The effect of orthographic depth on reading acquisition

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Abstract

This paper addresses orthographic differences and its effect on literacy acquisition especially reading acquisition. In considering reading acquisition the most remarkable feature of difference between orthographies is related to orthographic depth, which depends on the degree of regularity of grapheme-phoneme (G-P) relationship. The degree of orthographic depth has a major effect on reading acquisition.

Keywords: orthography, orthographic depth, phonological recoding, reading acquisition

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Introduction

Orthography is a method for writing the sounds of a language. Orthographic strengths or weakness has a great effect on learning how to read and write a language. When there is no rule to use written symbols there is a lot of problem especially for children to read and write correctly. For example there are four different letters in Persian alphabet just for the sound /z/, i.e. /ذ/, /ز/, /ض/ and /ظ/. Because there is no difference in pronunciation of these letters, children cannot differentiate among them, and when they have to use them in different words they become confused. So it raises the question of whether the difficulty of reading acquisition in alphabetic orthographies is related to the features of particular orthographies or not. This question has been investigated by a number of researchers (e.g. Burt 2006, Thorstad 1991, Cahill& Karan 2008) and suggests that there is a considerable variation in the rate of reading acquisition between orthographies, and that this variation is related to orthographic depth. The concept of orthographic depth refers to the degree of regularity of grapheme-phoneme (G-P) relationship. In shallow (regular) orthographies, such as Kurdish, the correspondences are direct and clear, whereas in deep orthographies, such as English, the relation between phonemes and graphemes is more ambiguous and difficult.

Different writing systems

Generally speaking there are three types of Orthography: Logography, syllabary and alphabetic. In logography words and morphemes are linguistic units; Chinese is the best example of logography. In syllabary system, syllables are the unit of writing such as Old Persian Cuneiform. But in alphabetic orthography, letters (graphemes) are units of writing and each alphabet letter represents a phoneme, a good example of alphabetic writing system is Kurdish orthography.

Levels of written language processing

Perception of written language psychologically occurs at different levels. According to Carroll (2008) in written perception we have three levels respectively: Feature, Letter and Word level. At feature level the shape of the alphabet letter is presented, that is we recognize letters by their shape e.g. we acknowledge /K/ as a vertical line and two diagonal lines or slashes. Then at the letter level we perceive letters as meaningful symbols rather than their physical shapes. For example we perceive the letter /F/ regardless of whether it is handwritten or is typed with different fonts. And finally at word level we see the word as a whole not as a set of letters, and then its properties such as pronunciation and meaning become available to us. Although in the Word-Superiority Effect theory words are important not letters, and word perception helps letter identification; but this is only correct with experienced readers, and novice readers need to decoding letters to understand new words either in their own language or another language.

Phonological recoding

Words are composed of letters that represent sounds. Using systematic relationships between letters and phonemes to pronounce or spell words is called phonological recoding. Because there are too many words in the language to rely on memorization as a primary word

identification strategy, in alphabetic writing systems, recoding is an important and primary means of recognizing words.

Studies of nonword reading skills show that the acquisition of phonological recoding skills varies among different orthographies. For example in English it is slow and difficult. Mean error rates for nonword reading at the end of grade 1 typically range from 40% to 80% (e.g. Seymour et al., 2003; Treiman, Goswami, & Bruck, 1990). In contrast, in Greek orthography which is regular, children of the same age made only about 10% errors when reading words and nonwords (Porpodas, 1999). In a review, Landerl (2000) reports that children in regular orthographies like Dutch, German, Greek, Italian, Portuguese or Turkish make no more than 25% errors on nonword reading at the end of grade 1.

Deep and shallow orthographies

In successful reading, the brain must first make a correct connection between the orthographic character of the word and its sound. Regarding orthographic depth there are two types of orthographies, Deep and Shallow. Deep orthographies are writing systems that do not have a full correspondence between the spoken phoneme and the written grapheme.

English is an example of orthography where the written script does not fully represent the phonemic structure of spoken language. According to Brinton (2000), there are 44 phonemes in English. While there are only 26 letters in English alphabet, the number of graphemes is much higher and many graphemes consist of multiple letters. A phoneme can be marked with a variety of graphemes, depending on the context, and vice versa. In English the reader has first to be able to make orthographic recoding of multi-letter and often inconsistent digraphs (e.g. ps-y-ch-o-l-o-g-y), where the knowledge of basic letter sounds does not suffice for being able to use the grapheme-phoneme correspondences.

Shallow orthographies, however, have a one-to-one relationship between graphemes and phonemes. Kurdish provides a good example, with 31 associations that match the exact number of letters (Bedir-Xan, 1931). There is one to one correspondence between phonemes and graphemes in this writing system. In fact, this means that a non- Kurdish person, who knows the sound of each letter, would be capable of reading aloud a Kurdish text and make it perfectly comprehensible to a Kurdish listener.

Written Kurdish stands in clear contrast to written English, which is a very inconsistent orthography. For example consider the English word 'school', the IPA phonemic representation for this word is /skul/, and its representation in Kurdish orthography is almost the same as IPA by showing it with four graphemes 'skûl' instead of six graphemes as in English orthography. This highly phonemic alphabet has a great role in reading acquisition and using Kurdish as a written language, especially in Turkey despite the state ban on Kurdish education. But there is no factual data showing the level of literacy acquisition pace among Kurdish learners using this orthography. Considering the fact that there exist two different competent types of orthographies in Kurdish, i.e. Soranî vs. Kurmancî, studying their effects on literacy acquisition, and evaluating them will be of considerable importance in choosing the best one to be the standard orthography as a prerequisite to language standardization.

Orthographic depth hypothesis (ODH)

According to orthographic depth hypothesis (ODH), lexical word recognition in shallow orthographies is mediated primarily by phonemic cues generated prelexically by grapheme-to-phoneme translation. In contrast, lexical access for word recognition in a deep orthography relies strongly on orthographic cues, where phonology is derived from internal lexicon.

While the question of differences between alphabetic orthographies has not received much attention in the field of reading acquisition, it has attracted more interest in studies of skilled reading and lexical access. The issue was first introduced into reading research as a result of findings concerning word recognition processes in Serbo-Croatian and English (e.g. Feldman & Turvey, 1983). These studies revealed that in Serbo-Croatian, word-recognition processes were biased towards phonemic coding, whereas in English, the orthographic processes were more important. Frost, Katz, and Bentin (1987) investigated the psychological reality of the concept of orthographical depth and its influence on visual word recognition in Hebrew, English, and Serbo-Croatian languages. The results were also interpreted as strong support for the orthographical depth hypothesis and suggest, in general, that in shallow orthographies phonology is generated directly from print, whereas in deep orthographies phonology is derived from the internal lexicon.

Two versions of the orthographic depth hypothesis (ODH) exist in the current literature, strong ODH and weak ODH. What can be called the strong ODH states that phonological representations derived from assembled phonology alone are sufficient for naming and lexical decision in shallow orthographies. Thus, according to the strong ODH, rapid naming in shallow orthographies is a result of only this prelexical analytic process and does not involve pronunciation obtained from memory, i.e., the lexicon. However Katz and Frost (1992) accept the role of lexicon in generating phonology and support the weak ODH. In this version, the phonology needed for the pronunciation of printed words comes not only from prelexical letterphonology correspondences but also from stored lexical phonology, that is to say, from memory.

The effect of orthography on the acquisition of reading skills

Most cross-linguistic comparisons of reading acquisition have been pair wise comparisons of English and a supposedly more regular orthography. One of the earliest studies of this kind was carried out by Öney and Goldman (1984). They compared the pseudo word reading skills of Turkish and American children at first and third grades. The results showed that the Turkish children were more accurate and also faster than the American children at the first grade, the accuracy percentages being 94% and 59%, respectively. At the third grade, the ceiling was reached by both groups, but the Turkish children were still the more fluent readers.

On the other hand research findings show that orthographic defects are time consuming and have a burden on development of children's literacy acquisition. It is important to note that the L1 English speaking beginner reader has been found to need twice as much time to develop basic decoding skills than a beginner reader of a shallow orthography (Seymour et al 2003). This conclusion is in agreement with Bassetti (2006), who has proposed that L2 orthography affects the mental representations of L2 phonology in beginner L2 learners. An essential part of it must be spelling acquisition, which must be carefully designed and taught, so that it will no longer contribute towards generating the wrong L2 English phonology.

Predictability is also an important factor in gaining reading skills. The results of an experiment carried out by Thorstad (1991) suggest that, if the orthography is predictable and invariant, the children use a systematic, phonological strategy and learn to read and spell more quickly and accurately. The cases of this study were English and Italian chilaren, and while English children read fast and inaccurately, the Italian children read slowly and accurately using a systematic, phonological strategy until 10 years, when they read fast and accurately.

The importance of phonological awareness as a central precursor for later developing reading skills is widely accepted. Phonological awareness refers to the child's awareness of sub-lexical segments of speech sounds; the realization that words can be divided into constituent sound segments. Furthermore, the development of phoneme awareness seems to be more rapid in transparent orthographies than in English. The results from orthographies such as Italian, Turkish, Finnish, Norwegian, Greek and German, show that phonemic awareness is at maximum level relatively soon after the beginning of reading instruction (Cossu, Shankweiler, Liberman, Katz, & Tola, 1988; Durguno lu & Öney, 1999).

Finally in a study Ellis et al (2004) investigated the effects of orthographic depth on reading acquisition in alphabetic, syllabic, and logographic scripts. Children between 6 and 15 years old read aloud in transparent syllabic Japanese hiragana, alphabets of increasing orthographic depth (Albanian, Greek, English), and orthographically opaque Japanese kanji ideograms, with items being matched cross-linguistically for word frequency. This study analyzed response accuracy, latency, and error types. Accuracy correlated with depth: Hiragana was read more accurately than, in turn, Albanian, Greek, English, and kanji. The deeper the orthography, the less latency was a function of word length, the greater the proportion of errors that were no-responses, and the more the substantive errors tended to be whole-word substitutions rather than nonword mispronunciations. Orthographic depth thus affected both rate and strategy of reading.

Conclusion

The development of early reading skills in a shallow orthography seems to be completely dependent on the phonological apparatus of the beginning reader. However, it can be concluded that a shallow orthography treats even a phonologically immature reader in a

moderate manner. It helps in explicating the alphabetic principle, the correspondence between spoken and written language. Since the grapheme-phoneme correspondences are regular at the level of single letters it does not trouble the beginning reader with complicated correspondence rules; and together with a systematic phonics teaching it provides the beginning reader with a simple tool for successful word recognition, without the troubles caused by contextual effects and irregularities.

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