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Cross-Linguistic Examination of Spelling Errors Made by Iranian EFL Learners

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Abstract. Patterns of spelling errors by EFL learners can reflect poor linguistic competence on different levels. With the purpose of examining factors affecting spelling errors of Iranian EFL learners, the present study aims to investigate writing skills of 465 Iranian high-school female students (mean age = 15.8) attending grades 1, 2, and 3 in Iran. Fifty selected words in each grade according to their textbooks were read to the students. For data analysis, the errors were classified into five major error categories including phonological awareness, knowledge of orthography, vocabulary, morphological and semantic relationships, and mental orthographic images. The content analysis of the data revealed that phonological skills were a strong predictor for spelling skills and pupils were relying on spoken language in deriving the written forms of words. Additionally, different types of spelling errors did not follow any distinct patterns based on the age. On the other hand, patterns of spelling errors for both areas (speaking Persian language at home versus speaking Arabic language at home) experienced similar patterns though at varying percentages.

Keywords: Spelling Errors, Persian language, English language, Orthography, Phonology.

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1. Introduction

As far as second language acquisition is concerned, both behaviorist psychologists and structural linguists believed that native language habits which are acquired during childhood as part of maturational processes interfere with the acquisition of second language habits which are usually quite different from the habits of mother tongue. In other words, second or foreign language learners will tend to transfer the formal features of their first language (L1) to their second language (L2) (Omidipour, 2014).

Generally speaking, the development of writing in EFL learners is influenced primarily by word-level skills such as word identification and spelling (for a review, see Adams, 1990). It is assumed that word identification and spelling depend on similar skills, namely, phonological and orthographic processing skills (Gough et al., 1992). Phonological processing skills represent the student's procedural knowledge about grapheme-to-phoneme correspondence rules. They enable readers to translate the letters into their corresponding sounds and then combine the sounds to read words. Furthermore, phonological skills are used to spell words. Phonological skills enable spellers to segment the sounds in words and try to represent the sounds with corresponding letters. An EFL learner may segment the phonemes in 'pat' as /p/, /ae/, and /t/ and represent each with the corresponding graphemes, p, a, t (Varnhagan, 1995). Orthographic processing skills represent the "ability to form, store, and access the orthographic representations" of words or meaningful parts of words (Stanovich and West, 1989). These skills involve one's knowledge of the letters in words and their sequence. Orthographic skills allow the spelling of words from memory.

Although the significant roles of both phonological and orthographic skills are well established, the contribution of each of these skills to EFL learners' spelling acquisition may differ based on the degree to which alphabetic writing systems represent the grapheme-to-phoneme or phoneme-to-grapheme correspondences (Katz and Frost, 1992). In consistent orthographic systems, the relation between grapheme and phoneme is straightforward, and grapheme-phoneme correspondences

are highly predictable. Indeed, in a perfectly consistent orthography there would be entirely one-to-one grapheme-to-phoneme and phoneme-to-grapheme correspondences. Languages such as Arabic, Spanish, Greek, Persian, German, and French are examples of consistent orthographies (although the degree and the direction of transparency may differ among them). There are languages, however, where the relation between grapheme and phoneme is not straightforward and each grapheme may correspond to many phonemes and / or each phoneme may be represented by more than one grapheme. For example, the /k/ sound can be represented by k, c, ck, or ch, depending on where it occurs in the word. Another example is the graphemic sequence gh which has three different pronunciations as in though, enough and ghost and the /f/ sound which is represented by different letter combinations as in "affair", "enough" and "pharaoh". Besides, the English language has more phonemes than graphemes, such as the letter s which can represent the sounds /s/ or /z/. Moreover, the context can greatly influence orthographic information. For instance, an e at the end of a one-syllable word lengthens the preceding vowel and double letters do not often appear at the beginning of words. It is also important to possess some fair morphological knowledge of words and derivatives to become an effective speller in English. The spelling of the suffixes ed for past or s for plural are good examples. Similarly, morphological knowledge helps discover the link between related words, such as 'signature' and 'sign' despite their formal dissimilarity. In brief, good English spelling requires a complex interaction between phonology, orthography and morphology (Treiman and Cassar, 1997).

EFL learners may also produce spelling errors in the second language due to the influence for the L1 on the L2 spelling which is manifested in the transfer of phonological knowledge or the transfer of grapheme-to-phoneme correspondence rules. A number of spelling studies, for example, show that EFL learners with an L1 Roman alphabet, such as German and Spanish, transfer their familiarity with the Roman letters while learning to read and spell in English, and also make use of their already acquired corresponding letter-to-sound mapping patterns (Fagerberg, 2006). In addition, there is a noted tendency among EFL learners to have difficulty with EFL phonemic segments and patterns

that do not exist in their L1. This certainly hinders the development of their English spelling and thus word recognition skills. For instance, as Spanish has a smaller set of vowels, especially short vowels, than English, EFL Spanish learners experience difficulty learning short and long-vowel-spelling patterns at the early stages of language acquisition (Zutell and Virginia, 1988).

Reviewing the EFL spelling literature, it was found that there is paucity in studies targeting Arab learners' spelling in English, especially at the level of secondary and postsecondary education. One relevant study was conducted by Al-Jarf (2008). The study aimed at investigating the phonological and orthographic problems that Saudi EFL freshmen students have in spelling English, their second language. With this aim in mind, the researcher asked 36 EFL freshmen students at the College of Languages and Translation, to complete a listening spelling test which required them to fill out 100 blanks in a dialogue. The results showed that the participants exhibited serious spelling difficulty, especially at the phonological level that constituted 63% of the errors. Poor spellers had difficulty hearing and discriminating all or most of the phonemes in a word, hearing and discriminating vowel phonemes and hearing the final syllable or suffix. As for orthographic problems, they included vowel diagraphs, double consonants, silent vowels, consonants and homophones. Al-Jarf (2008) concluded that most of the participants' weaknesses in spelling English can be attributed to the interference of the mother tongue. In other words, the participants were transferring the Arabic spelling system into English, which led to different spelling errors.

1.1. Learning to read and spell in Persian

Persian orthography consists of 32 alphabetic letters that are written from right to left. While most letters consist of distinct symbols, there are some letters that are distinguished by dots and marks (e.g., /b/ vs. /p/or /k/vs. /g/). There are three long vowels represented by letters and three short vowels represented by diacritics added above or below the consonant letters. The presence of diacritics alters the pronunciation of consonants.

Beginning readers of Persian start to read and spell by using diacritics but are gradually encouraged at the beginning of grade 2 to read and spell without using diacritics. The lack of diacritics is generally not a problem for skilled readers (Baluch, 1993). Indeed, the limited evidence shows that skilled readers show no difference in speed and accuracy for high frequency words while low frequency words with short vowels are read more slowly than those with long vowels (Baluch and Besner, 2001). Beginning readers, however, are less accurate on words with short vowels (Baluch and Shahidi, 1991).

Persian orthography is usually viewed as consistent in terms of grapheme to phoneme correspondence rules because each grapheme has a single pronunciation (Baluch, 1993; Baluch and Besner, 1991). Persian orthography is somewhat unpredictable in terms of spelling due to the existence of certain phonemes represented by more than one grapheme. For example, the phoneme /s/ can be represented by three different graphemes, (see also Arab-Moghaddam and Senechal, 2001; Baluch and Besner, 1991). The poligraphy of Persian should not have any effect on reading because any given letters has the same pronunciation; however, it may affect the spelling of a word because the speller has to select the correct letter from an array of possible letters.

Arab-Moghaddam and Senechal (2001) examined the role of phonological and orthographic skills in reading and spelling among bilingual Persian-English children (grade 2 and 3). They showed that orthographic skills were a better predictor of reading than were phonological skills, and that orthographic skills, not phonological skills, accounted for unique variance in Persian spelling. The pattern of strategies used by bilingual Persian-English children in Arab-Moghaddam and Senechal (2001) is similar to that reported for skilled readers (Baluch and Besner, 1991). In addition to relying more on orthographic skills to read and spell Persian words, the bilingual Persian-English children performed well on all tasks (i.e., reading 88%, spelling 77%, phonological skills 86%, and orthographic skills 95%), which is characteristic of skilled reading (Ehri, 1992).

The reduced role of phonological skills found in Arab-Moghaddam and Senechal (2001) is not consistent with the results of other stud-

ies showing that beginning readers of consistent orthographic systems rely mostly on phonological skills to read and spell words (Baluch and Shahidi, 1991). It should be noted that in Arab-Moghaddam and Senechal's study, however, children were bilingual. There is evidence showing that some metalinguistic and cognitive concepts develop differently in bilingual children in comparison to monolingual children (Lesaux and Siegel, 2003).

In another work, Rahbari et al. (2007) investigated the contribution of phonological and orthographic skills to Persian reading and spelling. They showed that although monolingual Persian children relied both on phonological and orthographic skills, phonological skills were a strong predictor for both reading and spelling. In their works, as expected, children spelled phoneme to grapheme (PG)-consistent words more accurately than PG-inconsistent words. So far, rare efforts have been made to critically address the influence of Persian language on the mechanisms of spelling in English Language. Additionally, there are still challenging topics related to the sources of spelling error patterns among EFL learners, which lead to contradictory results such as phonological processing skills or orthography processing skills. Consequently, by conducting a comprehensive survey and analysis of the results, this research attempts to gain more insight about spelling as a process by tracking the patterns of spelling errors and investigating whether or not participants' language (Persian language) influences the mechanisms of spelling in English Language. To this end, the following research questions guide the current study:

- What are the causes of producing spelling errors by second language learners?
- Does the discrepancy between Persian and English orthographies hinder the Persian learners' acquisition of English spelling?
- Does the grade/age have any effect on language errors made in English writing by Iranian school level EFL learners?
- Is the trend of errors made by those whose spoken language at home is Persian similar to the ones who speak Arabic in the house?

2. Methodology

2.1 Participants

The population sample, consisting of 465 learners of English, aged 15 to 18 years attending grades 1 to 3 in seven high schools in Shiraz and Mahshahr, Iran (with Persian language as their native language), took part in this survey. They all came from the same school type and were taught with the same syllabus and materials, but by different teachers. The participants were female. By the time the test was conducted, they had been learning English for about 3 to 5 years for at least four hours per week. Their exposure to English language was limited to the classroom. All participants who studied in Shiraz spoke Persian language at home while for about 85% of those who attended school in Mahshahr, Arabic was the language spoken at home.

The number of participants per grade and city is presented in Table 1.

Table 1: Total number of samples marked, overall by city, class/age

City	High School	Class / Age	Number per grade	Subtotal number
Shiraz	Tohidi	Grade 1	58	122
		Grade 2	38	
		Grade 3	26	
	Allameh Amini	Grade 1	27	85
		Grade 2	29	
		Grade 3	29	
	Derakhshesh	Grade 1	21	47
		Grade 2	26	
		Grade 3	0	
	Hesabi	Grade 1	40	101
		Grade 2	32	
		Grade 3	29	
Mahshahr	Pazhuheshgaran	Grade 1	41	83
		Grade 2	42	
	16 Azar	Grade 3	27	27
Total number of participants				465

2.2 Testing instruments

The test was elaborated with a four-step procedure which is as follows:

2.2.1 An initial selection of items from grades 1, 2, and 3 textbooks

Following Kibbel and Miles (1994), Randall (1997) and Masterson and Apel (2000), in this study, a sample of individual words taken from English textbooks in different grades of high school was collected as done in other studies (e.g., Arab-Moghaddam and Senechal, 2001; Baluch and Shahidi, 1991; Bruck et al., 1997; Juel, 1988). It is essential to mention that for grade 1 the words in review section were utilized. Furthermore, since the tests were taken in November 2014, two lessons of grade 1, 2, and 3 of each textbook that had been taught, were also added to the tests for each grade.

2.2.2 An initial verification of the difficulty level of the items

For this purpose, at least three experienced teachers in each grade were asked to rate the items on a 5-point scale (where 1 is easy and 5 is very difficult).

2.2.3 A second selection of easy and difficult items

In this part, based on the teachers' ratings, for each word an average of rating was obtained. In general, it was supposed that easy items having received a mean rating score of 2 or below while difficult items having received a mean score of 3.5 or above.

2.2.4 Final selection of the words

As with any other measure of assessment, it is imperative to begin with an adequate sample of the individual's spelling errors for each spelling pattern (e.g., short vowel a, s-clusters, silent consonants, unstressed vowels, inflected words) so that the error analysis yields valid results. Kibbel and Miles (1994) state that words selected for dictation should all be familiar to the learners. Feez (2001) in this regard says that the selected words for dictation should match the level of language of the course of study. Most standardized and criterion reference measures use 25-50 words to assess students' spelling skills. Although there are no data to

suggest the optimal sample size, a corpus of 50-100 words would appear to be an appropriate amount to capture patterns of spelling (Masterson and Apel, 2000).

Therefore, a final selection of items within the difficult items was made for each grade because the easy items were nearly at ceiling for accuracy. The final version of the test consisted of 50 words that included one-syllable, two-syllable, and three-syllable words (see Table 2). Within each group of one-, two-, and three-syllable words, some of them were PG-consistent while the others were PG-inconsistent.

Table 2: Final selection of the words:

Table 2 (a): Grade 1

1	arrive	11	exercise	21	minutes	31	raise	41	think
2	beautiful	12	field	22	necessary	32	raising	42	thirsty
3	breakfast	13	fruits	23	pay attention	33	restaurant	43	tomorrow
4	busy	14	getting late	24	Phone	34	several	44	understand
5	carefully	15	guest	25	Pick	35	sick	45	usually
6	climb	16	house	26	picture	36	sometimes	46	vegetables
7	climbed	17	kitchen	27	piece	37	studies	47	village
8	correctly	18	laugh	28	please	38	swimmer	48	wakes up
9	country	19	leave	29	pretty	39	swimming	49	was
10	difficult	20	library	30	questions	40	their	50	weather

Table 2 (b): Grade 2

1	across	11	build	21	don't worry	31	laugh	41	special
2	admire	12	butcher	22	Enough	32	migration	42	steam engine
3	attractive	13	century	23	Exercise	33	mystery	43	succeed
4	Australian	14	certainly	24	Follower	34	nationality	44	therefore
5	autumn	15	comfortable	25	Foreign	35	necessary	45	thirsty
6	be afraid of	16	creator	26	guidance	36	out of reach	46	thousand
7	be surprised	17	daylight	27	Guide	37	peace be upon him	47	universe
8	believe	18	dialogue	28	honesty	38	prophet	48	weather
9	borrow	19	discover	29	Ideal	39	receive	49	worse
10	brightly	20	distance	30	language	40	snow plow	50	worship

Table 2 (c): Grade 3

1	according to	11	composition	21	knowledge	31	professor	41	steal
2	actually	12	describe	22	language	32	punish	42	successfully
3	admire	13	disagree about	23	medicine	33	purpose	43	suddenly
4	advice	14	disease	24	muscle	34	quiet	44	suitable
5	against	15	education	25	museum	35	religion	45	terrible
6	although	16	expect	26	necessary	36	request	46	through
7	behavior	17	expression	27	photographer	37	Russian	47	thumb
8	bridge	18	giggle	28	politics	38	secretary	48	touch
9	business	19	guess	29	population	39	social	49	unwelcome
10	coach	20	knife	30	president	40	spaghetti	50	waist

2.3. Data collection procedure

According to Randall (1997) and Kibbel and Miles (1994), 50 selected words in each grade were read to the students followed by the context twice. There were a five-second pause between the first reading of the selected word and its context and the second reading of them. Then, the EFL learners were asked to write down the word in the blanks which they heard. It is essential to mention that all words were pronounced as per Longman dictionary.

2.4. Data analysis

Three experienced teachers of English were recruited as markers. They had over 25 years of teaching experience, mostly at secondary level. Within their group, one was the head of secondary English departments; one had experience of teacher training and of teaching in middle schools, and another was working for an examination board. Before undertaking the main marking, the markers went through an agreement trial. This consisted of marking a common set of scripts and then attending a meeting to discuss discrepancies and clarify obscurities in, or misunderstandings about, the instructions. In addition, following the main marking, one of the three markers checked a sample of the mark sheets of each of the other two. In general, satisfactory levels of inter-marker agreement were achieved in the agreement trial, and a high level of accuracy in the main marking The markers were asked to apply a very detailed ana-

lytic marking scheme summarized as below. These instructions, however, were devised especially for this project, and therefore some background explanation is given. In this study, markers were asked to assess the pupil's spelling on the basis of twenty-five errors in the tests as the maximum limit of mistakes. The reason for choosing this number of errors is that in APU surveys (Gorman et al., 1991) it had been found that 50% accuracy in each script provided sufficient evidence for reliable assessment of detailed analytic categories such as orthography. Additionally, the markers were asked to ignore all of the following:

• punctuation errors, including incorrect use or non-use of hyphen or apostrophe

• incorrect use of upper or lower case letters

• incorrect word division including the past tenses or plural forms, however if past tenses or plural forms are written inaccurately the error should be considered

We were therefore adopting a narrow meaning of 'spelling error'. Finally the markers should do as follows:

• If the pupil has made no spelling errors in this narrow sense at all, enter '00' in the 'Error no.' columns on both the Mark sheet and the Log sheet.

• Otherwise, for each spelling error detected, they should proceed as follows.

◦ Allot each error a number and enter it in the Error no. columns on the Mark sheet and Log sheet. Start at 01 and work up.

◦ Where the error-word is illegible or unclear, just allot the error an error number in the "Non coded" column on the marker sheet.

◦ If there is more than one error in a word, then number, log and code each error separately. For example, 'carectly' for "correctly" contains two errors, the omission of the 'r' and the substitution of 'a' for "o". For each codable error, do all of the following:

◦ Transcribe the error-word in the pupil's spelling in the 'Error' column on the log sheet as depicted in Table 3 a.

◦ In the 'Intended word' column on the log sheet enter the correct word as represented in the answer sheets (see Table 3 b)

Table 3: Sample of log sheets and marker sheets

Table 3 a: A sample of log shee

November 2014

Marker No.	1
Pupil No.	72
School	Hesabi
Grade	1

Error No.	Error	Intended word
01	arrives	arrives
02	carectly	correctly
03	countrys	countries
04	execsises	exercise
05	nessecary	necessary
06	pice	piece
07	raiseing	raising
08	studyise	studies
09	summer	swimmer
10	siwming	swimming
11	tarsty	thirsty
12	village	village
13	wether	weather

Table 3b: A Sample of marker sheet

	Second Category*					
No.	phon.	orth.	Voc.	Morph.	Ment	NC
1		1				
2					1	
3				1		
4		1				
5		1				
6					1	
7				1		
8				1		
9	1					
10	1			1		
11	1	1				
12		1				
13	1					
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
Sum	4	5	0	4	2	0

* Phon.: Phonological Awareness, Orth.: Orthographic Knowledge, Voc.: Vocabulary, Morph.: Morphological Knowledge and Semantic Relationships, Ment.: Mental Orthographic Images, NC: Non-coded errors

• Code the error according to categories below: Like reading, spelling is a written language skill that draws upon an individual's repertoire of linguistic knowledge, including phonological awareness, and knowledge of orthography, vocabulary, morphological and semantic relationships; and mental orthographic images (Apel and Masterson, 2001; Apel et al., 2004, P-12). Each of these areas of linguistic or "word study" knowledge contributes to spelling success (Treiman and Bourassa, 2000) and a deficit in any one of these areas of word study knowledge will manifest as a specific pattern of misspelling. Accordingly, in this category by analyzing individual's spelling errors as per the following sections, we are looking for identifying underlying linguistic deficits among EFL learners. Different parts of this category are as follows:

Phon. (1) Phonological Awareness:

Individuals rely upon the phonological awareness skills of phoneme segmentation, sequencing, discrimination, and identification during the spelling or "encoding" process. They use phonological segmentation skills when spelling by breaking down words into smaller units-such as syllables and phonemes-then linking these smaller units to their written forms. They use sound sequencing skills to map the letters to sounds in the correct order. They use phoneme discrimination and identification skills to perceive differences between speech sounds (e.g., between the short vowel e and short vowel i sounds) and to recognize that a difference in sound signals a difference in meaning (Wasowicz, 2007, P. 1to 3).

Orth. (2) Orthographic Knowledge:

Individuals also draw upon their orthographic knowledge during the encoding process. Specifically, individuals draw upon their knowledge of sound- letter relationships and knowledge of letter patterns and conventional spelling rules to convert spoken language to written form (Ehri, 1992; Treiman and Bourassa, 2000). Orthographic knowledge includes knowledge of specific letter-sound relationships (e.g., the/k/sound can be represented by the letters c, k, ck, cc, lk, ch, que); knowing which letter patterns are acceptable (e.g., the/k/sound is almost always spelled with the letter k at the end of a word after a long vowel sound); and understanding sound, syllable, and word position constraints on spelling

patterns (e.g., the/k/sound at the beginning of a word is never spelled with the letters ck, cc, lk). (Wasowicz, 2007, P. 1to 3).

Voc. (3) Vocabulary
Individuals use vocabulary knowledge to accurately store and retrieve the correct spelling of words. The knowledge of word meaning is particularly important for the correct spelling of homophone words (e.g., bare and bear). Vocabulary knowledge is also helpful to correctly spell the wh consonant digraph because the /w/ sound at the beginning of question words (what, where, when, why, which) is always spelled with the letters wh. (Wasowicz, 2007, P. 1to 3).

Morph. (4) Morphological Knowledge and Semantic Relationships:
Individuals also rely upon their morphological knowledge and knowledge of semantic relationships when spelling inflected or derived forms of words (Carlisle, 1995). Specifically, individuals rely upon their knowledge of letter- meaning relationships of individual morphemes (i.e., suffixes, prefixes, base words, and word roots), their understanding of semantic relationships between a base word and related words, and their knowledge of modification rules when adding prefixes and suffixes.

Inflected words contain suffixes that provide information about time or quantity without changing the meaning or class of the words (e.g., walk-walked; cat-cats). Derived words contain affixes (prefixes or suffixes) that change the meaning and sometimes the class of words (e.g., cycle-recycle; friend-friendly). When an individual is required to spell an unfamiliar word (e.g., exception), knowledge of the base word (i.e., except) and certain word endings (e.g.,-ion) can help the student spell the unfamiliar word correctly. An individual draws upon knowledge of rules for modifying base words to correctly spell inflected and derived forms of words. Individuals also draw upon knowledge of semantic relationships and rules for modifying words to spell irregular plural nouns, irregular past tense verbs, contractions, and possessive nouns. The use of knowledge of word parts and related words to spell words becomes increasingly important as individuals begin to spell words of greater length and complexity. (Wasowicz, 2007, P. 1to 3).

Ment. (5) Mental Orthographic Images:

Individuals need to develop clear and complete mental representations of previously read words. These mental images of words, also known as mental orthographic images (MOIs), are stored in an individual's long-term memory after repeated exposure to them in print (Ehri and Wilce, 1982; Glenn and Hurley, 1993). Inadequate MOIs are often formed when individuals use inappropriate reading strategies such as partial cue analysis, a process whereby the student guesses the identity of a word after decoding only the first letter(s) of the word. Clearly and completely developed MOIs allow individuals to quickly recall and correctly spell words and word parts. Individuals must rely upon the mental image of a word when phonological awareness and knowledge of orthography, vocabulary, word parts, and related words are not sufficient to correctly spell a spelling pattern within a word (e.g., rope not roap, bucket not buckit, actor not acter). (Wasowicz, 2007, P. 1to 3).

NC (6) Non-coded errors:

The error arises when the word is illegible or unclear, e.g. 'min' for "minutes".

Once marking was completed, the mark sheets were further checked for the greatest possible degree of accuracy in the results. Based on the criterion of maximum 25 errors for accepting the sample for further investigation, samples were divided into two groups valid and invalid as presented in Table 4. Therefore, further investigation on samples based on the abovementioned categories were performed on valid samples (235 samples).

Table 4: Number of valid and invalid samples, overall by city, class/age

City	Class / Age	No. of valid per grade	No. of invalid per grade	Subtotal valid no.	Subtotal invalid no.
Shiraz	Grade 1	101	45	174	181
	Grade 2	46	79		
	Grade 3	27	57		
Mahshahr	Grade 1	38	3	61	49
	Grade 2	17	25		
	Grade 3	6	21		
Total number of participants				235	230

3. Results and Discussions

In this section, three different scenarios were considered which are investigated in details in the following section:

- Frequency of Errors
- Variation in spelling performance related to age
- Variation in spelling performance related to spoken language at home

3.1. Frequency of errors

It is possible to identify an individual's linguistic deficits through spelling error analysis because a specific pattern of misspelling is associated with each specific type of linguistic deficit. Analysis of an individual's spelling errors reveals underlying deficits in phonological awareness, and in knowledge of orthography, vocabulary, morphological and semantic relationships, and mental orthographic images (Masterson and Mooney, 2006). Total number errors for each group with their percentage are presented in Table 5 and Figure 1.

Table 5. Total number of errors

Table 5. Total number of errors

Errors type	Numbers	Percent (%)
Phonological Awareness	1611	45
Orthographic Knowledge	972	27
Vocabulary	143	4
Morphological Knowledge and Semantic Relationships	292	8
Mental Orthographic Images	443	13
Not Coded	98	3
Total	3559	100

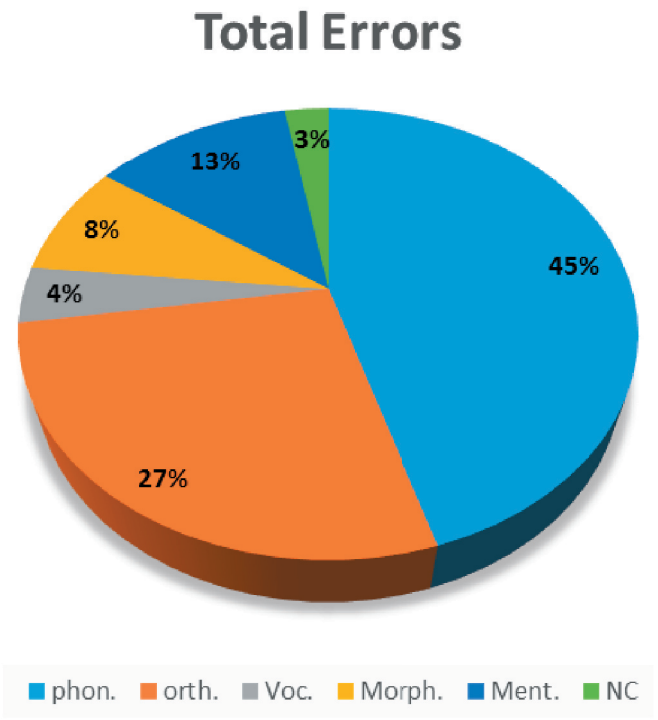

Figure 1. Linguistics deficit as per spelling errors

As it is depicted, 62 percent of all errors belongs to phonological awareness, vocabulary, and mental Orthographic Images. In fact, when these skills are weak or underdeveloped, pupils were relying too much on spoken language in deriving the written forms of words; and therefore spelling is negatively affected in very predictable ways. Typically, individuals with poor phonological segmentation skills deleted letters and syllables, usually omitting letters for less salient phonemes, especially those that occur in internal locations and in unstressed syllables, (e.g., neccery for necessary, teribl for terrible). Individuals with poor sound sequencing skills commonly reversed the sequence of letters when spelling. Letters reversals most commonly occur for liquids and nasals in a word or syllable sequence (e.g., undrestand for understand, bets for

best). Individuals with poor phoneme discrimination and identification skills are likely to spell distinct vowel sounds with the same letter, (e.g., ricive for receive). Moreover, for those who have trouble applying vocabulary knowledge or mental orthographic images confused the spelling of homophone words (e.g., piece for peace) or characterized mental images of words by "legal" substitutions (e.g., fild for field, fruts for fruits), and misspelling of unstressed vowel sounds (e.g., creater for creator).

On the other hand, orthography knowledge has got the next large portion of errors. Individuals whose orthographic knowledge is deficient often spell words incorrectly because they fail to recognize accepted spelling conventions. As such, the misspellings of individuals with orthographic knowledge deficits are predictably characterized by "illegal" substitutions (e.g., nessecarry for necessary), non-allowable letter sequences (e.g., pice for pick; cuistion for question), phonetically possible spellings that violate "rules" (e.g., kichen for kitchen; coatch for coach), and violation of word position constraints (e.g., knowlege for knowledge). However, even in these cases the problem of relying on spoken language in deriving the written forms of words is completely clear.

At the end, deficits in morphological knowledge and knowledge of semantic relationships depict their specific patterns of spelling errors. The misspellings of individuals with these types of deficits are characterized by phonetic spelling of morphemes (e.g., attenssion for attention), and misspelling of modifications when spelling inflected and derived forms of words (e.g., studyes for studies).

3.2. Variation in spelling performance related to age

There was a significant difference in the spelling performance of pupils in three age-groups: see Figure 2. Surprisingly, 15-year-olds (grade 1) made less error than 16 and 17-year-olds (grade 2 and 3). However, it was noticeable that the effect was mainly at the two 'extremes' of performance that is in the proportion of pupils making no or less errors (around 70 percent in grade 1) and among those making fifteen or more errors (around 60 percent in grade 2 and 3).

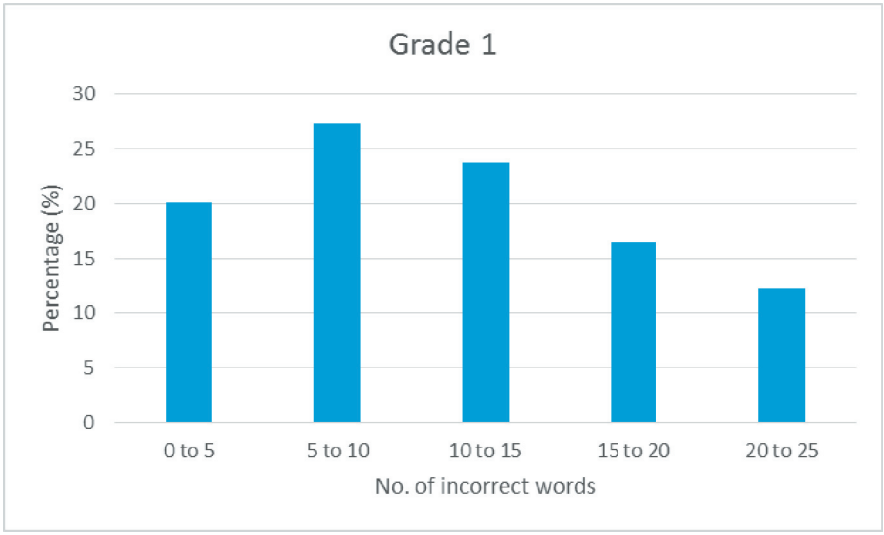

Figure 2 (a)

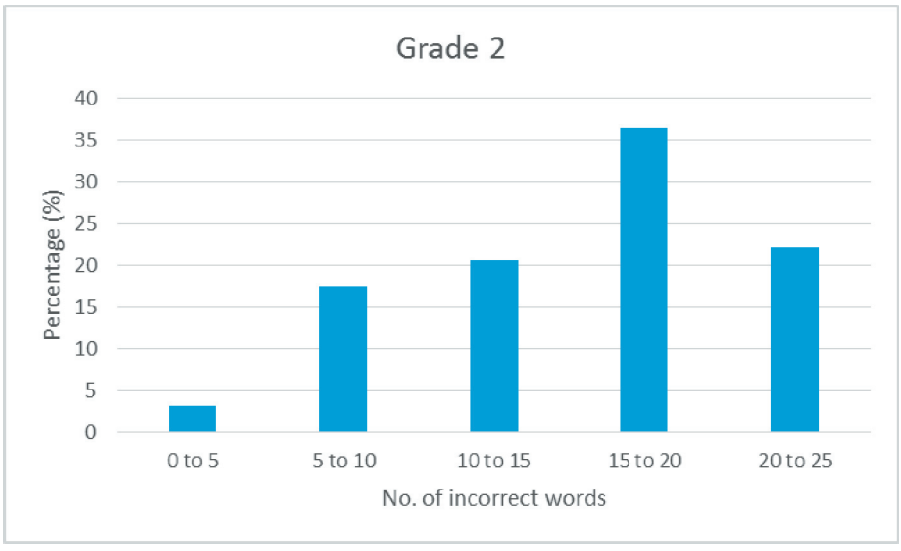

Figure 2 (b)

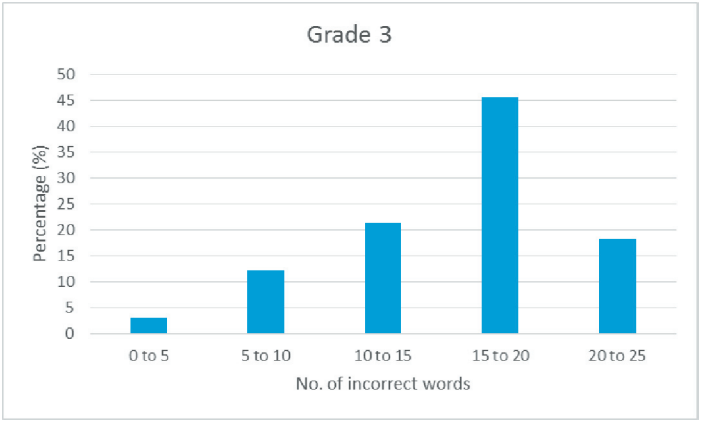

Figure 2 (c)

Figure 2. Percentage of errors per number of incorrect words by grade of pupils

What the figure indicates is that just over 3 percent of pupils aged 16 and 17 made no spelling errors to 5 incorrect words in the tests examined while this percentage for pupils aged 15 is above 20. Over 12 and 17 percent of the older pupils (aged 16 and 17, respectively) and just 27 percent younger ones made no more than ten errors. However, around twenty percent in all groups made ten to fifteen spelling errors in tests. At higher grades the corresponding error proportion was considerably higher than those in grade 1. To put this another way: 28 percent of 15-year-olds had got 15 or more words with incorrect spelling while the percentage for grade 2 and 3 were approximately 58 and 64, respectively.

3.2.1. Types of error

The number of errors per each grade are presented in Table 6 and Figure 3. As it is obvious, for all grades phonological awareness category experienced the greatest percentage of misspelled word followed by orthography knowledge group. Additionally, vocabulary, mental orthographic images, and non-coded categories have got approximately same percentage among pupils in different grades. It is also noticeable that 16 percent

of spelling errors among EFL learners in grade 1 belong to morphological knowledge and semantic relationships group while in grade 2 and 3 this percentage approached to 1 percent.

Table 6. Number of errors as per grade

Grade / Age	Errors type	Numbers	Percent (%)
Grade I	Phonological Awareness	723	40
	Orthographic Knowledge	449	25
	Vocabulary	67	4
	Morphological Knowledge and Semantic Relationships	282	16
	Mental Orthographic Images	222	12
	Not Coded	46	3
Grade II	Phonological Awareness	577	51
	Orthographic Knowledge	279	25
	Vocabulary	53	5
	Morphological Knowledge and Semantic Relationships	3	0.2
	Mental Orthographic Images	178	16
	Not Coded	39	2.8
Grade III	Phonological Awareness	311	48
	Orthographic Knowledge	244	38
	Vocabulary	23	4
	Morphological Knowledge and Semantic Relationships	7	1
	Mental Orthographic Images	43	7
	Not Coded	13	2

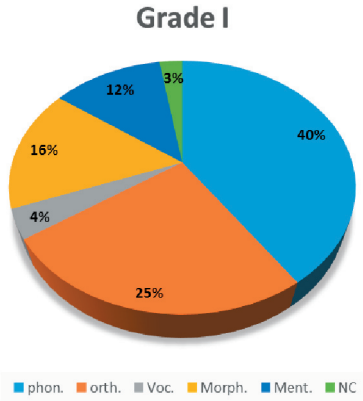

Figure 3 (a)

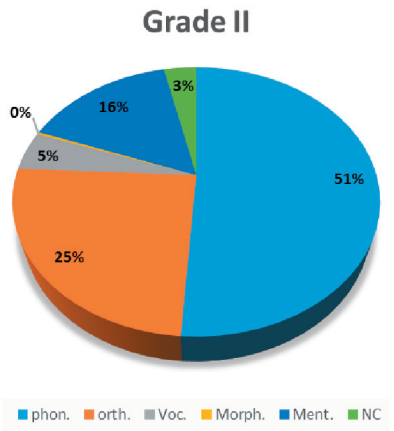

Figure 3 (b)

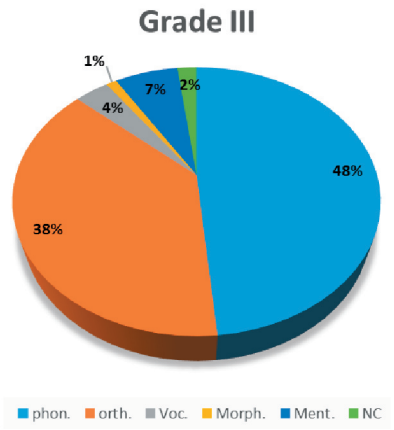

Figure 3 (c)

Figure 3. Linguistics deficit as per spelling errors for different grades

A better understanding of these explanations are depicted in Figure 4. As it is explained, an approximate range of 55 to 70 percent of all errors belongs to phonological awareness, vocabulary, and mental Orthographic Images based on various grades which proved that regardless of pupils' grades, they were relying too much on spoken language in deriving the written forms of words; and therefore spelling is negatively

affected. Furthermore, by considering orthography knowledge, it is deduced that phonic or 'sounding-out' approaches were absolutely common and were utilized among all students in various grades. In general, there was no evidence that pupils of different ages tended to make different types of error. In other words, spelling errors in other types of errors do not follow any distinct patterns.

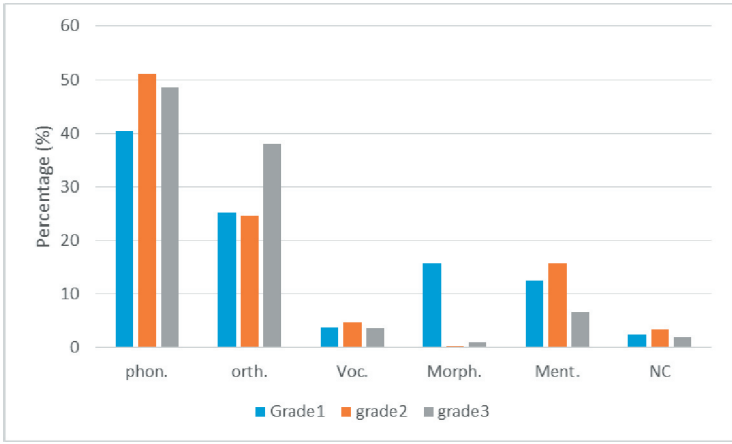

Figure 4. Comparison of number of errors for different grades

3.3. Variation in spelling performance related to Spoken language at home

Persian language has lots of similarity with Arabic language. The formal or literary form of both languages used for all written texts, is written from right to left and letters within words should be combined when possible. Persian and Arabic languages also use an alphabetic orthography that consists of thirty-two and twenty eight letters, respectively. They mainly represent consonants but also include three letters that correspond to long-vowel phonemes. In both languages, children initially learn to read and write a fully-vowelized orthography in which all the consonants and vowels are represented in the script, including the short-vowel diacritics. This orthography is very easy to phonologically decode because it is extremely reliable in terms of grapheme-to-phoneme correspondence rules. As a consequence, both of these languages are

consistent orthographic systems (although the degree and direction of transparency may differ among them) in which the relation between grapheme and phoneme is straightforward, and grapheme-phoneme correspondences are highly predictable.

Therefore in this section, for the sake of validation and due to the lack of research in particular at secondary levels in Persian language, at first the similarity between the results of pupils attending schools in Mahshahr (speaking Arabic language at home) with those of El-Dakh and Mitchell (2011) is investigated. Then, under the case of similarity, a comparison of the results of pupils attending schools in Shiraz (speaking Persian language at home) with those for whom Arabic was prominently the language spoken at home (Mahshahr schools) is also performed. El-Dakh and Mitchel (2011) showed that the most serious problem with Arab EFL learners is handling vowels, especially short ones. The phenomenon that Ryan (1997) describes as the 'vowel blindness' of Arab English language learners. The next problem right after the vowels reported in their work was the problem of silent letters since silent letters are an English-restricted phenomenon in comparison with the Arabic language. In contrast, the participants had acceptable performance on the application of spelling rules (e.g., crossing the final 'e' in verbs before the addition of 'ing' or the change of the final 'y' after a consonant into an 'i' before the addition of 'ed' for past).

As it is shown in Figure 5, in our work and among various spelling error patterns the largest category of errors was phonological awareness which mainly consists of vowels, silent letters or involved leaving a letter single that should have been doubled or vice versa. While similar to the findings of El-Dakh and Mitchel (2011), morphological and semantic relationships had got low proportion (around 10 percent) which showed acceptable performance of pupils in this linguistic ability.

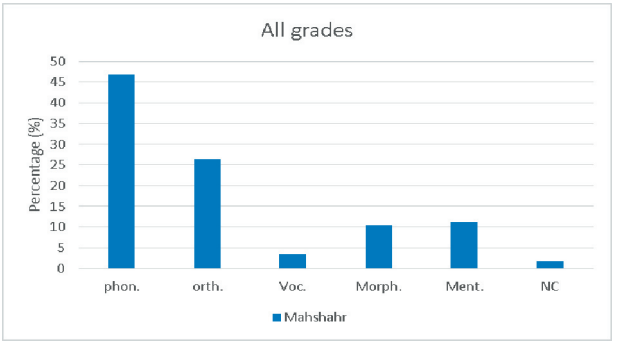

Figure 5. Spelling errors for all participants attending schools in Mahshahr

Thus, our results have got a reasonable consistency with those of El-Dakh and Mitchel (2011). Hence, a comparison between the results of pupils attending schools in Shiraz (speaking Persian language at home) with those for whom Arabic was prominently the language spoken at home (Mahshahr schools) is also performed. The errors numbers for each grade and totally between Shiraz and Mahshahr were compared in Figure 6. On the whole, almost the same percentage of error for each group was achieved among which phonological awareness experienced the greatest proportion in each grade and for both cities. In contrast, vocabulary, morphological knowledge and semantic relationships, and mental orthographic images were three less frequent errors among pupils from both cities and in all grades.

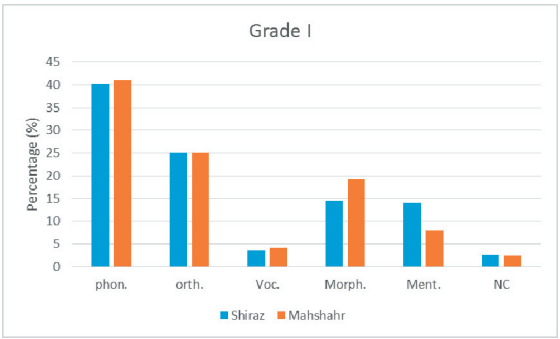

Figure 6 (a)

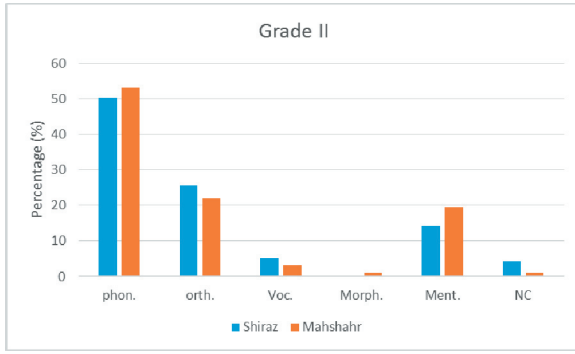

Figure 6 (b)

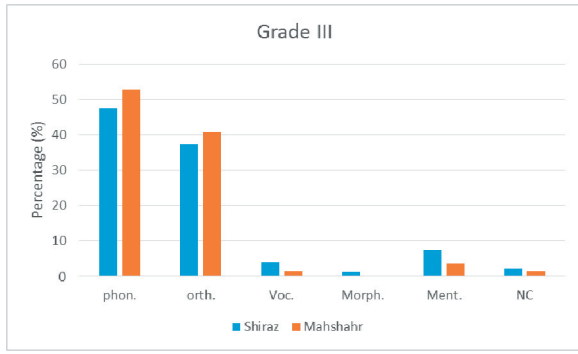

Figure 6 (c)

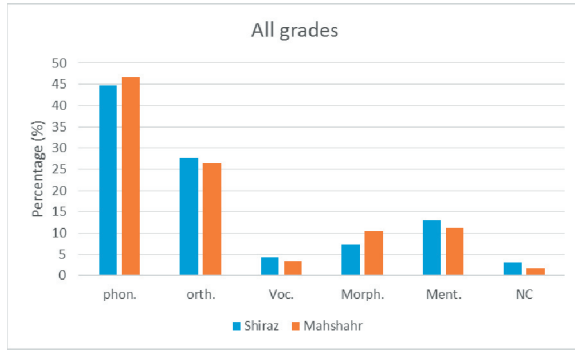

Figure 6 (d)

Figure 6. Linguistics deficit as per spelling errors for different grades between two cities: (a) grade 1, (b) grade 2, (c) grade 3, and (d) total sum of all grades

4. Conclusions

The present study investigated the sources of spelling errors among Iranian EFL learners through the following research questions:

• What are the causes of producing spelling errors by second language learners?

• Does the discrepancy between Persian and English orthographies hinder the Persian learners' acquisition of English spelling?

Based on the study, it clearly shows that poor spellers had difficulty hearing and discriminating all or most of the phonemes in a word, hearing and discriminating vowel phonemes and hearing the final syllable or suffix. As for orthographic problems, they included vowel diagraphs, double consonants, silent vowels, consonants and homophones. Thus, it could be concluded that most of the participants' weaknesses in spelling English can be attributed to the interference of the mother tongue. In other words, the participants were transferring the Persian spelling system into English, which led to different spelling errors.

Furthermore, two other scenarios were also considered in which the effect of age/grade and the influence of spoken language at home were investigated. The results are as follows:

• At higher grades the corresponding error proportion was considerably higher than those in lower grades. The relative error (number of errors per number of participants) for grades 1, 2 and 3 are 11.44, 15.73, and 16.36.

• In general, there was no evidence that pupils of different ages tended to make different types of error. In other words, spelling errors in other types of errors do not follow any distinct patterns.

• Separate analysis of spelling errors for each grade directly implies that pupils were relying on spoken language in deriving the written forms of words.

• These findings confirm the common-sense observation that even by the end of the compulsory school years many pupils are still making relatively frequent errors.

• Due to a great deal of similarity between Persian and Arabic language, as expected, all error categories were approximately the same for each grade and all grades on the whole in both areas.

5. Implications

It seems valid to deduce from the results reported here that many spelling errors show an over-reliance on phonic strategies, and therefore that there is a need for pupils to improve their visual strategies. One approach would be to emphasize such techniques as 'Look-Cover-Write-Check'. If spelling lists are used, they should be organized not in terms of sound (through-threw-do-blue-shoe), but according to spelling patterns, e.g. through-thorough-rough.

In order to do this, teachers need not only the visual knowledge of spellings they already possess, but also a more scientific knowledge of the phonemes and graphemes of English and of the relationships between them. This would enable them to pick out in particular words for which no phonic strategy can possibly work and for which no visual partners exist either. Therefore, such words should be learnt as 'one-offs', for instance of, was, women, straight. Such knowledge would benefit many primary teachers, especially those with particular responsibility for language, and secondary remedial teachers. Pupils with extreme problems in spelling would still, however, require specialist's attention.

6. Limitations

There are some restrictions to this work which are as follows:

•The results of this study were confined to only two cities and consequently, the outcomes of this work cannot be generalized covering all populations and situations.

• The questionnaire may not be representative of all high school textbooks since it is an artifact of the research design.

• There can be other groups of spelling error patterns which have not been considered in this study for example the consonants or consonant clusters that are different between the two languages

In general, error analysis which is significant in understanding language learning, also has limitations. There is a danger in giving too much attention to learners' errors as the teacher tends to become so preoccupied with noticing and correcting errors at the expense of the generation of meaningful language. Error analysis can keep us too closely focused on specific languages rather than viewing universal aspects of language.

7. Suggestions for Further Research

The present study did not account for the effect of L1 background in mixed language background classes because only about 25 percent of participants had Arabic L1 background; the remainders were from Farsi speaking families. Future research on the issue of spelling errors by Iranian school level EFL learners may be able to enlighten the effect of L1 background on the types of spelling errors in heterogeneous language background classes. The extension of Sample society is another factor which could be taken into account.

References

Adams M. (1990). *Beginning to read: Thinking and learning about print.* Cambridge, MA: MIT Press.

Al Jarf R. (2008). *Phonological and orthographic problems in EFL college spelling.* First Regional Conference on English Language Teaching and Literature (ELTL1) at Islamic Azad University, Iran.

Apel, K. and Masterson, J. J. (2001). Theory-guided spelling assessment and intervention. *Language. Speech, and Hearing Services in the Schools, 32*, 182-195.

Apel, K., Masterson, J. J., and Niessen, N. L. (2004). *Spelling assessment frameworks. Handbook of language and literacy: Development and disorder,* New York: Guilford Press, 644-660.

Arab-Moghaddam, N. and Senechal, M. (2001). Orthographic processing skills in reading and spelling in Persian/English bilinguals. *International Journal of Behavioral Development, 25,* 140-147.

Baluch, B. & Besner, D. (1991). Visual word recognition: Evidence for strategic control of lexical and nonlexical routines in oral reading. *Journal of Experimental Psychology, Learning, Memory, and Cognition, 17,* 644-652.

Baluch, B. and Shahidi, S. (1991). Visual word recognition in beginning readers of Persian. *Perceptual and Motor Skills, 72,* 1327-1331.

Baluch, B. (1993). Lexical decision in Persian: A test of the orthographic depth hypothesis. *International Journal of Psychology, 28,* 19-29.

Baluch, B. and Besner, D. (2001). Basic process in reading: Semantics affects speeded naming of high-frequency words in an alphabetic script. *Canadian Journal of Experimental Psychology, 55,* 63-69.

Bruck, M., Genesee, F., and Caravolas, M. (1997). A cross-linguistic study of early literacy acquisition. In B. A. Blachman (Ed.), *Foundations of reading acquisition and dyslexia: Implications for early intervention.* Mahwah, NJ: Erlbaum. 145-162.

Carlisle, J. F. (1995). *Morphological awareness and early reading achievement. In L. B. Feldman (Ed.), Morphological aspects of language processing.* Hillsdale, NJ: Erlbaum, 189-209.

EL-Dakhs, D. and Mitchell, A. (2011). *Spelling errors among EFL high school graduates.* The 4th Annual KSAALT Conference, paper presented in Al Khobar, Prince Mohammed Bin Fahad University.

Ehri, L. C. (1992). Reconceptualizing the development of sight word reading and its relation to recoding. In P. B. Gough, L. C. Ehri, & R. Treiman (Eds.),*Reading acquisition.* Hillsdale, NJ: Erlbaum, 107-143.

Ehri, L. C. and Wilce, L. (1982). Recognition of spellings printed in lower and mixed case: Evidence for orthographic images. *Journal of Reading Behavior, 14,* 219-230.

Fagerberg, I. (2006). *English spelling in Swedish secondary school. Students' attitudes and performance.* Karlstad, Sweden: Karlstad University Press.

Feez, S. (2001). *The role of dictation in teaching and learning English.* Available from: http://www.telenex.hku.hk/

Glenn, P. and Hurley, S. (1993). Preventing spelling disabilities. *Child Language Teaching and Therapy, 9,* 1-12.

Gorman, T. P., White, J., Brooks, G., and English, F. (1991). *Language for learning: A summary report on the 1988 APU surveys of language performance.* (Assessment Matters: No.4). London: School Examinations and Assessment Council.

Gough, P. B., Juel, C., and Griffith, P. (1992). Reading, spelling, and the orthographic cipher. In P. Gough, L. Ehri, R. Treiman (Eds.), *Reading acquisition.* Hillsdale: NJ: Erlbaum, 35-48.

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology, 80,* 437-447.

Katz, L. and Frost, R. (1992). The reading process is different for different orthographies: The orthographic depth hypothesis. In R. Frost, & L. Katz (Eds.), *Orthography, Phonology, Morphology, and Meaning.* Amsterdam: Elsevier, 67-84.

Kibbel A. and Miles, N. (1994). Phonological errors in the spelling of taught dyslexic children. In C. Hulme. & M. Snoling (Eds.), *Reading development and dyslexia,* London Whurr Publications.

Lesaux, N. K. and Siegel, L. S. (2003). The development of reading in children who speak English as a second language. *Developmental Psychology, 39,* 1005-1019.

Masterson, J. J. and Apel, K. (2000). Spelling assessment: Charting a path to optimal intervention. *Topics in Language Disorders, 20* (3), 50-65.

Masterson, J. J. and Mooney, R. (2006). *Criterion validity of the spelling performance evaluation for language and literacy (SPELL).* Annual Pathways to Communication Conference, Missouri State University, Springfield, MO, February, 10-12.

Omidipour, M. (2014). An analysis of errors in writing among adult Persian learners of English. *International Journal of Language Learning and Applied Linguistics World, 5* (3), 176-187.

Rahbari, N., Senechal, M., and Arab-Moghaddam, N. (2007). The role of orthographic and phonological processing skills in the reading and spelling of monolingual Persian children. *Journal of Reading and Writing, 20*, 511-533.

Randall, M. (1997). Orthographic knowledge, phonological awareness and the teaching of English: An analysis of word dictation errors in English of Malaysian secondary school pupils. *RELC Journal, 28* (2), 1-21.

Ryan, A. (1997). *Learning the orthographical form of L2 vocabulary: A receptive and productive process. Vocabulary: Description, acquisition and pedagogy.* Ed. Norbert Schmitt and Michael McCarthy. Cambridge, UK: Cambridge University Press, 181-198.

Stanovich, K. E. & West, R. F. (1989). Exposure to print and orthographic processing. *Reading Research Quarterly, 24,* 402-433.

Treiman, R. & Bourassa, D. C. (2000). The development of spelling skills. *Topics in Language Disorders, 20* (3), 1-18.

Varnhagan, C. (1995). Children's spelling strategies. In V.W. Berninger (Ed.), *The varieties of orthographic knowledge: Relationships to phonology, reading, and writing*, Dordrecht: Kluwer, 251-290.

Wasowicz, J. (2007). What do spelling errors tell Us about language knowledge? *Learning By Design Inc.* Evanston, IL, 1-9.

Zutell, J. & Virginia, A. (1988). The English spelling strategies of Spanish-speaking bilingual children. *TESOL Quarterly 22*, 333-340.