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Spelling knowledge and reading development: Insights from Arab ESL learners

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Abstract

The aim of the present study was to examine the relationship between spelling knowledge and reading skills among a group of 16 intermediate-level Arab learners of English as a second language (ESL) and a corresponding comparison group of 21 intermediate-level ESL learners in an English for academic purposes (EAP) program. A spelling task was used to assess the English orthographic or spelling knowledge, and standardized reading and listening tests were used to assess the general language processing and comprehension skills of the two groups. The results of the tests indicated that the Arab and non-Arab ESL students were not significantly different in listening (or auding) comprehension, but that the Arab students scored significantly lower on the spelling test and the reading comprehension test. This study discusses possible reasons why Arab ESL learners may exhibit difficulties with English spelling and then discusses the link between spelling knowledge and the development of reading fluency.

Keywords: ESL, word recognition, reading fluency, orthographic knowledge, spelling development

Over the past several years, English as a second language (ESL) practitioners in English for academic purposes (EAP) programs along with ESL researchers have noted a discrepancy in the emergence of oral and aural English language skills and the emergence of English literacy skills among Arab ESL students (Fender, 2003; Milton & Hopkins, 2006; Ryan, 1997; Ryan & Meara, 1991). The anecdotal evidence from general observations seems to indicate that Arab ESL learners exhibit more difficulties in developing ESL reading and literacy skills relative to other ESL learner populations; in contrast, Arab ESL learners seem to perform relatively well in the development of listening and speaking skills. This discrepancy suggests that Arab ESL learners may experience difficulties acquiring aspects of English literacy, namely, orthographic or spelling representations of English words. Difficulties acquiring English spelling knowledge not only affect word recognition skills but also constrain ESL reading skills. The present study examines the spelling, reading comprehension, and listening comprehension skills of a group of intermediate-level ESL Arab learners and a comparison group of non-Arab ESL learners to examine whether Arab ESL learners exhibit more significant difficulties in spelling and reading skills than other ESL learners. The study is aimed not only at examining the particular needs and

challenges that Arab ESL students seem to face in acquiring English literacy skills but also to better understand the nature of spelling development and how it relates to reading fluency. The study will also explore and discuss reasons for the spelling difficulties that Arab ESL learners exhibit, as well as the implications for pedagogical interventions.

Word Recognition and Reading Fluency: The Spelling Connection

First Language (L1) English Word Recognition Fluency and Reading Skill

There has been a considerable amount of research that has established the importance of word recognition skills in reading. L1 reading research has shown that fluent reading involves direct eye-fixations on most words in a text, and in particular, a vast majority of semantic content words; consequently, the predominant reocurring process in fluent reading involves word recognition and identification (Ehri, 2005; Perfetti, 1984; Rayner, 1998). L1 reading researchers have also established that proficient readers have significantly faster and more accurate word recognition skills than age-matched poor readers (Juel, 1988; Perfetti, 1985; Stanovich, 1980). Due to these and other research findings, reading researchers have concluded that word recognition processes must function rapidly and efficiently so that attention and resources can be utilized for higher-level reading comprehension processes beyond the word-level which are necessary to extract semantic propositions, generate inferences, and build a coherent situation model or text base (Ehri, 2005; Perfetti, 1985; Perfetti & Hart, 2001; Rayner & Pollatsek, 1989).

ESL Word Recognition Fluency and ESL Reading Skills

Much like the L1 reading research, second language (L2) in general and ESL reading research in particular have also found that word recognition efficiency is essential for the development of L2 and ESL reading proficiency and comprehension (Koda, 1996, 2005). Research conducted with children and adults at all levels of ESL reading proficiency shows that the emergence of ESL word recognition abilities involving phonological and orthographic decoding skills plays a major role in ESL reading development, and that is in part independent of ESL oral language proficiency and general vocabulary knowledge (Chiappe, Glaeser, & Ferko, 2007; Geva & Zadeh, 2006; Koda, 2005; Nassaji, 2003). For example, skills like phonemic awareness and word naming speed account for nearly all of the variance of reading skills among young beginning-level ESL readers (Chiappe et al., 2007; Geva & Zadeh, 2006). Even at higher levels of ESL reading proficiency, word recognition skills are a primary predictor of reading development. Nassaji and Geva (1999) conducted an ESL reading study with advanced ESL learners that had an L1 Farsi background. They found that word recognition measures such as homophone judgment and orthographic legality judgment tasks explained a significant portion of reading comprehension variance beyond ESL syntactic knowledge, ESL vocabulary, and working memory capacity. Another study conducted by Nassaji (2003) with a group of 60 advanced-level ESL readers also found that orthographic and phonological processing skills reliably differentiated the more skilled from the less skilled readers. Crucially, Nassaji found that an orthographic processing task accounted for more variance in the reading comprehension scores than a phonological processing task did, which suggests that more proficient ESL readers, like proficient L1 English readers, rely more on the use of visual orthographic information (i.e.,

spelling representations or orthographic codes) than phonological decoding processes and phonetic codes during word recognition. There is a general consensus that L2 and ESL reading skills are constrained by the ability to rapidly and efficiently recognize words (Birch, 2002; Grabe & Stoller, 2002; Koda, 1996, 2005; Paran, 1996; Segalowitz & Segalowitz, 1993). Thus, it is now widely acknowledged by both L1 and L2 reading researchers that reading fluency is determined to a substantial extent by the ability to rapidly and efficiently recognize words. Slow or inefficient word recognition processes constrain the flow of information to text interpretation and comprehension processes and limit the amount of text information that can be taken in and processed in a limited-capacity comprehension system (Perfetti, 1985).

L1 English Word Recognition and Spelling Skills

To account for how word recognition skills develop, some L1 researchers (Ehri, 2005; Ehri & Snowling, 2004; Perfetti, 1992, 1997) have made theoretical claims that word recognition skills develop as the quality of the orthographic or spelling knowledge in the orthographic lexicon develops, and these claims have been supported by recent L1 research (Berninger, Abbot, & Abbot, 2002; Katzir, Kim, & Wolf, 2006; Mehta, Foorman, Branum-Martin, & Taylor, 2005; Perfetti & Hart, 2001). Essentially, English orthographic or spelling knowledge emerges in two ways: (a) through the ability to recognize and map spelling patterns to corresponding sound patterns at the phoneme, syllable, and word levels; and (b) through repeated exposures to the words (Caravolas, Hulme, & Snowling, 2001; Ehri, 1997, 2005; Templeton & Morris, 2000). According to Ehri (2005), word recognition fluency emerges as well-formed spelling representations become tightly connected or bonded to corresponding phonological and semantic forms. Once a word's orthographic form or spelling becomes highly familiar, the orthographic form or spelling begins to function much like a graphic unit that can be recognized as a whole without attention to constituent letters. In other words, well-learned word spellings (i.e., sight vocabulary) are established in memory in graphic form and automatically recalled when they are encountered during reading. According to Perfetti (1992), well-learned orthographic words have fully specified spellings that are tightly connected to corresponding phonological forms, and it is these words that make up what he calls an autonomous lexicon (i.e., sight vocabulary). It is important to note that orthographic word forms or spellings can be linked to corresponding phonological forms at the phoneme, syllable, and whole word levels, and that well-learned orthographic forms may have tight connections to phonological forms at multiple levels (Ehri & Snowling, 2004; Perfetti, 1992). Perfetti and Hart (2001) emphasize the importance of spelling knowledge or orthographic representation in what they call the *lexical quality hypothesis*, which claims that spelling precision or specificity underpins the ability to rapidly recognize and identify words during reading. The lexical quality hypothesis postulates that words are composed of an orthographic constituent, a phonological constituent, and a semantic constituent. Once the orthographic constituent or spelling representation becomes fully specified and linked to phonological and semantic constituents, the word's graphic display and visual input during reading rapidly activates not only the word's orthographic constituent but also its corresponding phonological and semantic constituents. Regardless of the particular theoretical framework, many working in L1 psycholinguistic and literacy development research subscribe to the notion that English word recognition fluency is a function of spelling knowledge (Berninger et al., 2002; Bruck & Waters, 1990; Caravolas et al., 2001; Ehri, 1997; Perfetti, 1992; Perfetti & Hart, 2001; Templeton & Morris, 2000). Incomplete or inaccurate spelling representations or knowledge will

result in less efficient, and in some cases, less accurate word recognition skills (Burt & Tate, 2002; Ehri, 1997; Perfetti, 1992).

ESL Word Recognition and Spelling Skills

Unfortunately, very little or no research has been conducted on the effect of ESL spelling knowledge on ESL reading skills among adult ESL learners, though research with young ESL learners has shown that English spelling knowledge and English word reading skills are also closely related (Chiappe et al., 2007; Geva & Zadeh, 2006; Wade-Woolley & Siegel, 1997). Moreover, ESL children have exhibited moderate to strong correlations between English word recognition, spelling, and reading comprehension, which mirrors the research findings with L1 English children acquiring English literacy skills (e.g., Berninger et al., 2002; Mehta et al., 2005; Vellutino, Tunmer, & Jaccard, 2007).

Spelling as a Measure of the Orthographic Lexicon

In L1 English and ESL literacy research, word recognition skills have typically been examined through orthographic processing and phonological decoding tasks (Brown & Haynes, 1985; Katzir, et al., 2006; Nassaji, 2003; Perfetti, 1985; Wade-Woolley, 1999), and to a much lesser extent through English spelling production. However, L1 researchers have argued that English spelling production provides a clear and insightful measure of the underlying orthographic knowledge that facilitates English word recognition skills (Ehri, 1997, 2005; Perfetti, 1992; Worthy & Viise, 1996). In fact, there is good reason to believe that the same orthographic lexical representations underlie both word recognition skills on one hand and spelling production skills on the other (Ehri, 1997; Ehri & Snowling, 2004; Perfetti, 1992, 1997). L1 research has not only found close correlations between English word recognition skills and spelling skills (Berninger et al., 2002; Caravolas et al., 2001; Gough, Juel, & Griffith, 1992; Ehri, 1997; Katzir et al., 2006; Mehta et al., 2005), but L1 research has also found direct evidence of connections between word reading and word spelling (Burt & Tate, 2002; Holmes & Carruthers, 1998). Holmes and Carruthers (1998) examined the English word reading skills and word spelling skills of native English speaking college students. They examined the words that their participants knew but could not accurately spell, and they found that the words their participants misspelled were not read as rapidly as words that their participants could accurately spell. Similarly, Burt and Tate (2002) found that L1 English speakers who were university students were slower at making lexical decisions on low-frequency English words that they could not spell compared to low-frequency words that they could spell. Taken together, all of these studies support the notion that a single orthographic lexicon serves both English word recognition and spelling production, and that words that have incomplete or inaccurate spelling representations can be visually recognized during reading through partial spelling knowledge, though again, this results in less efficient and accurate word recognition skills.

Development of L1 English Spelling Skills

Because of the relationship between spelling knowledge and word reading skills, spelling development has become an area of interest among L1 reading researchers and psycholinguists (Caravolas et al., 2001; Ehri, 1997; Perfetti, 1997; Templeton & Morris, 2000). In general, the

L1 research on English spelling development shows that spelling skills emerge in stages or phases characterized by an early reliance on phonological codes to map sounds to letters and a later reliance on orthographic and phonological codes that map sounds and spelling patterns to words (Ehri & Snowling, 2004; Ganske, 1999; Henderson & Templeton, 1986; Templeton & Morris, 2000). Early alphabetic spelling abilities at around the first grade generally involve basic letter-to-sound mapping skills in what can be referred to as the early alphabetic stage (Ehri, 2005) or the letter-name stage (Templeton & Morris, 2000). At this stage, each sound is typically mapped to a letter in a one-to-one fashion and in a simple left-to-right linear order (e.g., the word *bed* has three sounds that map onto three corresponding letters in one-to-one linear fashion). Gradually, spelling patterns beyond simple one-to-one, letter-sound mappings are acquired. These spelling patterns primarily involve the emergence of common spelling patterns with long vowels (e.g., /i/, /e/, /ai/, /o/, /u/), such as the consonant-vowel-consonant-e (CVCe) pattern as in *made* and *bite* and the consonant-vowel-vowel-consonant patterns (CVVC) as in *boat*, *sleep*, and *read*, but also with complex vowel digraphs such as *sound*, *chew*, and *taught* (Ganske, 1999; Henderson & Templeton, 1986). The latter complex vowel digraphs involve multiple-letter-vowel-spelling patterns that are less common and productive than simple short- and long-vowel-spelling patterns.

The next general phase of English spelling development involves the ability to discover and acquire syllable-level-spelling patterns (Ehri & Snowling, 2004; Freeman & Freeman, 2004; Templeton & Morris, 2000). For example, the consonant doubling rule is acquired when spellers learn to add the suffixes *-ing* or *-ed* to words like *hop* as opposed to words like *hope*. Words with so-called short vowels like *hop*, *quit*, *clap*, and *bet* require consonant doubling at the syllable juncture of the root word and suffix to form *hopping*, *quitting*, *clapping* or *betting*, whereas words with long vowels like *hope*, *write*, and *ride* drop the *e* and have no consonant doubling at the syllable juncture (e.g., *hoping*). Notice that the above doubled consonant spelling involves a syllable break between the consonants in the vowel-consonant/consonant-vowel spelling sequence (i.e., VC/CV sequence). In contrast, words like *hope* and *write* involve a different syllable juncture pattern with a CV/C sequence (e.g., *ho/ping*, *wri/ting*) that typically encodes long vowels. Once the constraint of consonant doubling is acquired (i.e., VC/CV with the first vowel short), it can facilitate the spelling patterns of words such as *hap/pen* and *kit/ten* and extend to words like *nap/kin* and *win/ter*. Once the CV/C pattern is acquired, it can facilitate the acquisition of long-vowel-syllable-spelling patterns in words like *hu/mid*, *to/tal*, *fe/ver*, and *ri/val*.

The final spelling phase in English incorporates derivational morphology into spelling patterns of multisyllable words composed of root morphemes and derivational affixes (Ganske, 1999; Henderson & Templeton, 1986; Templeton & Morris, 2000). There are several difficulties involved in acquiring words with derivational spellings. For one, derivational affixation changes the stress patterns and hence the pronunciation of the vowels in root words like *compete* to derive morphologically complex words like *competition* or *competitive*, and this often induces spelling errors (Ehri, 1997; Henderson & Templeton, 1986). In addition, certain consonant letters, such as the final letter *c* in *electric* or *clinic* also involve a pronunciation change to derive *electricity* and *clinician*. Yet another difficulty at this stage involves the spelling of some derivational morphemes, such as knowing when to employ the spelling *–ible* or *–able* in words like *audible*, *credible*, *passable*, and *dependable*.

In short, the number of fully specified word spellings in the orthographic lexicon increases as knowledge of alphabetic, syllabic, and derivational spelling patterns is acquired (Ehri, 2005; Perfetti, 1992, 1997; Templeton & Morris, 2000). Importantly, research indicates that ESL children go through the same general phases of English spelling development as native English speakers (Chiappe et al., 2007; Geva & Zadeh, 2006; Wade-Woolley & Siegel, 1997). Finally, it is important to reiterate that as spelling development emerges, so do more accurate and efficient word recognition skills in reading (Ehri, 2005; Perfetti, 1992, 1997; Perfetti & Hart, 2001; Worthy & Viise, 1996).

L1 Transfer Effects on ESL Word Recognition and Spelling

Though there are similarities in the development of L1 English and ESL word recognition and spelling skills, the ESL research indicates that previously acquired L1 literacy skills (i.e., L1 word recognition and spelling) interact with and shape the emergence of ESL word recognition (Akamatsu, 2003; Koda, 2005) and spelling skills (Figueredo, 2006). Thus, ESL learners from different L1 backgrounds may have distinctly different problems and consequently different needs in developing ESL word recognition and spelling skills.

ESL Word Recognition and L1 Transfer Effects

There is a considerable amount of ESL research that indicates L1 word perception and processing skills influence the development of ESL word recognition skills of both children and adults (Akamatsu, 1999; Brown & Haynes, 1985; Chiappe et al., 2007; Wade-Woolley, 1999; Wade-Woolley & Siegel, 1997; Wang, Koda, & Perfetti, 2003). ESL learners with L1 alphabetic skills (e.g., L1 Farsi or Russian) have been shown to utilize more efficient phonemic awareness skills and discrete phonological processing skills than ESL learners with non-alphabetic L1 skills, such as L1 logographic reading skills developed through Chinese and Kanji characters (Akamatsu, 1999, 2003; Brown & Haynes, 1985; Wade-Woolley, 1999). Similarly, ESL learners with logographic L1 backgrounds (i.e., non-alphabetic) have been shown to do better in detecting visual-orthographic spelling patterns and retrieving visual-orthographic information from memory (Brown & Haynes, 1985; Koda, 2005; Wade-Woolley, 1999). Thus, there is evidence that L1 word perception and processing skills shape and influence the emergence of ESL word perception and processing skills. In other words, ESL learners with an L1 alphabetic literacy background develop and utilize more efficient ESL phonological decoding skills, whereas ESL learners with a logographic literacy background develop and utilize more efficient ESL visual-orthographic processing skills (Akamatsu, 1999, 2003; Brown & Haynes, 1985; Wade-Woolley, 1999; Wang & Koda, 2005).

ESL Spelling and L1 Transfer Effects

The ESL spelling research conducted with children and adults also indicates that the emergence of ESL spelling skills are influenced by the L1. These influences on ESL spelling development have been found in two ways. One involves the manner in which orthographic word forms are processed and subsequently acquired. For example, Wang and Geva (2003) found that L1 Chinese children acquiring English performed as well or better than native English speaking

children when spelling English words, but they were significantly worse than native English speakers in spelling pseudo words. This suggests that the native Chinese speakers had acquired English word spellings as whole lexical or visual-orthographic forms and had relied less on phoneme-level decoding and mapping skills, the latter of which are necessary to sound out and spell unfamiliar English words and pseudo words. Similarly, Holm and Dodd (1996) examined the English word recognition and word spelling skills of a group of adult ESL learners from Hong Kong. The ESL learners from Hong Kong did not differ from the other ESL groups in the study when reading and spelling English words, but they were significantly worse in a pseudo word spelling task, again indicating difficulty in using phonological codes and processing skills to sound out and spell unfamiliar orthographic forms. These studies indicate that many ESL learners with an L1 logographic literacy experience tend to rely on visual-orthographic information to process and acquire English spellings, and they underutilize phonological processing skills that characterize L1 alphabetic reading and spelling skills, which mirrors the findings in the ESL word recognition research (Akamatsu, 1999, 2003; Brown & Haynes, 1985; Wade-Woolley, 1999).

Another way that the L1 influences ESL spelling is in the transfer of phonological knowledge, or the transfer of grapheme-phoneme correspondence skills. Several studies show that ESL learners with an L1 Roman alphabetic literacy experience (e.g., German or Spanish) transfer not only a familiarity of letters but also corresponding letter-sound mapping patterns (i.e., grapheme-phoneme correspondences) when they acquire ESL reading and spelling skills (Figueredo, 2006; Muljani, Koda, & Moates, 1998). Another transfer issue pertains to the acquisition of ESL phonemic segments and patterns that do not exist in the Ll, and this may hinder the acquisition of some ESL spellings, particularly at the earlier stages of English acquisition. For example, some of the short- and long-vowel-spelling patterns may be difficult for some native Spanish speakers to acquire, partly because Spanish has a smaller set of vowels, and in particular, short vowels (Zutell & Allen, 1988). However, the spelling research indicates that as ESL learners develop proficiency with English literacy skills, they exhibit less L1 effects in their spelling (Chiappe et al., 2007; Figueredo, 2006).

L1 Arabic Literacy Experience and ESL Literacy Development Among ESL Arab Learners

L1 Arabic Literacy Development

In order to better understand possible L1 literacy effects among ESL Arab learners acquiring English literacy skills, it is important to look at L1 Arabic literacy education and the Arabic orthography. L1 Arabic-speaking children learn to speak a colloquial dialect of Arabic as their L1 but then learn to read and write using Modern Standard Arabic (MSA), which is the formal or literary form of Arabic used for all written texts. MSA is quite distinct from colloquial Arabic in vocabulary, and in some aspects of phonology and grammar as well; consequently, children learn to read in what some consider an L2 (Ayari, 1996; Saigh-Hadad, 2003).

MSA utilizes an alphabetic orthography comprised of 28 letters. These primarily represent consonants but also include three letters that correspond to long-vowel phonemes. In addition,

there are three short-vowel forms that are written as diacritics placed above or below the consonant letters. There are also diacritics that indicate no vowel and consonant and vowel lengthening (Bauer, 1996; Fischer, 1998). Arabic is written from right to left in cursive form, and letters within words must be combined when possible.

Children initially learn to read and write Arabic through use of a fully-vowelized orthography in which all the consonants and vowels are represented in the script, including the short-vowel diacritics. Thus, beginning readers and writers learn to use a fully-specified, phonologically transparent writing system in which every phoneme is represented in the spelling. These texts are easy to phonologically decode or sound out since the letters and diacritics have highly consistent and reliable grapheme-to-phoneme (letter-to-sound) correspondences. The fully-vowelized orthography is used for children's books, the Koran, and poetry. In contrast, all print materials in the mass media, including newspapers, magazines, books, and textbooks, do not encode vowel diacritic information and thus are less phonologically transparent.

At about the fourth grade, children generally transition from reading a fully-vowelized orthography to reading an orthography without the diacritics that encode short vowels, and this requires a different set of literacy skills (Abu-Rabia & Taha, 2006; Taouk & Coltheart, 2004). In other words, children move from reading a phonologically transparent orthography to an opaque orthography that lacks some phonological information in the word spellings. The latter opaque or deep orthography requires readers to utilize extra-lexical information such as morphological knowledge and sentence context to infer the missing phonological information. In MSA, all words are based on a root morpheme that is typically composed of three or four consonants (e.g., *k-t-b* is the root morpheme for the general concept *to write*). However, as with other root morphemes, *k-t-b* is not a word and has no pronunciation. Therefore the root morpheme must be mounted on an affix pattern to generate a word, and these affix patterns include short vowels (e.g., *kataba* he wrote, *yaktub* he writes, *kitaab* a book, *maktab* office). Even though letters and diacritics are added to the root morpheme, the root morpheme consonants always appear in the same order. An example of this in English would involve the words *sing*, *song*, and *sang*, all of which would be represented in the same way if the short vowels were removed (i.e., as the consonant form *sng*; Shimron, 1999). Thus, when reading in Arabic without diacritics (i.e., unvowelized Arabic), a reader must not only utilize the consonant spelling and phonological information in the graphic display, but they must rely on extra-lexical information such as morphological knowledge, syntactic knowledge, and sentence and discourse context (Abu-Rabia, 2002).

Though children primarily read unvowlized texts by the end of elementary school, they continue to write in fully-vowelized spellings throughout primary school. Azzam (1993) states that children can learn to read in the vowelized, transparent script using basic phonological decoding skills, but that learning to spell Arabic effectively takes many years since spelling requires MSA language skills (i.e., acquisition of MSA lexical items and MSA morphosyntax, which take many years to acquire and master). In fact, a study by Abu-Rabia and Taha (2006) found that native Arabic speakers in the 1st year of high school are still acquiring the MSA language skills necessary to spell accurately.

Research on L1 Effects Among Arab ESL Learners

Aside from anecdotal evidence, there have been a few isolated studies that have examined the development of English visual orthographic and word recognition skills among native-Arabic ESL learners. Ryan and Meara (1991) conducted a small study using a same-different matching judgment task with a native Arabic speaking group and a proficiency-matched ESL comparison group. The task involved a 1-second presentation of relatively long words consisting of 10 letters (e.g., *department*, *experiment*, *revolution*, *photograph*), followed by a 2-second blank screen, and then the presentation of the word in either its correct spelling, or incorrect spelling with a vowel missing in one of four positions. Some of the words had a vowel missing in the second letter position (e.g., *dpartment*), some had a vowel missing in the fourth letter position (e.g., *expriment*), some had a vowel missing in the sixth letter position (e.g., *revoltion*), and some with a vowel missing in the eighth letter position (e.g., *photogrph*). The ESL participants were instructed to decide whether the second presentation of the word was the same (i.e., correct spelling) or different (i.e., incorrect spelling with missing vowel). This task depends crucially on the ability to use spelling knowledge to detect spelling errors (cf. Perfetti, 1997). Ryan and Meara found that the Arab ESL participants made significantly more errors in all conditions compared to the non-Arab ESL group, but also took significantly longer to make the same-different judgments. Consequently, Ryan and colleagues (Ryan & Meara, 1991; Ryan, 1997) argue that L1 Arabic literacy affects and shapes the ability of Arab ESL learners to extract and process some of the vowel information encoded in the graphic display. They argue that since the Arabic orthography used in mass media materials like magazines and newspapers does not encode short vowels, native Arabic readers learn to focus on the consonant forms of Arabic words, especially since the consonant structure encodes the root morpheme with general semantic information. In fact, Abu-Rabia (2002) argues that Arabic word recognition and identification processes rely on identifying the root morpheme and utilize the syntactic and semantic context to infer missing vowel information (cf. Shimron, 1999, for a similar proposal in Hebrew). Ryan and Meara further argue that native Arab ESL learners transfer their L1 word recognition skills to English and thereby rely more extensively on consonant graphemes (i.e., letters corresponding to sounds) in word spellings than the vowel graphemes, and for that reason they seem to develop lexical spelling representations that specify consonants and lack accurate vowel spellings. The fact that English vowel spellings are irregular and inconsistent (e.g., the *o* in *phone*, *gone*, *done*), especially in unstressed syllables, may also make them less reliable as letter-sound spelling cues and hence less salient spelling patterns.

However, as Ryan and Meara's (1991) study suggests, many Arab ESL students appear to struggle more with word recognition and word reading skills than their proficiency-matched ESL peers. A study conducted by Fender (2003) found that native Arabic ESL speakers were significantly slower than a group of proficiency-matched Japanese ESL speakers in a lexical decision task (i.e., an isolated word recognition task), though there were no significant differences in reading words in sentence contexts. These results suggest that Arabic speakers have slower and less efficient context-free word recognition skills, which again suggests underdeveloped orthographic knowledge or spelling representations. However, in the sentence contexts there are syntactic and semantic features (i.e., extra-linguistic cues) that may have helped facilitate word recognition and identification processes for the Arab speakers (cf. Abu-Rabia, 2002; Shimron, 1999).

Thus, the Fender (2003) and Ryan and Meara (1991) studies indicate that Arab ESL learners have more difficulties recognizing English words in isolated context-free environments relative to other proficiency-matched ESL speakers, and this may be due to difficulties in perceiving and acquiring precise English orthographic forms or word spellings as a result of the transfer of L1 word recognition tendencies. Part of the difficulty may be due to the fact that L1 Arabic literacy skills develop in the fully-vowelized (i.e., transparent) script with reliable and consistent grapheme-phoneme mappings, and though the more opaque script has missing short-vowel information which results in underspecified word spellings, it nonetheless has fairly reliable phoneme-grapheme information. In contrast, English has some variable grapheme-phoneme spellings, even for consonants, such as the phoneme /k/ being spelled as *c* as in *pi<u>c</u>nic*, *k* as in *<u>k</u>itchen*, *ck* as in *stu<u>ck</u>*, *ch* as in *s<u>ch</u>edule*, and the grapheme *gh* being pronounced as /g/ in *<u>gh</u>ost*, */f/* as in *lau<u>gh</u>*, or as part of a complex vowel digraph as in *throu<u>gh</u>* or *cau<u>gh</u>t*, which arguably have no straightforward phoneme-grapheme mapping. Therefore, native-Arabic ESL learners may initially experience some difficulty acquiring English orthographic spelling patterns that deviate from consistent and reliable grapheme-phoneme mappings. However, as Ryan and Meara claim (Ryan & Meara, 1991; Ryan, 1997), native Arabic ESL learners may also transfer some of their L1 word recognition skills developed to read the opaque, unvowelized script. As a consequence, L1 Arabic readers learn to rely on partial spelling information to identify the root Arabic morpheme, as well as the sentence context to help fully identify the word (Abu-Rabia, 2001, 2002; Ryan, 1997). If Arab ESL learners utilize these same processing skills to help them read or decode English words in text, then this may hinder the acquisition of spelling knowledge precision in general.

Since spelling knowledge is closely linked to word recognition skills (Berninger et al., 2002; Burt & Tate, 2002; Holmes & Carruthers, 1998; Ehri, 1997; Mehta et al., 2005; Perfetti, 1992), deficiencies in spelling knowledge would lead to problems in word recognition and reading comprehension, but not necessarily in listening comprehension. Theoretically and empirically, spelling knowledge is not directly connected to listening (or auding) comprehension, and this is best illustrated from a *component skill approach* to reading. The most prevalent component skill approach to reading postulates that reading comprehension is the product of word recognition skills (including spelling knowledge) on one hand and listening or auding comprehension skills on the other (Ehri, 2005; Grabe & Stoller, 2002; Koda, 2005). In fact, an extensive amount of L1 English research shows that word recognition skills and listening or auding comprehension skills not only account for much of the variance of reading comprehension among children and adults, but that they are dissociable skills (Gough, Hoover, & Peterson, 1996; Juel, 1988; Sticht & James, 1979; Vellutino et al., 2007). Some poor L1 readers have problems with word recognition but not listening or auding (dyslexics), and some poor readers exhibit good word recognition skills but have poor listening or auding skills (hyperlexics), though it is more typical to find poor L1 readers who have problems with both component skills (Gough et al., 1996; Leach, Scarborough, & Rescorla, 2003). From a component skills approach, spelling knowledge directly impacts word recognition and reading comprehension; however, spelling knowledge does not directly affect listening or auding comprehension because spelling and listening are unrelated skills.

If acquiring English orthographic or spelling knowledge is particularly problematic for Arab ESL

learners relative to other ESL populations, then it is plausible that Arab ESL learners at an intermediate level of proficiency may perform as well as a comparison ESL group in listening, but because of difficulties with spelling, the Arab ESL group may exhibit lower reading comprehension. The current study examines this question by looking at the spelling, reading, and listening skills of a group of Arab ESL students and a non-Arab ESL comparison group. Only a small number of studies have closely examined the word spelling and reading skills of ESL speakers (Chiappe et al., 2007; Holm & Dodd, 1996; Wade-Woolley & Segal, 1997), and to date, very little or no research has been done to examine the spelling production skills and reading skills of Arab and non-Arab ESL learners that are matched on a listening comprehension measure. This is a significant gap in the literature, especially because anecdotal evidence suggests that Arab ESL learners struggle with both ESL spelling development and reading fluency relative to listening and speaking skills (cf. Milton & Hopkins, 2006) and because there is very little research that has examined both the spelling knowledge and reading skills of Arab ESL learners in an EAP context.

If Arab ESL learners do have difficulty acquiring English spellings, then we might expect differences between Arab and a comparison group of ESL learners in spelling and reading comprehension, but not necessarily in listening comprehension. Consequently, the following research questions were motivated by the present study:

1. If intermediate Arab and non-Arab ESL learners are matched on a listening proficiency measure, will there be differences in the ESL reading comprehension skills of the Arab and non-Arab learners?

2. Are there differences in the spelling knowledge of the Arab and non-Arab ESL learners?

Method

Participants

There were a total of 37 ESL participants. All the participants were enrolled in the same high-intermediate level ESL classes at the same time (i.e., same semester) in the same EAP program. The EAP program is located in a large university in North America. Of the 20 Arab students enrolled in the high intermediate classes at the time of the study, 16 took the paper and pencil TOEFL reading test, TOEFL listening test, and a spelling test, and thus were included in the study. The comparison group consisted of ESL participants (L1 Chinese, L1 Korean, and L1 Japanese) whose native language literacy skills did not include the Latin alphabet; thus, the Arab and comparison ESL groups had minimal grapheme-phoneme correspondence skills and spelling knowledge that could transfer from their L1 (cf. Figueredo, 2006; Muljani et al., 1998). Overall, 21 out of 26 (= 81%) of the students who were native speakers of Chinese (n = 9), Korean (n = 5), and Japanese (n = 7) took all three tests and were included in the study. All the participants reported that their first formal study of English began upon entry into secondary school in their home countries. All of the Arab ESL participants were enrolled in English classes in order to enter an academic program in the United Sates in either the graduate or undergraduate level,

whereas fewer than half of the (non-Arab) comparison group participants planned on entering an academic program at the university level.

Finally, the participants in the non-Arab ESL comparison group were nearly 2 years older (mean age = 24.35 years) than the Arab ESL participants (mean age = 22.43 years), and though the mean age difference between the two groups was not significant, $t(34) = 2.04$, $p = .052$, it approached significance.

Procedure

The listening and reading subsections of a paper and pencil TOEFL test were used to assess the students' general listening skills and reading comprehension skills. The tests were administered using standard procedures during the first week of a semester term, which was also the time all the participants were beginning to study at the high-intermediate level in the same EAP program. The 58-item spelling diagnostic was administered in the following week (Week 2) of the semester. The participants received response sheets on which to write their spelling words. The administrator read the target word (e.g., *bottle*), used the word in a sentence (e.g., *I bring a bottle of water to class everyday*), and then read the target word again. Two example spelling words were given at the beginning. After going over the two examples, the administrator then gave the spelling test. The spelling test took 20–25 minutes to administer.

Materials

There were two primary criteria used to select the words for the spelling test. One was to select words that would be familiar and known by students at an intermediate level of ESL proficiency. The second was to select words that corresponded to levels of spelling difficulty so that the two groups could be compared with regard to within-word spelling skills, basic syllable pattern spelling skills, and multiple-syllable spelling pattern skills with unstressed syllables and derivational spellings.

The spelling test was composed of relatively common everyday words (e.g., *train*, *shout*, *bridge*) and common long words often used in academic and non-academic contexts (e.g., *information*, *necessary*, *knowledge*) that were expected to be familiar to intermediate ESL learners in an EAP program according to the *Words for Students of English Vocabulary* series (Rogerson, Hershelman, & Jasnow, 1992). The spelling word list consisted of items taken from the elementary spelling inventory (McKenna & Stahl, 2003), and from the elementary level (K-6th) items from the *Wide Range Achievement Test 3* spelling assessment (Jastak & Wilkerson, 1993).

Four of the high-intermediate ESL reading teachers in the EAP program were asked to judge how familiar the words were for the majority of the intermediate ESL learners entering the high-intermediate course in Week 1 (i.e., at the time of testing). Of the 58 words on the spelling test, the teachers judged 54 words as highly familiar and part of the productive vocabulary knowledge of most of the students entering the high-intermediate level course. Four words on the spelling test (*recognize*, *personal*, *confusion*, *preparation*) were judged by two of the teachers as words that were known and part of the receptive knowledge of the ESL learners entering the high-intermediate level, whereas two teachers judged the same four words as highly familiar and part

of the productive vocabulary of the ESL learners (see Appendix A for the words used on the spelling test).

The spelling test was designed to examine the acquisition of the English spelling rules and constraints used by L1 English literacy researchers (Ganske, 1999; Henderson & Templeton, 1986; Templeton & Morris, 2000). Thus, the spelling test examined the within-word spelling skills involving short vowels (e.g., *cut*, *dress*, *catch*), long vowels (e.g., *train*, *reach*, *strange*), and complex vowels (e.g., *flew*, *mouth*, *found*) in single-syllable words. There were a total of 22 within-word spelling items. In addition, the spelling test assessed basic syllable-juncture-pattern-spelling skills with words that had two or more syllables, and included syllable juncture spelling skills with consonant doubling (e.g., *written*, *swimming*), long-vowel spellings skills with open syllables (e.g., first syllable in *music* and *babies*), and short-vowel spelling skills with closed syllables (e.g., first syllable in *kitchen* and *dollar*). There was a total of 18 words that assessed basic syllable-juncture-pattern-spelling skills. Finally, the spelling test examined more complex spelling skills, involving derivational spellings (e.g., *suggestion*, *electrical*, *decision*) that also included multisyllabic words with unstressed syllables (e.g., *necessary*, *interesting*). The Cronbach alpha reliability estimate was .91 for the spelling test.

The TOEFL listening subsection was used to assess listening comprehension or auding skills. The listening subsection measures receptive language skills in three formats: short conversational exchanges, minitalks, and lectures. The listening section tests auditory receptive language skills such as receptive vocabulary knowledge, sentence parsing and processing skills, various types of inferencing skills (e.g., with anaphora and pronoun resolution, generating inferences from background knowledge), and integration skills (e.g., detecting key information such as main ideas and integrating that information into a coherent text representation). There are a total of 50 questions (i.e., maximum raw score of 50), all of which are multiple-choice items.

The TOEFL reading subsection was used to assess reading comprehension skills. There are six passages with 7 to 10 comprehension questions for each, all of which are multiple-choice items. There are a total of 50 test items in the reading section (i.e., maximum raw score of 50). The reading test measures the same language comprehension skills as the listening comprehension test (i.e., receptive vocabulary, sentence processing, inferencing skills, and information integration), though the reading test includes a larger range of vocabulary and sentence structures that are more indicative of expository discourse. According to the *TOEFL Score User Guide* (2001), the paper-based reading and listening test scores yield a correlation of .70, which indicates that many of the same receptive language processing skills are tested across the two tests (also see Freedle & Kostin, 1999; Hale, Rock, & Jirele, 1989). Nonetheless, the correlation is not perfect, and this is likely due to some of the linguistic and topic content differences in the two sections (e.g., roughly half the mini talks or long conversations in the listening section have academic topics, whereas all the reading passages cover academic topics; Freedle & Kostin, 1999).

Results

Table 1 summarizes the results of the TOEFL tests, which are based on a maximum raw score of

50 for both the listening and reading tests. The Arab ESL group scored higher on the TOEFL listening test (mean of 28.13 for the Arab ESL group, mean of 25.33 for the non-Arab ESL group) than the comparison ESL group, but the difference was not significant $t(34) = 1.31$, $p = .20$. Thus, both groups exhibited comparable listening (auding) comprehension. In contrast, the Arab ESL group scored significantly lower on the TOEFL reading test (mean of 20.91 for the Arab ESL group, mean of 29.71 for the non-Arab ESL group) than the non-Arab comparison ESL group, $t(35) = 3.27$, $p = .002$.

Table 1. *TOEFL listening and reading scores (out of 50 maximum)*

	Listening		Reading		
Language group	*M*	*SD*	*M*	*SD*	Group means
Arab group	28.13	6.33	20.91	7.61	49.04
Non-Arab group	25.33	6.51	29.71	8.56	55.04
Condition means	53.46		50.62		

Correct items on the spelling test were tabulated as follows. Any word spelled with any incorrect letters (e.g., *desigion* for *decision*), incorrect sequences of letters (e.g., *trian* for *train*), missing letters (e.g., *fund* for *found*), or extra letters (e.g., *shouet* for *shout*) was incorrect. Table 2 presents the group mean results of the correctly spelled words for the Arab and non-Arab ESL groups across the within-word spellings ($n = 22$), basic syllable-spelling patterns ($n = 18$), and multiple-syllable and derivational spelling patterns ($n = 18$). Figure 1 presents the mean scores as percentages correct for the two groups across the three sets of words in the spelling task. A 2 × 3 (Language Group × Word Condition) repeated measures ANOVA was conducted with the two language groups as the between-subjects factor and the three word conditions as the within-subjects factor. The ANOVA revealed a main effect for group, $F(1, 35) = 38.76$, $p < .001$. The mean scores indicated that the Arab ESL group scored significantly lower on the spelling test than the non-Arab ESL group. Not surprisingly, there was a main effect for word condition as well, $F(2, 70) = 197.23$, $p < .001$. There was also an interaction between language group and word condition, $F(2, 70) = 8.61$, $p < .001$. A post hoc analysis indicated that the non-Arab ESL comparison group was more accurate than the Arab ESL group with the within-word spellings, $t(35) = 3.57$, $p = .001$, the syllable juncture spellings, $t(35) = 5.01$, $p < .001$, and the derivational spellings, $t(35) = 6.27$, $p < .001$.

Table 2. *Means of within-word spellings, syllable juncture spellings, and derivational spellings*

	Arab ESL group		Non-Arab group	
	M	*SD*	*M*	*SD*
Within-word	18.19	2.88	20.71	1.31
Syllable juncture	10.00	3.27	14.52	2.23
Derivational	8.38	2.85	14.57	3.06

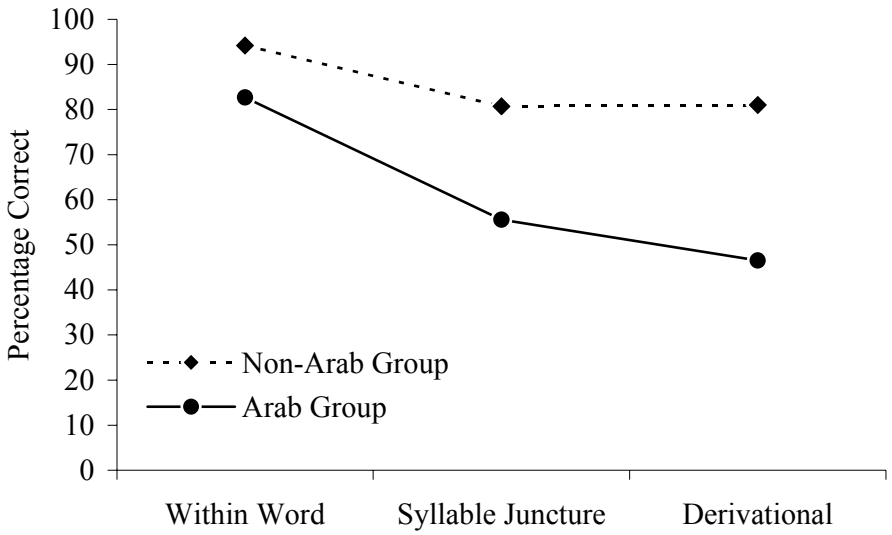

Figure 1. Accuracy (in percentages) for both Arab and Non-Arab ESL groups across the within-word, syllable juncture, and derivational word conditions.

Discussion

The results show that the two groups were comparable in listening (auding) comprehension skills, yet the Arab ESL group scored significantly lower on the spelling and reading comprehension test. These results make sense from the component skills approach when we consider two points. First, spelling is a measure of the orthographic knowledge that underpins word recognition skills in reading, which is supported by strong correlations between spelling knowledge and word recognition skills (Berninger et al., 2002; Geva & Zadeh, 2006; Katzir et al., 2006; Mehta et al., 2005) and the direct relationships between spelling performance and word recognition performance (Burt & Tate, 2002; Holmes & Carruthers, 1998) indicating that the same knowledge source (i.e., orthographic representations in the orthographic lexicon) informs spelling and word recognition (Ehri & Snowling, 2004; Perfetti, 1992). Secondly, orthographic or spelling knowledge is an important aspect of the word recognition component that supports reading comprehension but is not directly related to listening or auding comprehension skills (Berninger et al., 2002; Chiappe et al., 2007; Gough et al., 1996; Mehta et al., 2005). Thus, two groups of ESL learners can have comparable listening (auding) skills, as in this study, and yet have significantly different reading abilities if there are significant differences in orthographic or spelling knowledge. The results of this study help to explain the discrepancy between the listening comprehension skills and the reading comprehension skills of some Arab ESL learners and indicate how spelling knowledge can affect the emergence of reading skills relative to listening or auding skills.

In examining the spelling scores across the three spelling conditions, it is generally the case that the Arab ESL participants exhibited more difficulty than the comparison ESL participants when spelling involves orthographic or spelling pattern information that is independent of basic (i.e., the most common) grapheme-phoneme correspondences. For example, the Arab ESL learners had relatively little problem in spelling most of the mono-syllabic words with relatively common

sound-letter spellings with short and long vowels (e.g., *cut*, *dress*, *train*); yet some spelling problems tended to emerge with digraphs that did not involve common short- and long-vowel-spelling patterns (e.g., *fl<u>ew</u>*, *sh<u>out</u>*) or consonants with complex digraph spellings (e.g., *bri<u>dge</u>*) or less common grapheme-phoneme mappings (e.g., the /s/ spelled *c* in *choi<u>ce</u>*). Though both groups had more spelling difficulties with syllable-spelling patterns (e.g., open and closed syllable-spelling patterns in *hotel* and *bottle*) and derivational spelling patterns (e.g., spelling unstressed vowels in words like *decision* or *distance* or *furniture*), the Arab speakers experienced more drastic problems with these spellings, as is apparent in results in Figure 1. In other words, it is natural that words with more orthographic and spelling pattern complexity will be more difficult for both L1 and ESL learners to spell. Nonetheless, the problem is especially acute among the Arab ESL participants who seem to struggle with orthographic complexity, especially with the basic syllable-spelling patterns and derivational spellings. It should be added that although the Arab participants on the whole missed around half of the multiple syllable words (i.e., basic syllable-spelling patterns and derivational spellings), they were clearly able to spell half of these words correctly and misspelled many words by one or two letters, indicating that they had substantial spelling knowledge of many of the words. Nonetheless, incomplete or partial spelling knowledge of even one letter can result in less efficient and accurate word recognition processes (Perfetti, 1992; Perfetti & Hart, 2001), processes which are crucial to word recognition fluency and reading comprehension.

Though the study found differences between the Arab and comparison ESL groups in spelling, the reasons for the differences are less clear. One possibility involves L1 literacy experience and how that experience influences or shapes the development of ESL literacy skills, and in particular ESL spelling and orthographic skills. There is now a considerable amount of research in the past 20 years showing that L1 word recognition skills interact with and influence the emergence of L2 word recognition skills (e.g., Akamatsu, 1999, 2003; Koda, 2005; Wade-Woolley, 1999). Recent work done in L1 Arabic and Hebrew literacy development indicates native readers of Arabic and Hebrew focus on the consonant structure of printed words to identify root word forms but then must also rely on extra-linguistic sources of knowledge (sentence context, morphological knowledge) to identify the word since short-vowel information is missing (Abu-Rabia, 2002; Shimron, 1999). If Arab ESL learners transfer some of these L1 word recognition tendencies to English, then this may result in ESL word recognition processes that rely on partial spelling information (e.g., consonants and consonant structure) and extra-lexical sentence context information to identify words during reading.

Though L1 influences are difficult to determine from paper and pencil tests, there is some indication of this when we look at correlations between the spelling scores and reading comprehension scores. Typically, there is a moderate to strong correlation between spelling knowledge and reading comprehension because spelling knowledge and word recognition skills crucial to reading are closely linked to the same orthographic representations (Berninger, et al., 2002; Chiappe et al., 2007; Katzir, et al., 2006; Mehta et al., 2005), and this is consistent with the spelling and reading comprehension scores for the ESL comparison group ($r = .57$, $p < .01$). However, there is no correlation between the spelling and reading comprehension scores of the Arab ESL group ($r = -.15$, *ns*), though a note of caution is in order when examining correlations on relatively small numbers of subjects (cf. Wade-Woolley, 1999). With that being said, detailed or precise orthographic or spelling knowledge as measured by the spelling test appears to have

little relationship to the reading scores for the Arab ESL participants in this study, and this seems quite unusual when we consider the close relationship that has been found between spelling knowledge and word recognition skills among L1 English and ESL populations (e.g., Chiappe et al., 2007; Geva & Zadeh, 2006; Katzir et al., 2006; Mehta et al., 2005). However, if the Arab ESL learners relied on partial spelling information and extra-lexical information (e.g., sentence and discourse context) to identify English words during reading, then we should expect to find a lower correlation between spelling knowledge and reading comprehension measures. This also suggests the Arab ESL learners were relying on extra-lexical context information to help them identify English words in a way that parallels L1 Arabic word recognition skills. The use of extra-lexical information in L1 Arabic is essential in identifying Arabic words with incomplete or partial spelling information in the less transparent orthography that lacks short-vowel diacritics (Abu-Rabia, 2001, 2002). At the very least, the spelling score and reading score correlations suggest that spelling knowledge played less of a role in the reading outcomes for Arab ESL participants than the non-Arab ESL participants. Furthermore, word recognition tendencies that rely on extra-lexical information to identify English words would also be less likely to extract and encode detailed spelling information in the graphic display during ESL reading, which would inhibit the development of ESL spelling skills.

The results of the present study are also consistent with previous research showing that Arab ESL learners experience more difficulty than other ESL populations in processing English word forms (Fender, 2003; Ryan, 1997; Ryan & Meara, 1991). Recall that Ryan and Meara (1991) found that a group of Arab ESL learners was significantly less accurate and efficient than an ESL control group in making same-different judgments in a matching task. That is, they were less likely to detect spelling discrepancies (i.e., words with a missing vowel) and thereby made more errors in matching up incorrectly and correctly spelled word forms. This suggests that the Arab ESL learners had less specified spelling knowledge of the words than the control group did. Likewise, Fender (2003) found that a group of advanced ESL proficiency Arab learners were significantly slower than a proficiency-matched ESL group on word recognition skills in a lexical decision task. These results, along with the present study, suggest that the learners have less detailed spelling information in the orthographic lexicon, and this is reflected in a range of tasks that utilize spelling or orthographic knowledge.

However, it is also plausible and likely that the Arab ESL learners in this study had less experience processing English print materials than the other ESL learners. Recall that the participants in the non-Arab ESL group were nearly 2 years older on average than the Arab ESL participants, and this was close to being a significant difference. Such an age difference could mean that the non-Arab ESL group had an additional 2 years of potential exposure to English texts. It should be mentioned that the previous studies examining Arab ESL learners had not conducted a thorough analysis to examine the different print processing experiences that the Arab and non-Arab ESL learners have had in their home countries. Though it seems likely that some of the difficulties Arab ESL learners have with English spellings can be attributed to previous L1 print processing experiences, it also seems possible that English print processing experience in their home country, or possibly lack thereof, is a significant factor as well. Thus, one of the major limitations of this study is the lack of background survey data that would help more closely examine the ESL print processing experiences and English language learning practices of the Arab participants.

Another limitation to the present study involved the language proficiency measures. For one, there was no direct measure of vocabulary knowledge. Though the two groups were comparable in listening (auding) comprehension, this does not ensure that both groups of learners had the same receptive vocabulary knowledge, which is a crucial factor in determining reading comprehension. However, the TOEFL listening test is sensitive to general receptive vocabulary skills and sentence processing skills, and if there were significant differences in these two areas then this should be reflected in the listening test results. Nonetheless, future work examining the ESL spelling and reading skills of Arab ESL learners should assess vocabulary knowledge more directly (cf. Milton & Hopkins, 2006). Finally, it is possible that the comparison ESL group utilized a more effective set of reading strategies than the Arab ESL group, and this could potentially account for some of the difference between the listening and reading scores (i.e., lack of reading strategy skill could potentially suppress the Arab ESL participants' reading comprehension scores). Interestingly, this latter consideration is not typically discussed in research examining component skills (e.g., Gough et al., 1992).

Another limitation to this study pertains to the population sample and size. Though the students were entering high-intermediate level ESL courses, many of them were at a general intermediate level of English proficiency in the EAP program. These results would pertain to students at this general proficiency level, which appears to be the same level as the students in the Ryan and Meara (1991) study. Therefore, Arab ESL learners may require more time to develop English spelling and orthographic knowledge at lower-levels of English proficiency that are not as pronounced at more advanced levels of English proficiency. Finally, the Arab ESL group had a smaller sample size, and this is less than ideal.

Nonetheless, this study along with other research suggests that the quality of spelling knowledge may be a problem for many Arab ESL learners, at least at an intermediate level of English proficiency, and that this potentially impacts the development of reading skills relative to the development of listening comprehension skills. The results from the spelling, listening, and reading comprehension tests in the present study are generally consistent with previous research showing that Arab ESL learners are less efficient and accurate in English word recognition skills. Since orthographic or spelling knowledge informs both spelling and word recognition skills, then less developed English orthographic knowledge would result in less efficient and accurate word recognition skills, as found by the Arab ESL participants in the Ryan and Meara (1991) and Fender (2003) studies. Furthermore, the lack of a correlation between spelling precision and reading comprehension suggests that the Arab ESL learners may be relying on extra-lexical sentence and discourse context to identify words, a strategy that would work much better for narrative texts than expository texts such as those encountered on the TOEFL reading test.

Implications

Most of the Arab ESL learners in this study demonstrated spelling knowledge of within-word-spelling patterns with long and short vowels (e.g., *train*, *reach*, *catch*, *dress*) but exhibited more spelling difficulty with multisyllabic words that included spelling patterns across syllables (e.g., *customer*, *bottle*, *success*) and derivational spellings (e.g., *decision*, *knowledge*, *responsible*).

Thus, being able to segment words into syllables and acquiring an understanding of syllable-level-spelling patterns with open and closed syllables could be particularly helpful in being able to both acquire syllable-level-spelling patterns and to map vowels to spellings (Bear, Invernizzi, Templeton, & Johnston, 2004). This understanding may be crucial in helping learners understand and acquire how English spelling patterns at the phoneme, syllable, and morpheme or word levels correspond to pronunciations. Then, when readers see and pronounce a word, an enriched awareness of spelling-sound relationships can be utilized, which then may potentially secure a word's spelling in memory. In this way, ESL learners who struggle with English spelling would be able to acquire detailed orthographic or spelling forms more quickly and thoroughly.

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Appendix A

Spelling Test

Directions: Say the word once, then say the word in a sentence, and then repeat the word again.

Instruct the students to spell the words as best they can if they are not sure how to spell the word.
Example: bed I got out of bed at 7 a.m. this morning.
hand I write with my right hand.

Within-word spellings (1–22, 22 items)
1. run Billy can run fast.
2. cook My mother will cook dinner soon.
3. cut My mother will cut the cake with a knife.
4. arm John fell and broke his right arm.
5. dress She is wearing an expensive dress.
6. train The train was on time.
7. shout If you shout, everyone will hear you.
8. watch I usually watch TV on Monday night.
9. share The boy will share his food with the children.
10. choice You have the choice of taking the vocabulary class or the TOFL class.
11. catch I will catch a bus tomorrow morning.
12. found The boy finally found his ball.
13. reach The little boy cannot reach the light switch.
14. bird There is a bird in the tree.
15. strange I watched a very strange and unusual movie last night.
16. burn The food will burn if it stays in the oven.
17. cold It is cold outside.
18. bridge The bridge was built in 1989.
19. throw The child will throw the ball.
20. mouth His mouth is full of food.
21. flew The plane flew from Los Angeles to New York.
22. grown Bill's children have grown up and are in high school.

Syllable juncture spellings (23–40, 18 items)
23. kitchen Our kitchen is small.
24. result His TOEFL test result was good.
25. advice The teacher usually gives good advice to the students.
26. surprise The students will surprise their teacher.
27. purchase The student purchased all his books at the bookstore.
28. package John received a package in the mail.
29. music I like to listen to music when I drive.
30. customer The restaurant serves the customers with good food.
31. separate We must separate the spoons and forks.
32. babies My brother and his wife have two babies.
33. written Many of the level 5 students have written research papers.
34. napkin I need a napkin to wipe my mouth.
35. swimming We like to go swimming in the ocean.
36. market My father goes to the market to get fresh fruit.
37. dollar A bottle of water costs one dollar.
38. bottle I bring a bottle of water to class everyday.
39. thirsty The thirsty boy drank all the water.
40. success The boy worked hard and had great success in his classes.

Derivational spellings (41–58, 18 items)
41. insurance You must have care insurance to drive in California.
42. suggestion Mary made a good suggestion.

43. distance	The distance between Los Angeles and San Diego is 100 miles.
44. decision	The students must make a decision about their elective class.
45. recognize	The woman did not recognize her childhood friend.
46. necessary	It is necessary to do all your homework.
47. carefully	The little girl carefully crossed the busy street.
48. personal	Every employee has their own personal computer.
49. confusion	There was a lot of confusion about the new rules.
50. electrical	I want to study electrical engineering.
51. attendance	Jill had very good classroom attendance this year.
52. responsible	Parents are responsible for taking care of their children.
53. information	The lady at the library gave me useful information.
54. furniture	My roommate and I need to buy some new furniture.
55. preparation	There are some good TOEFL preparation books.
56. interesting	We read an interesting story in class yesterday.
57. education	Many people don't have a college education.
58. knowledge	The old man has lots of knowledge.

About the Author

Michael Fender is currently an assistant professor at California State University, Long Beach. His primary research interests include first and second language reading development, particularly the emergence of lower-level reading skills involving word recognition and sentence processing. He has published articles on these topics in *Language Learning* and *Applied Psycholinguistics*.
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