some rubrics were developed by the National Assessment of Educational Progress [NAEP] in America in 1992 to classify students into four levels of prosody in English (ETS, 1995; McKenna & Stahi, 2003). Other rubrics were developed to assess prosody in Arabic (Abdelbari, 2011; Abu-Hajaj, 1993; Ali, 2009; Shehatah, 1981). The current study used three rubrics to assess prosody: (a) phrasing, reading in complete meaningful sentences, (b) smoothness, reading without hesitations or repetitions, and (c) expressiveness, reading with intonation and stopping in each punctuation mark correctly.

1.2.4 Oral Reading Comprehension (ORC)

Above all, the ultimate target of reading is comprehension. Researchers document the importance of rate, accuracy, and prosody in order to aid reading comprehension (Benjamin & Schwanenflugel, 2010; Denton et al., 2011; Hasbrouck & Tindal, 2006; Kuhn, Strauss, & Morris, 2006; Mckenna, 2002; McKenna & Stahi, 2003; Mohamed, 2006; Schwanenflugel et al., 2006; Samuels, 2004; Spooner, Baddeley, & Gathercole, 2004). Nevertheless, ORC as an indicating factor of ORF, as is the case in the current study, has received very little attention (University of Oregon, 2008). Thus, the current study measured ORC, as an indicating factor of ORF, through three sub-skills: (a) identifying the main idea, (b) identifying details, and (c) making inferences.

1.3 Context

This study was conducted in Egyptian primary public schools. These schools involve two types mainly monolingual schools and fewer of bilingual schools. All students in those two types of schools are native Arabic-speaking. The two types of school teach the same subject matters as public schools and the main difference is that in addition to teaching advanced English subject matter, the bilingual schools use English to teach Mathematics and Science. But, the monolingual schools teach very simple English as well. This context raised a critical issue that is the influence of the second language, English, on the first language, Arabic i.e., whether bilingual education affects students' ORF in Arabic or not.

1.4 The effect of Bilingual Education on ORF in Arabic

Cook (1991, 1994, 2007) advocates the notion of multi-competence or the knowledge of more than one language in the same mind. The key principle is that the mind of someone who knows more than one language is different from the mind of a monolingual (Cook, 2003; Kecskes & Papp, 2000). The argument is that knowledge of more than one language affects and restructures linguistic system and even nonlinguistic cognition in the L2 user's mind (Cook, 2002, 2003; Kecskes, 2010). Learning another language affects the L2 user's first language (Balcom, 2003; Mennen, 2004; Zampini & Green, 2001). Above all, the first language can be enhanced by learning a second language (Cook, 2003), e.g., Arab university students learning English showed better performance in syntactic processing in Arabic rather than their monolingual counterparts (Noor, 2007), teaching Italian to English children improved their reading in English (Yelland et al., 1993), and learning a second language helped Hungarian secondary school students with the ability to write essays in the first language (Kecskes & Papp, 2000). The current study examined the effects of English (L2) on students' ORF (L1), and hence it explored the differences between the monolingual school students and the bilingual school students in ORF in Arabic.

2. Questions of the Study

Following the foregoing analysis, the current study pursued the following questions;

-   What is the level of the sixth grade Arabic-speaking students in ORF?

-   To what extent do oral reading rate, oral reading accuracy, prosody, and oral reading comprehension reflect ORF?

- What is the effect of bilingual education on students' ORF in Arabic?

3. Methods

3.1 Participants

A convenience sample of 510 (258 males and 252 females) Arabic-speaking sixth-graders (62 bilinguals and 448 monolinguals) was selected from one educational district (Ismailia district). This sample represented 10.2% percent of the total number of students (community of the study) in the sixth-grade (4984 students) in primary public schools in the district in question. Students were selected from 11 public schools: nine monolingual schools, where Arabic is the medium of instruction and two bilingual schools (Arabic-English). The two types of school teach the same subject matters as public schools and the main difference is that in addition to teaching an advanced English subject matter, the bilingual schools use English to teach Mathematics and Science. But, the monolingual schools teach very simple and basic English as well. Both types of schools teach the same Arabic subject matter as a national and a mother tongue language of all students. In fact, Egyptian education system involves two types of schools mainly monolingual schools and fewer of bilingual schools. Furthermore, socioeconomic status (SES) of students' parents was controlled by using a questionnaire to identify parents' education, income, and occupation. It is well-established in the literature that SES highly correlates with cognitive development and language proficiency (e.g., Bradley & Corwyn, 2002; Hart & Risley, 1995; Hoff, Laursen, & Tardif, 2002; Mercy & Steelman, 1982). An informed consent form was collected in writing from parents, the Ismailia educational district and the schools where the sample was selected. In addition, an oral consent was obtained from children.

Table 1. Demographic data for the participants from public bilingual and monolingual schools

Variable	Bilingual students	Monolingual students
Age	M = 146 months	M = 145 months
	SD = 1.8	SD = 2.7
Gender	Male = 39	Male = 220
	Female = 23	Female = 228
Mother tongue	Arabic	Arabic
Medium of instruction	Arabic-English	Arabic
Hours of weekly English usage	Average = 10.5 Teaching Mathematics, Science, and English (advanced)	Average = 1.5 Teaching English (basic)

3.2 Measures

The researcher developed the Oral Reading Fluency Measure (ORFM). It measures the four indicating factors of ORF: oral reading rate, oral reading accuracy, prosody, and oral reading comprehension. It consists of three unvowelized informational excerpts. The three excerpts or passages (passage 1 = 230 words, passage 2 = 204 words, passage 3 = 237 words) used in ORFM were taken from a reading textbook, which is no longer used in schools, developed by the Ministry of Education (2009) for sixth-grade students in Egypt, and therefore these excerpts are expected to be at grade level and adequately and independently readable by those children. Children had not exposed to these excerpts. The assumption is that testing children while they read more than one passage gives a better account of their ORF rather than reading a single passage (Barth et al., 2012; Burns et al., 2011). ORFM involves two versions: the student's version and teacher's version. In the student's version, there were five multiple choices comprehension questions at the end of each passage to be answered by a student after s/he had finished reading. The teacher's version involves three tables at the end of each passage. The first table was used to write down time a student spent in reading, the second table was used to write down number of errors a student made, and the third table was used to tick the three binary (Yes or No) rubrics of prosody: phrasing, smoothness, and expressiveness.

The researcher made sure that ORFM is a valid and a reliable measure by distributing it to five experts in the field of teaching Arabic and requesting them to judge the measure in terms of the extent this measure operationalizes the four indicating factors of ORF (Cohen, Manion, & Morrison, 2007) and checking the clarity of the measure. As a consequence, the researcher introduced some amendments in light of experts' comments

and recommendations e.g., he removed omissions, alterations, additions from prosody factor to avoid overlap and repetition as they were involved in measuring oral accuracy factor. In addition, the researcher applied the ORFM to a pilot sample (22 females and 39 males) and calculated reliability using Cronbach's Alpha = 0.94 which indicates that ORFM is a reliable measure.

3.3 Procedures

ORFM was administered in one single session by school teachers after the researcher had three training sessions with them to explain how the measure can be applied in a consistent way e.g., all teachers had to use a stopwatch to calculate time a student spent in reading and all teachers had to mark any word a student read incorrectly. To make sure teachers were more familiar with ORFM, the researcher requested them to apply the measure to each other once. Each child in the sample was tested individually. A student was requested to read aloud the passage and answer five written multiple choices comprehension questions at the end of the reading, as explained above. The administrator of the instrument (a) calculated time, (b) marked words that are read incorrectly, and (c) ticked the three binary (Yes or No) rubrics of prosody, mentioned above.

3.4 Analyses

Descriptive statistics were performed to explain students' level of ORF and an Independent-Samples T Test analysis was conducted to compare between the bilingual and monolingual students' ORF. Confirmatory Factor Analysis (CFA) was performed using the IBM SPSS's Amos 20.0 to test the best model by which oral reading comprehension, oral reading rate, oral reading accuracy, and prosody reflect ORF. Three statistical measures were used to assess goodness of fit (GOF) between the proposed model and the observed data: (a) Chi-square ($\chi 2$), a non-significant $\chi 2$ indicates adequate model-data fit, (b) normed fit index (NFI), a value of 0.95 suggests appropriate model-data fit, and (c) root mean square error of approximation (RMSEA), a value close to 0.06 indicates adequate model-data fit (Clara, Cox, & Enns, 2001; Hu & Bentler, 1999; Schreiber, Stage, King, Nora, & Barlow, 2006).

4. Results

Descriptive statistics revealed that the Median of student's oral reading rate on the three excerpts was 90 w.p.m. It is important, however, to clarify in depth the distribution of students by the number of words read per minute. The Figure 1 depicts the data derived from the ORFM.
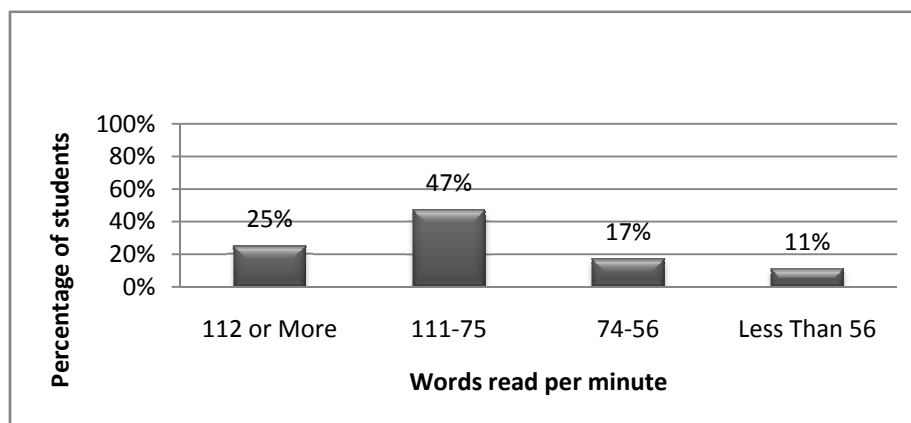

Figure 1. Average number of words read per minute

Figure 1 indicates that 25% of sixth-grade students read at least 112 w.p.m., well above the median of 90 w.p.m. Moreover, 28% of students read at or less than 75 w.p.m., substantially less than the median.

In addition to oral reading rate, the results showed the level of student's oral reading accuracy. Figure 2 shows that 41% of students can read independently, and 46% of them read at the expected instructional level (read with 97-90 accuracy) and hence need some sort of support to improve oral accuracy. Furthermore, 13% of students fell at the frustration level and read with less than 90% accuracy.
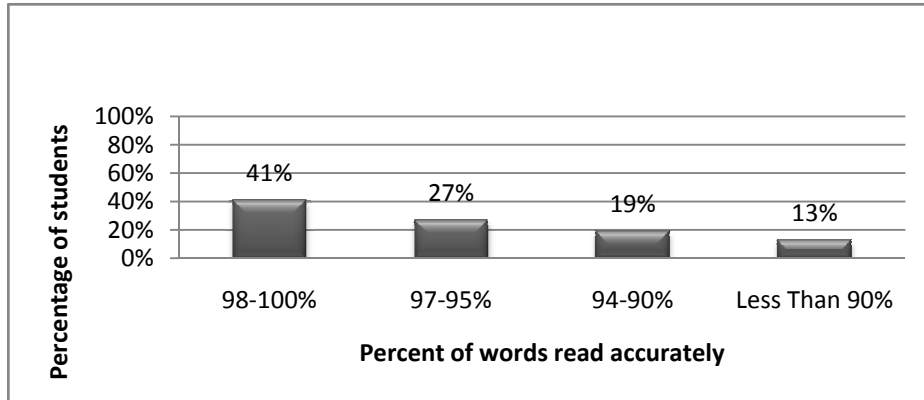
Figure 2. Degree of oral reading accuracy

Examining the level of prosody, Figure 3 shows that 66% of sixth-grade students read with good prosody, whereas 34% of them did not.
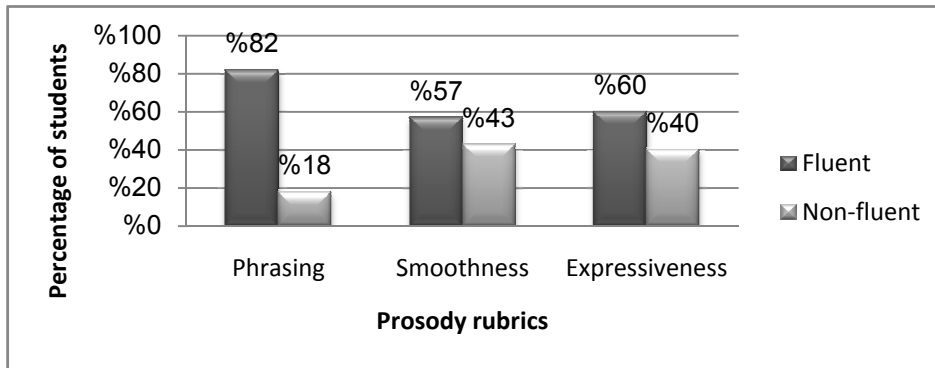

Figure 3. Prosody level

Above all, there were five questions to be answered by a student once s/he had finished reading each passage orally, and these five questions measure three oral reading comprehension components as depicted in the Figure 4.
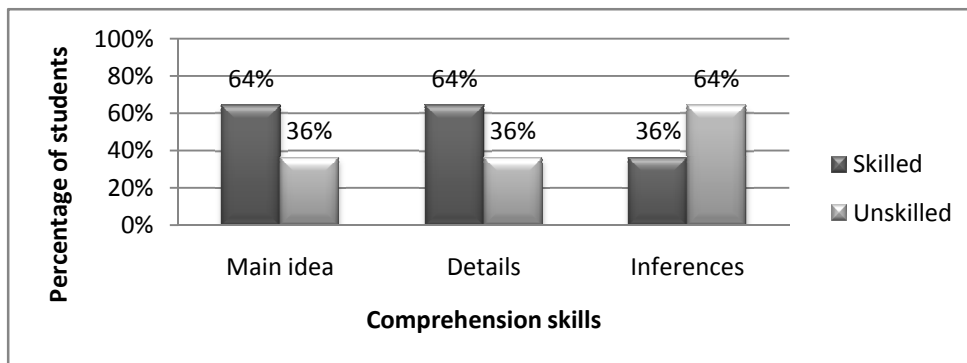

Figure 4. Oral reading comprehension level

Figure 4 indicates that students performed better in identifying the main idea and details than making inferences.

Addressing the second core question to the current study, "To what extent do oral reading rate, oral reading accuracy, prosody, and oral reading comprehension reflect ORF?" Confirmatory Factor Analysis was performed.

Table 2. Model fit summary of oral reading fluency

Model	CMIN(χ^2)	P	NFI	RMSEA
Default model	2.597	.27	.996	.024
Default model	2.449	.294	.996	.021
Default model	1.861	.553	.998	.000
Default model	.960	.619	.999	.000

Note 1: p < .05

Note 2: Four proposed models of indicating factors of ORF were tested

a. The model involves ORR, ORA, prosody, and ORC (i.e. identifying main ideas, identifying details, and making inferences).

b. The model involves ORR, ORA, prosody, and indentifying main idea only.

c. The model involves ORR, ORA, prosody, and identifying details only.

d. The model involves ORR, ORA, prosody, and making inferences only.

Table 2 indicates a very good fit between the four proposed models and the observed data. However, the model is the best model ($\chi2$ = .960, p = .619, NFI = .999, RMSEA = .000) indicating ORF in the current study. Despite that all the observed variables in the four models are significant indicators of ORF (all ps < .000) as depicted in Table 3, prosody, oral reading accuracy, oral reading rate, and making inferences (the observed variables in the model) are the best indicators of ORF in the current study.

Table 3. Estimates of the indicators of oral reading fluency

Indicators of ORF			Estimate	SE	C.R	P
Comprehension	←	ORF	.411	.043	9.601	.000
Identifying main ideas	←	ORF	.060	.012	4.969	.000
Identifying details	←	ORF	.158	.017	9.131	.000
Making inferences	←	ORF	.173	.021	8.115	.000
Prosody	←	ORF	1.0			
Oral accuracy	←	ORF	.795	.044	17.968	.000
Oral rate	←	ORF	.580	.036	16.051	.000

Note: p < .05.

Answering the third and last key question "What is the effect of bilingual education on students' ORF in Arabic?" An Independent-Samples T Test analysis was conducted as depicted in Table 4.

Table 4. Results of an Independent-Samples T Test analysis of the bilingual and monolingual students' oral reading fluency

Indicators of ORF	Students						T	Sig.
	Monolinguals			Bilinguals				
	N	M	SD	N	M	SD		
Oral reading rate	425	87	26.8	64	98	26	3.070	.002
Oral reading accuracy	425	9.9	2.9	65	8.8	2.4	2.640	.009
Prosody	401	5.9	3.1	65	6.7	2.8	1.776	.076
Oral reading comprehension	426	10.9	2.8	65	10.8	2.3	.112	.911

Note: p < .05.

Table 4 explains that the bilingual students performed better than the monolingual students on oral reading rate, oral reading accuracy, and prosody. However, both bilingual and monolingual students performed at the same level on oral reading comprehension.

5. Discussion

The core findings of the current study are that ORC is an indicator of ORF in addition to prosody, ORR, and ORA. The models tested in the current study showed that ORC and each of its examined sub-skills (i.e. identifying main idea, identifying details, and making inferences) are significant indictors of ORF as explained in Table 3. But, the confirmatory factor analysis revealed that the best model of ORF, in the current study, involves prosody, ORR, ORA, and making inferences as depicted in Table 2. That is, researchers and practitioners need to consider the four indicating factors in ORF.

In the literature, many researchers documented the importance of rate, accuracy, and prosody in order to aid reading comprehension (e.g., Benjamin & Schwanenflugel, 2010; Denton et al., 2011; Hasbrouck & Tindal, 2006; Kuhn, Strauss, & Morris, 2006; Mckenna, 2002; McKenna & Stahl, 2003; Mohamed, 2006). Others related comprehension to reading rate, accuracy, or prosody (e.g., Abbott, Wills, Miller, & Kaufman, 2012; Ali, 1987; Behari, 1988; El-Essawi, 2002; Daane et al., 2005; Mohamed, 2006). Furthermore, some researchers predicated comprehension by rate, accuracy, or prosody (Binder et al., 2012; Kim, Wagner, & Foster, 2011; Paleologos & Brabham, 2011; Riedel, 2007; Wood, 2006).

ORC, in the current study, is rather an indicating factor of ORF. This is consistent with the notion of retell fluency (RTF) to examine comprehension as a factor of ORF in addition to oral rate, oral accuracy, and prosody, which makes ORF one of the best measures of overall reading competence (University of Oregon, 2008). The argument has been made that reading with good prosody, accurately, and rapidly without comprehension means very little (e.g., Chapman & King, 2003; Hussien, 2009, 2011, in press; Hussien, Beverton, & Byram, 2009; Pikulski & Chard, 2005; Wray, 2004). That is, the current study adds to the literature with respect to ORC as an indicating factor of ORF. In addition, the results indicated that examining ORC as an indicating factor of ORF involves both literal (identifying main idea and details) and inferential levels (making inferences).
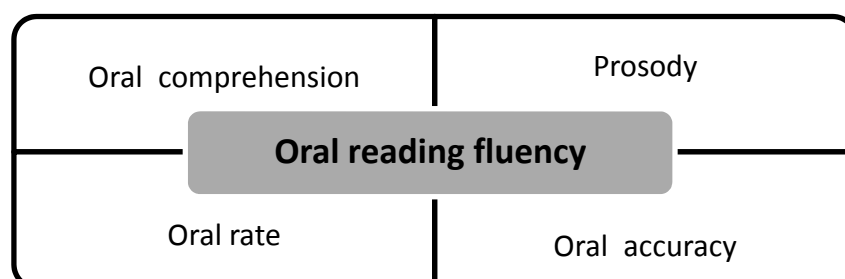

Figure 5. Indicating factors of oral reading fluency

The second key findings of the current study are that bilingual education significantly affected the students' ORF as explained in Table 4. The bilingual students performed better than their monolingual counterparts on ORR, ORA, and prosody. However, both bilingual and monolingual students performed at the same level on ORC. Interestingly, students in the monolingual school were exposed to Arabic more than English though, the bilingual students were more fluent than monolingual students in ORR, ORA, and prosody. This result is consistent with the notion of multi-competence that learning a second language, English, has positive effects on learning the first language, ORF in Arabic. As explained above, the mind of someone who knows more than one language is different from the mind of a monolingual.

In fact, reading comprehension requires more than reading words accurately at a rapid rate. Context for reading plays a critical role in comprehension (Abu-Rabia & Siegel, 1995), for example. In this vein, native Arabic-speaking students learning English as a second language transfer local reading strategies, i.e., relevant to single words and sentences, between English (L2) and Arabic (L1) and vice versa (Ghuma, 2011). This also may explain why students learning English (L2), in the current study, performed better than the monolingual students on ORR, ORA, and prosody but not on ORC. Further research is needed to investigate in depth how English (L2) affects Arabic (L1).

The final important findings of the current study are that six-grade Arabic-speaking monolingual and bilingual students performed better in ORR and ORA than in prosody and ORC. For better understanding of these results, a critical issue should be considered that is the unique characteristics of Arabic orthography, as mentioned above.

Referring to the Median of student's ORR (90 w.p.m) stated above. The argument has been made that there is no single reason that explains how many words fluent student can read per minute. ORR depends on many factors chief among them, the nature of orthography (Abu-Hajaj, 2006; Hussien, in press).The orthography of Arabic is a complex i.e., multi-syllabic words (Saiegh-Haddad, 2004), and word recognition in Arabic is a cognitively demanding process that involves processing of letters and vowels, visible or deduced, and differentiating homographs, identical form of words, if text is introduced unvowelized (Abu-Rabia, 1998). This may explain why students who read Arabic, in the current study, had a lower ORR than students who read English, for example. In reading English, 61% of fourth-graders read a moderately difficult passage at a rate of at least 100 w.p.m. (Pinnell et al., 1995).This emphasizes that the nature of Arabic orthography has indispensible variables e.g., vowels and homographs, to science of reading (Abu-Rabia, 1997, p. 66, 1998; Hussien, in press).

In the same direction, nearly a half of students (46%) fell at the instructional level (read with 97-90% accuracy), and 13% faced difficulty reading passages with less than 90% accuracy. In this context, a special sort of practice with easier and more readable passages could be useful since practice should be fitted to children's initial reading level (Steenbeek-Planting, Van Bon, & Schreuder, 2012). Despite the fact that ORA can be improved by practice, the issue here is that ORA in Arabic is also a cognitively demanding process that involves phonological, morphological, and syntactic processes (Abu-Rabia, 1998). To read aloud accurately in Arabic, students need to process letters and vowels. These vowels explain the correct pronunciation, unequivocal meaning, and function of a word in a sentence. The end of a word changes according to its function in a sentence (Abu-Rabia, 1998, p. 107). In fact, these results also suggest that visible vowels, which are not the case in the current study, are important even in the later years in the primary school to read aloud accurately. Students read Arabic vowelized scripts more accurately than unvowelized texts (Abu-Rabia, 1998, 2001; Hussien, in press). Similarly to vowels in Arabic, points in Hebrew (a Semitic orthography like Arabic) help skilled adults with reading aloud accurately (Abu-Rabia, 2001).

Furthermore, reading with good prosody or reading without hesitation or repetition and reading with intonation in Arabic requires students to read words accurately at a rapid rate which in turn involves processing many variables e.g., deducing absent vowels, knowing a function of a word in a sentence, recognizing changes in the end of words and above all, understanding context for reading. This may explain why more than a third of students (41%) read with unsmoothly and inexpressively as Figure 3 shows.

Despite the importance of ORR, ORA, and prosody as indicating factors of ORF, teachers need to concentrate on ORC as an indicating factor of ORF and not to stress too much on ORR, ORA or prosody. Hasbrouck and Tindal (2006) suggest that 50% of fluency in these three factors is enough to start with and to improve comprehension. Previous research also suggests that about 50 word correct per minute (wcpm) among primary school children are needed as a minimum rate or a starting point in comprehension of a text in English (Burns et al., 2002, 2011). Sixth-grade children, in the current study, showed more fluency in literal comprehension, where they were able to identify the main idea and details than in inferential comprehension, where they were requested to make

inferences from what they read orally, as explained in Figure 4. A plausible explanation of this is that making inferences is more sophisticated than identifying main idea and details which are direct information in a text being read (Al-Naqah & Hafez, 2002; Mullis, Kennedy, Martin, & Sainsbury, 2006; Rasslan, 2005; Te'eimah & El-Shoaibi, 2006; Younis, 2005). In addition, students devote more effort to read words aloud accurately at a rapid rate, and with good prosody, which affects their comprehension (Huey, 1908; LaBerge & Samuels, 1974; Mckenna, 2002; Nicholson & Tan, 1999; Samuels, 1976, 2004; Samuels, Schermer, & Reinking, 1992). In shallow and deep orthographies e.g., Arabic or Hebrew, reading comprehension is affected by the unique characteristics of these Semitic orthographies. Students gained more comprehension of vowelized scripts than unvowelized texts in Arabic (Abu-Rabia, 1999, 2001; Hussien, in press) and similarly, students accomplished more comprehension of pointed texts than unpointed in Hebrew (Abu-Rabia, 1999, 2001; Shimron, 1993; Shimron & Sivan, 1994). This may also explain why students had difficulty in making inferences from unvowelized scripts used in the current study.

To sum up, these results raise two critical issues that are; (a) Arabic orthography has indispensible variables e.g., vowels, to science of reading, and (b) teachers need to fit their teaching not only to students' initial ORF level but also to the unique characteristics of Arabic orthography. In this context, teachers may use and adjust some techniques to improve ORF in Arabic e.g., fluency-enrichment programs (Reis, Eckert, McCoach, Jacobs, & Coyne, 2008), fluency-focused interventions (Martens et al., 2007; Schwanenflugel et al., 2009), readers' theatre (Abdelhameed, 2005; Keehn, 2003), repeated reading, choral reading, or peer-reading (Abdelbari, 2011).

6. Conclusion

In addition to oral reading rate, oral reading accuracy and prosody, the current study adds to the literature with respect to oral reading comprehension as an indicating factor of ORF. It also provides a comprehensive account about oral reading rate, oral reading accuracy, prosody, and oral reading comprehension in Arabic among sixth-graders, which is a critical step in establishing standards for sixth graders' ORF in Arabic. Interestingly, the current study explains the positive effects of learning a second language, English, on the ORF in the first language, Arabic. Above all, it shows that the nature of Arabic orthography is an indispensible factor when examining ORF in science of reading. Further research is needed to examine ORF in Arabic with different genres e.g., poetry, or narration, and with different conditions i.e., vowelized or unvowelized scripts. In addition, further research is needed to investigate in depth how English (L2) affects Arabic (L1).

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