

Cognitive Skill Transfer in English Reading Acquisition: Alphabetic and Logographic Languages Compared

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Abstract

The purpose of this article is to review published studies regarding acquisition of English as a second or foreign language by students of different linguistic backgrounds, in light of the English language's opaque alphabetic orthography. This review focuses on the contribution of first language cognitive skills (orthographic knowledge, phonological awareness, and morphological awareness) in native speakers of languages with alphabetic and logographic orthographies, to English second-language reading skills (word reading and reading comprehension), to better understand the contribution of cognitive reading skills in alphabetic and logographic languages to the acquisition of English reading skills as a second language. The author examines findings in the context of second-language learning theories, and two contradictory hypotheses in particular—the linguistic interdependence hypothesis and the script-dependent hypothesis. The author finds that no consensus can be indicated as to the contribution of most native-language skills in alphabetic vs. logographic languages to the acquisition of second-language or foreign-language English reading, or even whether or not they are language-specific (script-dependent). The exception is phonological awareness in alphabetical orthographies (but not logographic orthographies) which received a consensus among researchers supporting its transfer from the native language to English as a second or foreign language.

Keywords

English as a Second Language, English as a Foreign Language, Alphabetic Language, Logographic Language, Cognitive Reading Skills, Language Learning Theories

1. Introduction

English is one of the most important languages in the world (Liu, 2009; Liu & Chu, 2010). It has become the

global language for international communication among people with different national, cultural, ethnic, and linguistic backgrounds (Crystal, 2003; Hu & McKay, 2012; McKay & Bokhorst-Heng, 2008). More and more children around the world with different linguistic backgrounds are educated in English as a second language (L2) or foreign language (FL), because it can ensure international status in every field all over the world, including academia, economics, and politics. English enables individual to belong to the “global village” community and provides “global citizenship”, allowing access to most places around the world and making it possible to communicate with much of the world's population.

A substantial number of studies in the last two decades have examined the relationships between first-language (L1) alphabetic or logographic orthography and English L2 in terms of cross-linguistic transfer of orthographic knowledge, phonological awareness, morphological awareness, and reading skills (word reading and reading comprehension) (Abu-Rabia & Siegel, 2002, 2003; Abu-Rabia & Shakkour, 2014; Akamatsu, 1999, 2003; Alshaboul, Asassfeh, Alshboul, & Alodwan, 2014; Al-Tamimi & Rabab’ah, 2007; Cisero & Royer, 1995; da Fontoura & Siegel, 1995; D’Angiulli, Siegel, & Serra, 2001; Hamada & Koda, 2010; Ho & Bryant, 1997; Nassaji & Geva, 1999; Wydell & Butterworth, 1999; Yeung & Chan, 2013).

The purpose of the present review is to evaluate the research on the contribution of the cognitive reading skills in orthographic knowledge, phonological awareness, and morphological awareness in alphabetic vs. logographic L1, to English L2 reading abilities, in order to understand compare the contribution of cognitive reading skills in alphabetic and logographic L1 to English L2 reading acquisition.

2. Method

This review was based primarily on the findings of empirical studies conducted during the past two decades which examined the transfer of linguistic skills such as orthographic knowledge, phonological awareness, and morphological awareness, from alphabetical and logographic languages to English as a second or foreign language. The included studies were published in various scientific journals in the areas of second-language acquisition, bilingualism, psycholinguistics, etc. On the basis of the various findings, the author conducted a comparison of the degree of contribution of linguistic skills from alphabetic and logographic languages to reading in English as a second or foreign language.

The research reviewed here is examined in the context of two basic hypotheses describing L1-L2 transfer: the interdependence hypothesis (IH), which proposes that Cognitive Academic Language Proficiency is transferred from one language to another (Cummins, 1979, 1981), and the Script Dependent Hypothesis (SDH), which suggests that L1 reading efficiency does not necessarily influence reading abilities in a second language (Lieberman, Shankweiler, Fischer, & Carter, 1974; Lindgren, Dernzi, & Richman, 1985).

Based on research findings in 160 studies of cross-language transfer of cognitive skills from alphabetic and non-alphabetic native languages to English L2 reading skills, this review aims to find answers to two basic questions and to examine these answers in the context of IH and SDH:

- 1) Is there a consensus among researchers studying cross-language transfer, that first language alphabetic or logographic cognitive reading skills, orthographic knowledge, phonological awareness, and morphological awareness can predict reading skills for English L2?
- 2) Does cross-language transfer of cognitive skills from alphabetic languages to English L2 reading acquisition include a similar transfer of the same skills from logographic languages to English L2 reading skills? In other words, are there differences between the contributions of reading skills in alphabetic and logographic to English L2 reading abilities?

3. Background

The writing system that a language uses affects children’s acquisition of literacy. Each system is based on a different set of symbolic relations and requires different cognitive skills (Coulmas, 1989). The following sections present an overview of two types of writing systems: alphabetic and logographic. The subsequent section presents the two hypotheses this review takes place in the context of: the interdependence hypothesis (IH) and the script dependent hypothesis (SDH).

3.1. Alphabetic Writing Systems

The segmental phoneme (distinguishable speech sounds) is the most important unit in learning to read alphabetic

languages. Alphabetic scripts use individual written symbols or symbol groups (graphemes) to represent phonemes in writing. In other words, alphabetic systems are based on correspondences between phonemes and graphemes. Each language consists of a limited number of these letter - speech sound units, which can be combined to create an infinite number of words (Perfetti & Marron, 1998). Even though different scripts can be used, such as Latin or Semitic, they share the essential feature that the graphemes represent phonological segments. This contrasts, for instance, with *syllabaries*, such as Korean, which establish correspondences between graphemes and consonant-vowel groups. The first crucial step when learning to read an alphabetic script is therefore to acquire a basic understanding of the system that maps symbols to sounds (Ziegler & Goswami, 2005). One can differentiate between alphabetic languages based on their “depth”. In shallow orthographies, the relationship between grapheme and phoneme is direct and simple: The correspondence between a letter and its sound is one to one and readers rely more on sub-lexical phonological units for decoding words. Examples include Greek, German, Finnish, Spanish, Italian and Serbo-Croatian (Katz & Frost, 1992). In languages with deep orthographies, as in English, on the other hand, consistency is low, and the relationship between grapheme and phoneme is indirect, vague, and much less predictable. The relation between a letter and its sound can vary, allowing for pronunciation options (Share, 2008). Therefore, each grapheme can represent several different phonemes, and every phoneme could be represented by more than one grapheme. In this situation, the decoding of words cannot rely entirely on the matching of letters to sounds; consequently, the reader relies more on a visual orthographic reading strategy of whole-word recognition (Frost, 1994; Katz & Frost, 1992; Wang & Geva, 2003).

3.2. Logographic Writing Systems

The Chinese script and the Japanese kanji script are considered logographic writing systems or, more accurately, a morphosyllabic system (DeFrancis, 1989; Mattingly, 1992; Perfetti & Zhang, 1995). Despite the similarity between the two, there are some minor differences between Chinese and Japanese kanji, as will be explained below. The Chinese writing system is based on characters, each representing a monosyllabic morpheme pronounced as one open syllable. In contrast to an alphabetic writing system, Chinese graphemes map not onto individual phonemes but rather syllables, which are also each a morpheme (Perfetti, Liu, & Tan, 2002). The Chinese character comprises basic strokes, combined to form component radicals—the atomic unit of a Chinese character. Many Chinese characters are compound characters, combining two or more radicals. Most Chinese characters include a semantic radical, carrying information about meaning, alongside phonetic radicals signifying the character’s pronunciation (Chan & Siegel, 2001; Ho & Bryant, 1997). So although the compositional relationship of radicals to form characters may seem superficially to the relationship of letters forming words in alphabetic writing systems, the two are fundamentally distinct (Perfetti et al., 2002). The basic Chinese speech unit is the syllable, conventionally broken down into two parts: onset and rime. In Mandarin Chinese, the onset of a syllable is always a single consonant (initial clusters are not permitted). The rime consists mainly of a vowel (Hu & Catts, 1998; Huang & Hanley, 1994; McBride-Chang & Ho, 2000).

The relation between Japanese kanji and Chinese logographs has historical origins: kanji characters are originally Chinese characters. Japan borrowed Chinese characters from China several times between the fifth and fourteenth centuries, and the Japanese adopted them each time (Taylor & Taylor, 1983). There is a great deal of similarity between the two written languages, with some slight alterations. For example, as previously mentioned, a Chinese character generally consists of two individual parts called radicals, one signifying the pronunciation and the other the meaning. While the adoption of Chinese characters into Japanese kanji retained the meaning of the symbol, the pronunciation was changed. This important aspect of the orthography means that the pronunciation of each individual kanji character must be memorized (Akamatsu, 1999; Morton & Sasanuma, 1984). Therefore, in Japanese the majority of kanji have two types of pronunciation: the *on’yomi* reading (Chinese-derived pronunciation) and the *kun’yomi* reading (native Japanese pronunciation). The Japanese language has many more homonyms than the Chinese language does. Spoken Chinese has tones, which play an important role as phonemes. This means that “a change in the tone creates a different word with a different meaning” (Tamaoka, 1991). When the Japanese adopted the Chinese characters, these tones in the pronunciation were ignored, and as a result there are a great number of homonyms in the Japanese language (Akamatsu, 1999).

3.3. Theories of Second Language Learning

3.3.1. The Linguistic Interdependence Hypothesis (IH)

Cummins (1979, 1981) argues that a significant relationship exists between L1 and L2, so a deficiency in one

language will also be exhibited in the other. He argues further that reading and writing proficiency and general academic skills that are successfully acquired in L1 should be transferred to L2 automatically. The main idea of this hypothesis is that learning two languages will improve the learning process of both, regardless of type of orthography (Cummins, 1979). This hypothesis is based on the assumption that Cognitive Academic Language Proficiency is transferred from one language to another (Cummins, 1979, 1981).

3.3.2. The Script Dependent Hypothesis (SDH)

This hypothesis suggests that reading efficiency in L2 is a direct function of L1 orthography, and that orthographic differences play an important role in the L2 reading process. The hypothesis also argues that reading development in a certain language will be constrained by the orthographic features of that language. The SDH proposes that reading problems in one language will reflect the degree of grapheme-phoneme correspondence in that language, and that this will not influence another language. Thus, children's reading efficiency in a particular language does not necessarily influence their ability to read a second language. Furthermore, each language develops independently from another. The main focus of this hypothesis is consideration of the characteristics of the L1 orthography during the reading acquisition process of the different orthographies of the L2 (Lieberman, Shankweiler, Fischer, & Carter 1974; Lindgren, De Renzi, & Richman, 1985).

3.3.3. Predictors of Reading and Reading Comprehension Acquisition

Learning to read is essentially the art of mapping between the spoken and written form of the language (Adams, 1990; Perfetti, 1985, 2003). It is a process of interpreting and understanding written language that begins with visual stimulation and ends with an understanding of the idea the writer is trying to convey (Rayner & Pollatsek, 1989). According to Perfetti (1985, 2003), learning to read symbolizes the deciphering of the spoken language as expressed in a written framework. The reading process is reflected only by the ability to understand the meaning of the text, while the process itself is a very comprehensive one, and includes evaluating, identifying, interpreting, and understanding the deep stratum of the text. According to Snow and Sweet (2003), reading comprehension is a multi-dimensional and complex process that requires high cognitive ability in extraction and construction, in that the reader extracts the meanings from the text, while at the same time combining them with existing knowledge in order to construct new meanings. This suggests that the interaction between a text and a child's basic knowledge will contribute to reading comprehension development (Alderson & Urquhart, 1988). Therefore, learning to read involves and demands a complex cognitive process, which in itself requires mastery of several linguistic and meta-linguistic skills.

4. Analysis

This review of literature examined the findings of various studies which examined the transfer of linguistic skills such as orthographic knowledge, phonological awareness, and morphological awareness, from alphabetical and logographic languages to English as a second or foreign language, on the basis of a comparison of the degree of contribution of linguistic skills from alphabetic languages on the one hand and logographic languages on the other, to reading skills in English as a second language.

The author examined the studies' findings with regard to each linguistic skill separately, both from alphabetic languages and from logographic languages, as predictors for reading ability in English as a second language. At the end of each section, the trend vis-à-vis the skill's contribution from alphabetic and logographic languages to English reading skill is presented. The analysis of the findings of studies for each of three skills (orthographic knowledge, phonological awareness, and morphological awareness) is presented together in a table (see **Table 1**) in order to provide an overview facilitating comparison of the contribution of these skills in alphabetic and logographic languages to reading ability and reading comprehension in the English language, as well as the trend indicated from this comparison.

Numerous research study findings indicate that linguistic components of L1, such as phonological awareness, morphological awareness, orthographic knowledge and meta-cognitive knowledge, all contribute to the development of reading and reading comprehension in a second language (Carlisle, Beeman, Davis, & Spharim, 1999; Cho & Tong, 2014; Gottardo & Mueller, 2009; Kahn-Horwitz, Shimron, & Sparks, 2005; Kieffer & Lesaux, 2008; Lefrançois & Armand, 2003; Lervåg & Aukrust, 2010; Nakamoto, Lindsey, & Manis, 2008; Nassaji & Geva, 1999; Nergis, 2013; Proctor, August, Carlo, & Snow, 2006; Pasquarella, Gottardo, & Grant, 2012; Protopapas, Sideridis, Mouzaki, & Simos, 2007; Van der Leij, Bekebrede, & Kotterink, 2010; Wang, Ko, & Choi, 2009).

The following is a short literary review of the linguistic and meta-linguistic skills referring to reading and reading comprehension acquisition in first and second language.

4.1. Cross-Language Skill Transfer

4.1.1. Orthographic Knowledge

Orthographic knowledge refers to the written framework of any given language, and consists of the orthographic symbols used in the written word that help in its identification and proper understanding (Ehri, 1992; Nassaji & Geva, 1999), whether an isolated word or within full texts (Wagner & Barker, 1994). Knowledge of the names of the letters of any alphabet constitutes one of the most fundamental indicators of the proper acquisition of reading skills among beginners (Badian, 1995; Scanlon & Vellution, 1997; Snow, Burns, & Griffin, 1998). Since such basic knowledge of names of letters also often describes their sounds, it allows beginning readers to acquire their first word-decoding strategies (Carroll, 2000). To acquire L2 orthographic skills, learners need to develop sensitivity towards orthographic rules in the target language. That means that learners of any language must understand the heterogeneous nature of orthographic information; specifically, they must know written symbols, recognize accepted patterns, and understand linguistic rules, as well as master the correspondence of symbols and their sounds (Shiotsu, 2009).

4.1.2. Transfer between Alphabetic Languages and English

Literature that examined the impact orthographic knowledge on second language acquisition raises the issue of orthographic knowledge transfer between languages, or language-specifically (dependent on the script). Numerous studies have indicated cross-language transfer of orthographic skills between alphabetic languages and English (Abu-Rabia & Sanitsky, 2010; Abu-Rabia & Siegel, 2002; Deacon, Comissaire, Chen, & Pasquarella, 2013; Deacon, Chen, Luo, & Ramirez, 2011; Deacon, Wade-Woolley, & Kirby, 2009; Kahn-Horwitz, Shimron, & Sparks, 2005; Nassaji & Geva, 1999). Kahn-Horwitz and colleagues (2005) indicated that orthographic knowledge in Hebrew L1 (which uses an alphabetic script) contributed to identifying letters and their sounds in English L2. Further, decoding orthography in Hebrew contributed to reading and reading comprehension in English. Abu-Rabia and Sanitsky (2010) indicated that orthographical skills in Hebrew L2 and in Russian L1 (also an alphabetic script) were a good predictor of orthographic proficiencies, reading and spelling in English L3. The researchers explained their findings by suggesting that learning two orthographies enriches the child's orthographic lexicon and helps him to acquire a third orthography, despite the difference in depth of the last orthography from the other two. Likewise, Nassaji and Geva (1999) examined linguistic transfer of orthographic skills between Persian, defined as a shallow (transparent) alphabetic orthography, and English. Their findings revealed that orthographic processing skills in L1 Persian significantly contributed to acquiring reading comprehension skills in L2 English. Additionally, Deacon, Wade-Woolley, and Kirby (2009) examined the transfer of orthographic skills between two languages with deep orthography, English and French. Their findings revealed important correlations between the orthographic systems of the two languages, and found a strong positive correlation between processing orthography in English and proper reading and spelling in French. Similarly, Deacon, Chen, Luo, and Ramirez (2011) found that Spanish (with a shallow alphabetic orthography) sub-lexical orthographic processing was related to English word reading for Spanish-English bilingual children in Grades 4 and 7. This relationship survived controls for mother's education, verbal and nonverbal abilities, rapid automatized naming, and phonological awareness. Both of these studies were conducted with languages with the same units of representation: i.e., the Roman alphabet. The researchers explained their findings by claiming that the higher the level of similarity between two orthographies, the greater the chance of a linguistic transfer of orthographic knowledge. That is to say, children's attention to features common to both languages might be one source of a linguistic transfer of orthographic processing to reading between languages (Deacon et al., 2013). These previous studies' findings indicated that neither orthographic knowledge nor the transfer of skills between languages is language-specific. Also, these studies support Cummins's IH (1979, 1981).

In contrast, many other studies that investigated linguistic transfer of orthographic knowledge between alphabetic languages and English revealed that orthographic knowledge is language-specific and cannot transfer between languages (Abu-Rabia, 1997a, 2001; Abu-Rabia & Blueistin-Danon, 2012; Abu-Rabia, Shakkour, & Siegel, 2013; Abu-Rabia & Siegel, 2003; Abu-Rabia & Shakkour, 2014; Arab-Moghaddam & Sénéchal, 2001; Morfidi, Van der Leij, de Jong, Scheltinga, & Bekebrede, 2007; Ryan & Meara, 1991; Sun-Alperin & Wang,

2009; Wang et al., 2006). Sun-Alperin & Wang (2009) indicated that processing orthography did predict reading and spelling abilities in Spanish L1 and English L2, but there was no transfer between them. In other words, orthographic patterns may be language-specific, and therefore unlikely to transfer to the other language. Abu-Rabia (2001) examined Russian bilingual students learning English as a foreign language (FL). The findings indicate that linguistic skills in L1 tend to transfer to the FL, except orthographic skills that are language specific. These findings lead to the common conclusion that children need increased exposure to the specific orthography to understand the way a specific written language is represented. Similar findings come from the study of Ryan and Mera (1991) that examined Arabic-speaking children learning English L2. Their findings revealed that native adult Arabic readers read texts without short vowels, which is a strategy they transferred from Arabic (with shallow alphabetic orthography) to the English script. This means that different orthographies lead to different types of errors in L2 learning, implying that orthographic knowledge is not transferred between languages and is indeed language-specific. Arab-Moghaddam & Sénéchal (2001) examined Persian bilinguals studying English as FL. The researchers reported significant transfer of phonological skills between the two languages. However, processing orthography predicted reading and spelling within languages, but not between languages. Identical findings were reported regarding Circassian-English (Abu-Rabia, 1997b), Dutch-English (Morfidi et al., 2007) Hebrew-English (Shimron & Sivan, 1994), and Korean-English (Wang, Koda, & Perfetti, 2003). These findings support the SDH (Lieberman et al., 1974; Lindgren et al., 1985), i.e., that orthographic skills are not transferred between languages but are rather language-specific.

4.1.3. Transfer between Logographic Languages and English

Many studies have examined the impact of orthographic knowledge in languages with logographic orthography on English acquisition (Cheung, Chan, & Chong, 2007; Jackson, Lu, & Ju, 1994; Leong, Cheng, & Tan, 2005; Tong & McBride-Chang, 2010; Wang & Geva, 2003; Wang et al., 2005). These studies have revealed cross-language transfer of orthographic knowledge between languages with logographic orthography and English L2 regardless of orthographic type. Cheung, Chan, and Chong (2007) reported that children's Chinese ortho-phonological knowledge uniquely explained variance in their abilities to read aloud in English and also contributed to English reading comprehension via mediation of English reading aloud. Tong and McBride-Chang (2010) examined Chinese bilingual children studying English as L2 in visual orthographic tasks, phonological processing, morphological processing and reading words in both Chinese and English. Their study showed that of the linguistic tasks examined, only visual orthographic skills in Chinese language predicted reading in second language English. The researchers explained their findings in that the "look and say" reading strategy, promoted in Hong Kong and China, strengthens visual analysis in word identification, which transferred to word identification in English too. The findings of all these studies support Cummins's IH (1979, 1981). In contrast, many studies that investigated languages with logographic orthography and English, showed that orthographic knowledge is a language specific (Akamatsu, 1999, 2003; Gottardo, Yan, Siegel, & Wade-Woolley, 2001; Keung & Ho, 2009; Leong, Cheng, & Tan, 2005; Wang, Yang, & Cheng, 2009; Wang et al., 2005; Wydell & Butterworth, 1999; Holm & Dodd, 1996). Keung & Ho (2009) examined cognitive skills related to reading among native Chinese bilingual children in the second grade learning English as a second language. Their findings showed orthographic skills in Chinese language did not contribute to reading acquisition in L2 English. Similarly, Gottardo and colleagues (2001) failed to find robust correlations between Chinese orthographic knowledge and English word reading or identification in Chinese children. Likewise, Wydell and Butterworth (1999) showed that orthographic knowledge in Japanese did not contribute to reading and spelling in L2 English. Such findings support the SDH (Lieberman et al., 1974; Lindgren et al., 1985).

In sum, no consensus can be indicated from the review of these findings as to whether orthographic knowledge transfers between alphabetic and logographic languages and English, or is language specific (script-dependent).

4.1.4. Phonological Awareness

Phonological awareness is a linguistic skill that relates to the ability to identify and manipulate speech sounds, including spoken words, syllables, onsets, rimes, and phonemes (Ehri, 1997; Gillon, 2002; Goswami & Bryant, 1990; Mann, 1998; Stanovich, 1986). Good phonological awareness is a crucial skill for decoding connections between phonemes and letters, an ability which not only leads to spelling and reading fluency, but also serves as a significant and reliable predictor of later reading abilities (Lipka, Siegel, & Vukovic, 2005; Chiappe, Siegel, &

Gottardo, 2002). Even though phonological awareness itself is not a reading skill but rather a general linguistic skill, it is strongly related to the development of reading proficiency (Geva & Siegel, 2000; Lipka et al., 2005; Lyon, Fletcher, & Barnes, 2003). Dixon, Stuart, and Masterson (2002) reported that children who received training and exposure to phonological awareness acquired reading skills and vocabulary faster than did children who did not receive such training. It is probably best described as a linguistic cognitive skill that can be transferred between languages, and which can serve as a key predictor of reading abilities not only in the mother tongue, but for L2 and L3 as well (Abu-Rabia & Shakkour, 2014; Adams, 1990; Alshaboul, Asassfeh, Alshboul, & Alodwan, 2014; Ball, 1993; Chiang & Rvachew, 2007; De Jong & Van der Leij, 1999; Durgunoğlu & Öney, 1999; Laurent & Martinot, 2010; Mann, 1998; Sun-Alperin & Wang, 2009; Al-Tamimi & Rabab'ah, 2007). The importance of phonological awareness as a reading predictor is not restricted to languages with alphabetical orthography but holds also for languages with logographic characteristics, like the Chinese language and the Japanese kanji orthography (Chan & Siegel, 2001; Gottardo et al., 2001; Ho & Bryant, 1997; Keung & Ho, 2009; So & Siegel 1997; Wang et al., 2005; Yeung & Chan, 2013).

4.1.5. Transfer between Alphabetic Languages and English

Many studies have investigated cross-linguistic transfer of phonological awareness between Spanish and English (August, Calderón, & Carlo, 2002; Bialystok, Luk, & Kwan, 2005; Cisero & Royer, 1995; Deacon et al., 2011; Durgunoğlu, Nagy, & Hancin-Bhatt, 1993; Lindsey, Manis, & Bailey, 2003; Sun-Alperin & Wang, 2009; Swanson, Rosston, Gerber, & Solari, 2008). Durgunoğlu et al. (1993) investigated cross-language transfer of phonological awareness in bilingual Spanish-English beginning readers. Their results demonstrated that children who could perform well on Spanish phonological awareness tasks were more likely to be able to read English words and pseudowords compared to children who performed poorly on these tasks. Supporting these findings were the findings of studies examining the transfer of phonological skills between Arabic and English (Abu-Rabia & Siegel, 2002, 2003; Abu-Rabia et al., 2013; Abu-Rabia & Shakkour, 2014; Al-Shaboul et al., 2014; Al-Tamimi & Rabab'ah, 2007; Farran, Bingham, & Matthews, 2012). In these studies the researchers reported that phonological skills did indeed transfer between Arabic and English. Al-Shaboul and colleagues (2014) examined phonological awareness transfer between Arabic and English, among Jordanian first grade students. Their findings revealed a strong positive correlation of phonological skills between the two languages. Moreover, the results clearly showed that phonological awareness in Arabic was a strong predictor for reading skill acquisition in English. Similar findings were found with Hebrew and English (Abu-Rabia, 1997a; Abu-Rabia, Peleg, & Shakkour, 2014; Geva & Siegel, 2000; Kahn-Horwitz, Shimron, & Sparks, 2005; Russak & Kahn-Horwitz, 2013; Wade-Woolley & Geva, 2000). Abu-Rabia et al. (2014) examined the relation between linguistic skills amongst Israeli Grade 11 students whose mother tongue was Hebrew and who were learning English as a second language. The findings demonstrated a significant positive correlation between phonological skills in first language and the same skills in the second language, in addition of significant positive correlation between phonological skills in Hebrew and text reading and pseudo-word reading in English. Identical findings were revealed between Korean, considered as an alphabetic language, and English (Chiappe, Glaeser, & Ferko, 2007; Kim, 2009; Kang, 2012; McBride-Chang et al., 2005; Wang, Cheng, & Chen, 2006). According to these studies, there is cross-linguistic transfer of phonological awareness in spite of the differences in phonological representation between the two languages. For example, Kim (2009) found that identifying rhymes in Korean L1 correlated with phonological awareness in English L2. In addition, phonological skills in Korean positively contributed to the decoding of words in English, in spite of the difference in phonological representation between the two languages. Likewise, Chiappe et al. (2007) investigated speech perception and phonological processing skills among Korean bilingual children learning English as a second language, and native monolingual children speaking English in Northern California in the United States. Their findings indicated that speech perception and phonological awareness are important predictors for reading in English among both students groups. Similar findings were revealed regarding phonological awareness transfer in language pairs German-English (Mann & Wimmer, 2002), Dutch-English (Timmer & Schiller, 2012; Morfidi et al., 2007), Farsi-English (Arab-Moghaddam & Sénéchal, 2001; Gholamain & Geva, 1999), Finnish-English (Dufva & Voeten, 1999), French-English (Comeau, Cormier, Grandmaison, & Lacroix, 1999; Chiang & Rvachew, 2007), Italian-English (D'angiulli et al., 2001), Portuguese-English (da Fontoura & Siegel, 1995), and Russian-English (Abu-Rabia, 2001; Abu-Rabia & Sanitsky, 2010). The findings of all of these studies support Cummins's IH (1979, 1981).

4.1.6. Transfer between Logographic Languages and English

Numerous studies have examined cross-language transfer of phonological skills between languages that differ in orthographic character like Chinese or the Japanese kanji and English (Chow, McBride-Chang & Burgess, 2005; Chung, McBride-Chang, Cheung, & Wong, 2011; Gottardo et al., 2001; Gottardo, Chiappe, Yan, Siegel, & Gu, 2006; Keung & Ho, 2009; Luo, Chen, & Geva, 2014; McBride-Chang et al., 2008; Tong & McBride-Chang, 2010; Wang, Lin, & Yang, 2014; Wang et al., 2005; Yeung & Chan, 2013). These studies revealed that phonological skills did indeed transfer between logographic languages and English. Gottardo and colleagues (2001, 2006) demonstrated that L1 and L2 phonological awareness were significantly correlated and that L1 phonological skills explained unique variances in L2 reading performance among Cantonese-speaking Chinese children learning English as a second language. Chung and colleagues (2011) had similar findings in a study examining speech perception, phonological awareness and word reading among Chinese bilingual children learning English as a second language. The findings indicated that Chinese phonological awareness and speech perception were uniquely associated with English word reading. Conversely, not all studies have shown clear transfer of phonological skills between logographical languages and English (Akamatsu, 1999, 2003; Bialystok et al., 2005; Hamada & Koda, 2010; Knell et al., 2007; Luck, 2003; Koda, 1989; Wydell & Butterworth, 1999). For example, Knell et al. (2007) examined linguistic skills transfer between Chinese and English. They found that phonological awareness in Chinese moderately predicts words identification in English. Luck (2003), however, studied groups of Chinese children studying English as a second language. The study findings showed a high correlation in phonological awareness between the two languages. However, phonological awareness in Chinese did not predict English reading skills acquisition. The researcher's conclusion was that reading skill in logographic languages develops separately from phonological awareness skills. The results of Wydell and Butterworth (1999) were the same, from studying dyslexic Japanese high school students studying English as a second language. The findings showed that students' performance in phonological processing for Japanese was good and successful, but their performance in English was weak. Moreover, there was no correlation of phonological awareness between the two languages, and Japanese phonological awareness did not contribute to English reading and spelling acquisition. The researchers conclude that the depth of English orthography and the low correspondence between letters and their sounds posed a significant barrier for the Japanese students acquiring English. Hamada and Koda (2010) studied four groups of bilingual students: two groups with alphabetical linguistic backgrounds (Turkish and Korean) and two groups with logographical linguistic backgrounds (Chinese and Japanese). All students were tested in their first language and in L2 English, in a task involving identifying pseudowords, phonological decoding, and rapid naming. The findings showed that students with alphabetical linguistic background performed better in all tested skills than the students with logographical linguistic background. They found that phonological decoding skill in Turkish and Korean was a stronger and more significant predictor for word and pseudo word reading in English, as compared to the effect from Chinese and Japanese.

In summary, the literature review reveals that these studies demonstrated transfer of phonological skills between different languages, regardless of orthographic type (logographic or alphabetic) and regardless of orthographic depth (shallow or deep), lending support to Cummins's IH (1979, 1981). Conversely, the above studies proved that phonological awareness does not transfer between languages differing in orthographic characteristics (logographic, alphabetic, shallow and deep), supporting the SDH (Lieberman et al., 1974; Lindgren et al., 1985).

4.2. Morphological Awareness

Morphological awareness means perceiving a word's morphological structure and being able to manage this structure (Carlisle, 1995; Carlisle & Stone, 2003). This includes the accessibility of morphemes, reflecting a child's ability to apply morphemic knowledge in identifying and creating more complex forms of words and in adapting the new structure to the given language (Perfetti, 1985; Byrne, 1996). Many studies examining the early stages of reading acquisition suggest that young children show a fundamental understanding of the morphological knowledge component of the word. Byrne (1996) noted that English-speaking children in the early reading stage tend to notice morphological features more than phonological features of new words, and that morphological awareness of spoken language contributes to children's reading development (Deacon & Kirby, 2004; Mahony, Singson, & Mann, 2000). In addition, morphological awareness has an important role in enriching the reader's vocabulary (Carlisle & Fleming, 2003; Wang et al., 2006). Other studies have demonstrated that morphological awareness has an effect on reading comprehension (Casalis & Louis-Alexandre, 2000; Deacon & Kirby, 2004; Kieffer & Lesaux, 2008; Zhang & Koda, 2014), also on the acquisition of spelling skills (Abu-Rabia, 2001; Ravid,

2001).

4.2.1. Transfer between Alphabetic Languages and English

Few studies have examined morphological cross-linguistic transfer, but those which did have indicated that morphological features influence the transfer direction of morphological skills. Transparent orthographies usually relate to a deep and complex morphological system, whereas deep orthographies accompany a transparent and simple morphological system. Consequently, it should be easier to transfer morphological skills from deep morphological systems like Arabic, Hebrew, Spanish, Finnish and Korean to transparent morphological systems, like English, but not vice versa (Bindman, 2004; Jarvis & Odlin, 2000; Kahn-Horwitz et al., 2005; Kieffer & Lesaux, 2008; Ramirez, Chen, Geva, & Kiefer, 2010; Saiegh-Haddad & Geva, 2008; Schiff & Calif, 2007; Wang et al., 2009). Ramirez et al. (2010) examined the linguistic transfer of morphological skills among bilingual Spanish-speaking children learning English as their L2. Children were tested by two measures of derivational morphology. The findings indicated that morphological awareness contributed to reading within languages in Spanish and English. In addition, morphological awareness in Spanish was a good predictor of word reading in English. However, morphological skills in English did not predict word reading in Spanish. Likewise, Saiegh-Haddad and Geva (2008) found that morphological awareness in L2 Arabic predicted word and pseudoword reading in L1 English. However, there was no cross-linguistic transfer of morphological skills between English and Arabic. In other words, the English-language morphological awareness did not predict reading skill in Arabic language. Jarvis and Odlin (2000) examined the relationship between morphological skills and reading acquisition among Finnish bilingual children learning English as a second language. The findings indicated that Finnish-language morphological awareness was a good predictor of English word reading. Likewise, Wang and colleagues (2009) examined the cross-language transfer of morphological awareness among bilingual Korean-speaking children studying English as a second language. Study findings indicated that morphological awareness predicted word reading and reading comprehension within the two languages, Korean and English. They also found a significant correlation between Korean-language morphological skills and English-language word reading and reading comprehension. Deacon et al. (2009) examined the effect of morphological awareness on reading in two languages with deep orthography: English and French. The researchers reported a bidirectional cross-language transfer of morphological skills between the two languages. In other words, English morphological awareness was an important predictor of word reading in French, and morphological skills in French language predicted word reading in English.

Findings that demonstrate cross-language transfer of morphological skills support Cummins's IH (1979, 1981), while findings of non-transfer of morphological awareness from English to other languages with shallow orthographies support the SDH (Lieberman et al., 1974; Lindgren et al., 1985).

In summary, previous research findings indicated that morphological awareness predicts reading measures within the L1 and L2; morphological awareness in orthographically shallow native languages significantly contributed to reading skills in English L2, but not vice versa. In other words, the findings revealed unidirectional cross-language transfer of morphological awareness, from shallow orthographies with deep morphological systems to deep orthographies with shallow morphological systems, but not the other way around. Where the two languages' morphological systems are similar in their level of complexity (like English and French), bidirectional cross-linguistic transfer of morphological awareness skills takes place.

4.2.2. Transfer between Logographic Languages and English

Few studies have examined the effect of morphological awareness skills on reading acquisition in languages with logographic orthography. Fewer still investigated the cross-language transfer of morphological skills from languages with logographic orthography (like Chinese) to languages with alphabetical orthographies (like English). These studies revealed that compound awareness in Chinese L1 predicted English L2 reading acquisition. However, inflectional and derivational awareness in Chinese did not show a significant cross-linguistic relationship with English reading abilities (Chung & Ho, 2010; Luo et al., 2014; Hu, 2013; Pasquarella et al., 2011; Wang et al., 2006, 2009; Zhang, 2013; Zhang & Koda, 2014; Zhang et al., 2010). There is some indication that these findings are affected by the morphological structure of the typologically distinct languages (Zhang & Koda, 2014; Zhang, 2013): The derivational process in Chinese is very limited, with few derivational affixes, of little functional salience. Chinese makes heavy use of compounds to create new words, and written Chinese is rife with them. Inflectional and derivational morphology, in contrast, are quite limited (Fabb, 1998; Packard, 2000). English stands

in stark contrast to Chinese. English is known for its rich derivational morphology (Li & Thompson, 1981; Plag, 2003) while Chinese rarely exhibits any at all. Compounding, however, is evident in English as well; therefore, transfer of compounding awareness happens readily, as this structure is productive in both languages, but not derivational awareness, which is productive and typical for English but not for Chinese (Zhang, 2013; Zhang & Koda, 2014). Zhang (2013) examined cross-language effects of compound and derivations awareness on word-level reading among Chinese Grade 6 students speaking English as a foreign language. Results showed that the contribution of Chinese morphological awareness to English morphological awareness was larger for compound words than for derived words. In addition, Chinese compound words uniquely predicted a significant degree of variance in reading real words in the other language. However, Chinese derivational awareness did not stand out as a significant, independent contributor to English reading abilities. Likewise, Wang et al. (2006) found that awareness of Chinese compound structure was a unique predictor of English word reading. However, Chinese derivational awareness did not predict acquisition of reading and reading comprehension in English L2. Chung and colleagues (2010) revealed that Chinese L1 compound awareness was transferred to facilitate English L2 word reading, over and above English derivational awareness and phonological awareness. In contrast, McBride-Chang et al. (2005) argued that morphological awareness affects reading acquisition in alphabetic languages like English and Finnish and almost insignificantly in Chinese language. Evidencing this claim, Tong and McBride-Chang (2010) showed that morphological awareness skills are language specific in their study, which examined the effect of compound structure on reading acquisition in both Chinese and English. Findings showed that compound awareness predicted reading in both languages. However, there was not cross-language transfer of compound awareness in both languages. Meanwhile, Zhang et al. (2010) argued that increasing exposure to native language compound awareness skills would facilitate transfer to the corresponding skills in a second language. The researchers revealed that Chinese compound awareness training facilitated transfer to the corresponding awareness in English L2.

In summary, studies that revealed cross-language transfer of Chinese compound awareness skills to English L2 support Cummins's IH (1979, 1981), while findings of non-transfer of derivational awareness from Chinese to English support the SDH (Lieberman et al., 1974; Lindgren et al., 1985). One may therefore state that limited studies, which examined the cross-language transfer of morphological awareness of compound and derivations awareness in languages with logographic orthography, do not permit conclusions and comprehensive generalization. However, according to the findings in this chapter, I can be carefully summarize that compound awareness transfer is more possible from logographic orthographies to English, however Chinese derivation awareness is language-specific and didn't facilitated English L2 word reading.

5. Discussion

This section summarizes the findings of the literature review in general while providing answers to the above research questions. Subsequently, we will discuss the contribution of each linguistic skill in acquiring L2 English. The findings above, taken from research which examined the contribution to English L2 reading skills (word reading and reading comprehension) from alphabetic and logographic (e.g. Chinese and Japanese kanji) first-language cognitive skills in orthographic knowledge, phonological awareness, and morphological awareness, revealed that:

1) Many studies have demonstrated cross-language transfer of alphabetic or logographic first-language reading skills in orthographic knowledge, phonological awareness, and morphological awareness, to second-language English reading abilities. The findings of these studies support Cummins's IH (1979, 1981).

2) There is no consensus among researchers reviewed in the present article that alphabetic or non-alphabetic language reading skills predict reading skills in second-language English. The exception is phonological awareness in alphabetic orthography, which received a consensus among researchers of cross-language skill transfer—but not so in the case of logographic orthography.

Studies that revealed cross-language transfer of phonological skills support Cummins's IH (1979, 1981), while findings of non-transfer of alphabetic or logographic first language cognitive skills to English L2 reading skills support the SDH (Lieberman et al., 1974; Lindgren et al., 1985).

3) There is a difference in the contribution of each linguistic skill in alphabetic and non-alphabetic languages to English L2 reading abilities (see Table 1, which summarizes the previous research findings regarding the transference of language skills from alphabetic and logographic languages to English L2 reading skills).

Table 1. Summary: transference level of orthographic knowledge, phonological awareness, and morphological awareness, from alphabetic and logographic languages to English L2/FL reading skills.

	Orthographic Knowledge, Transference Level to English L2/FL Reading Skills	Phonological Awareness, Transference Level to English L2/FL Reading Skills	Morphological Awareness, Transference Level to English L2/FL Reading Skills
From Alphabetic Languages	Transfer is only from alphabetic languages with similar orthographic features to English.	There is a consensus that phonological awareness transfers to English L2 regardless of orthographic depth.	Unidirectional from shallow orthographies to English L2, but not vice versa. Bidirectional between deep orthographies (including English).
From Logographic Languages	There is no consensus that orthographic knowledge transfers to English L2. Mixed findings.	There is no consensus that phonological awareness transfers to English L2. Mixed findings.	Transfer of morphological awareness regarding compounding possible.

5.1. Orthographic Knowledge

5.1.1. Alphabetic Languages

Having reviewed the research findings, we may conclude that there is no consensus that orthographic knowledge in native alphabetic languages contributes to English L2 reading abilities—the findings were mixed. We may conclude that cross-language transfer of alphabetic orthographic skills is possible when the level of similarity between orthographic systems is higher. In contrast, however, other researchers concluded that orthographic knowledge is language-specific, therefore unlikely to transfer to the other language, especially from languages that differentiate in their orthographic features from English.

5.1.2. Logographic Languages

Regarding orthographic knowledge in logographic languages, research findings were similar, that is, mixed. Some studies showed cross-language transfer of orthographic knowledge from logographical languages to English L2, despite the large difference between the two writing systems. Other studies indicated that logographical orthographic knowledge is language-specific and the possibility of transference to L2 English is extremely low. The researchers argued that the difference between the two orthographic systems prevents transference of orthographic skills.

5.2. Phonological Awareness

5.2.1. Alphabetic Languages

Research findings have indicated that phonological awareness in alphabetical languages, independently from the orthographic depth of these languages (opaque or transparent) predicted English reading skills. Indeed, only for phonological awareness in native alphabetic languages could we find a consensus among bilingual linguistic researchers supporting contribution to L2 English reading acquisition.

5.2.2. Logographic Languages

In contrast, in non-alphabetic languages the findings were mixed, meaning I found no consensus among researchers that phonological skills transfer between logographic languages and English; some studies indicated that phonological awareness in logographic languages contributed to reading skills in L2 English, whereas others reported that phonological awareness in logographic languages is language-specific, and did not transfer to L2 English.

5.3. Morphological Awareness

5.3.1. Alphabetic Languages

Findings from alphabetic languages have revealed that morphological awareness transfers from languages with shallow orthographies, characterized by deep morphological systems, to languages with deep orthographies, characterized by shallow morphological systems—such as English. However, no transference of morphological skills was found from languages with deep orthographies (as in English) to languages with shallow orthographies. In other words, there is a unidirectional transfer of morphological awareness, from shallow orthographies to deep

orthographies, but not vice versa. In addition, cross-language transfer of morphological skills will occur between languages with deep orthographic features as with French and English. This means that when the languages' morphological systems are similar in their level of complexity, there will be bidirectional cross-languages transfer of morphological awareness skills.

5.3.2. Logographic Languages

In non-alphabetic languages, characterized by logographic orthographies, it can be summarized that compound awareness skills predicted English L2 reading skills. However, inflectional and derivational morphology is very limited and didn't facilitate English L2 reading skills. The researchers argued that the transference process of morphological skills from logographic L1 to English L2 was affected by the morphological structure of the typologically distinct languages (as explained above in more detail).

6. Conclusion

We may conclude that the contribution of alphabetic cognitive skills to the acquisition of English reading abilities is different from the contribution of logographic cognitive skills. This difference is due to the orthographical, phonological, and morphological structures of the typologically distinct languages. In other words, the transference of language skills from alphabetic languages to English is likelier than the transfer of the same skills from logographic languages to English. This leads us to the common conclusion that one can overcome this difference by increased exposure to the English language, to facilitate understanding of the way the language's specific orthographical, phonological and morphological structures are represented (Abu-Rabia, 2001; Abu-Rabia & Shakkour, 2014; Zhang, 2013).

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