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Spelling and reading development: The effect of teaching children multiple levels of representation in their orthography

Victoria Devonshire*, Paul Morris, Michael Fluck

University of Portsmouth, United Kingdom

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ABSTRACT

A novel intervention was developed to teach reading and spelling literacy to 5 to 7 year-old students using explicit instruction of morphology, etymology, phonology, and form rules. We examined the effects of the intervention compared to a phonics-based condition using a cross-over design with a baseline measure. One hundred and twenty children attending an English state funded primary school were randomly allocated either to a traditional phonics condition followed by the novel intervention, or to the novel intervention followed by the phonics condition. The novel intervention significantly improved the literacy skills of the children including both word reading and spelling compared with the phonics condition. We conclude that early teaching of English literacy should include instruction in morphology, etymology and rules about form in addition to traditional phonics. We suggest that the results of the study could inform future policy on the teaching of English literacy skills.

1. Introduction

The purpose of the current study is to investigate the efficacy of two different approaches to the teaching of literacy skills (i.e. word reading, and spelling skills in English). The most frequently used method in many countries is phonics. The essence of the phonics approach is to teach letter (grapheme) sound (phoneme) matching that emphasises the phonological aspect of language. A pupil is taught to identify a sound such as the /c/ in <cat> and relate it to the letter <c>. However, the use of phonics may be less suitable for English than for other languages as English has a deep orthography (writing system) where the relationship between letters and sounds is inconsistent. However, supplementary approaches to teaching English that focus on structure and etymology have been neglected in England. One reason for the neglect may be that there are few studies that have examined the ability of appropriate age children to use non phonics based approaches to acquiring literacy skills. We investigate whether children taught to use etymological and structural aspects of language have superior literacy skills to children relying solely on phonics.

1.1. Transparency of language and literacy acquisition

The transparency of a language refers to the mapping of letters and sounds (phonology). In highly transparent languages such as Finnish, Italian and Spanish, there is an almost one-to-one mapping between letters and sounds, and such languages are said to have a shallow orthography. In contrast, English has a deep or opaque orthography since only 56% of its words can be predicted by phonological rules (Crystal, 2000). Therefore it is claimed that literacy acquisition may be easier with transparent languages because these languages only require children to learn one-to-one correspondences between spoken and written units (Wyse & Goswami, 2008). There is much evidence to support this view. Finnish children read with 90% accuracy after a very short period of formal instruction (approximately 10 weeks) whereas English children take four or five years to achieve the same level of accuracy (Goswami, 2005). Seymour, Aro, and Erskine (2003) compared reading development across 14 European languages. Their findings revealed striking differences between languages. At the end of grade one English-speaking children performed poorly (34% correct word reading). In contrast, children learning to read in transparent orthographies (Greek, Finnish, German, Italian, and Spanish), were close to ceiling performance. Furthermore, a recent study of Italian children by Desimoni, Scalisi and Orsolini (2012) also provides further evidence 'that the consistency of an orthography affects the characteristics of reading and spelling acquisition' (p12).

* Corresponding author. Department of Psychology, University of Portsmouth, King Henry 1st Street, Hampshire PO1 2DY, United Kingdom. Tel.: +441329 847676; fax: +4423 92846300.
E-mail address: Victoria@devonshire.org (V. Devonshire).

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However, differences in performance in literacy acquisition are not necessarily attributable to the nature of the language itself. There is a potential confound between the nature of the language (i.e. transparent vs. opaque languages) and the teaching of the language and other contextual factors affecting the acquisition of literacy. For example Finnish is a highly transparent language but Finland is also noted for its outstanding education system (Sahlberg, 2007). One study exists that eliminates any possible confound between the language itself and the education system. Ellis and Hooper (2001) conducted a study that compared literacy acquisition in children in Wales who attended either a Welsh speaking school (Welsh [unlike English], has a transparent orthography, which is highly consistent phonologically) or an English speaking school. The same method of literacy teaching was used in both schools. Furthermore, other possible confounding variables were carefully controlled including: demography, geography, curriculum and management of the schools. It was found that pupils in the Welsh speaking school had superior word reading compared to their counterparts in the English speaking school. The results of this study have been interpreted as providing strong evidence that the intrinsic properties of a language do have an impact on the acquisition of literacy skills.

1.2. The structure of different languages and teaching literacy

In the UK and US teaching practice reflects stage-models of literacy development (see Frith, 1985; Gentry, 2005). In broad terms stage models suggest children pass through stages in a specific sequence. These stages begin with a logographic stage (identifying marks on paper represent letters and words), followed by an alphabetic stage (mapping phonemes and graphemes as in phonics). The final stage is orthographic (incorporating morphology). Teaching literacy in the US and UK begins with phonics and much later might incorporate morphological skills.

We have argued that it is easier to acquire literacy skills in some languages than others. In transparent languages where there is a close mapping of letters and sounds an approach known as phonics would seem highly appropriate. Two different approaches (although extremely closely related) to the use of phonics have emerged. These two types of phonics instruction differ in the following way: synthetic phonics, builds words by 'synthesising' (blending) phonemes sequentially together, whereas analytic phonics takes a whole word and each phoneme is identified (analyzed) to produce the sound of that word. The consensus amongst policy makers in England is that the synthetic approach is superior 'Having considered a wide range of evidence, the review has concluded that the case for systematic phonic work is overwhelming and much strengthened by a synthetic approach' (Rose, 2006 p. 20). However, there is still a vigorous debate in the research literature about the respective merits of the two approaches to phonics (National Institute of Child Health and Human Development, 2000; Wyse & Styles, 2007).

In transparent languages phonics would seem the logical approach to teaching basic literacy skills. However, in non transparent languages, such as English, the approach may be less appropriate. It should be remembered that about 50% of the words in English are exceptions to the rules of phonics. Therefore it would be helpful to explore the structure of the English writing system to investigate other aspects of this language that may be more appropriate for learning and teaching literacy.

Written English is described as morphophonemic as it represents both morphemes (the smallest unit of meaning in a word) and phonemes. It is more regular at the level of the morpheme rather than the phoneme, however, because there are more phonemes (44) than there are letters in the alphabet (26). Consequently, combinations of letters as well as single letters are used to represent phonemes. In contrast to Italian, which has 25 phonemes and only 33 spellings to represent them, English has 1120 different spellings to represent its 44 phonemes (Paulesu et al., 2001). In addition to morphology and phonology, English spelling also retains etymological information, which often determines the spelling of a word. For example, the words *science, conscience,* and *conscious* all contain the same etymological root <sci> (from the Latin, meaning to know) which requires different pronunciations in those words. Another layer of complexity in English comes from spelling conventions related to form. For example, double letters never occur at the beginning of words but they can occur at the end or in the middle of a word. Similarly, certain letter combinations are only permissible in certain positions in a word, thus <ck> is not found at the beginning of the word and <v> is not found at the end of a word.

Given these different levels of representation and complexity, it is perhaps understandable that researchers and educators have focussed on teaching one level at a time. Initially learning about written language only at the level of the phoneme (as is current practice, DfES, 2003) may lead children, and their teachers, to construe spelling as primarily the representation of speech sounds, which it is not (Pinker, 1994; Venezky, 1970). Phonic-only instruction may make it difficult for children to generate hypotheses about written language that go beyond sound-letter mappings; instead they may treat words that do not conform to predictable phonic rules as exceptions that need to be learned in isolation.

Writing systems can be described in terms of levels of representation (or organisation), such as the word, morpheme, syllable, onset, rime, phoneme and phone. In alphabetic writing systems like English, at word level, the phoneme is the basic level of representation and the morpheme is the highest level (Byrne, 1998). However, Byrne's (1998) research indicates that English-speaking children and adults are not aware of the levels of representation in their orthography even when they are learning to read and spell. Byrne concludes therefore that it is beneficial to 'tell' learners about these levels, and that the effect should be faster and better learning; 'if we want children to know something, we would be advised to teach it explicitly' (p. 144). Byrne argues that the most important level of representation in English is the phoneme, and agreement with this view is echoed in current teaching policy and practice in the UK and US (see DfES, 2007; Strauss, 2005). He argues that children who are taught about phonic structure are better at decoding (i.e., reading, although not necessarily comprehending) words than children who have not received this type of instruction.

It is only relatively recently that intervention studies have addressed literacy in relation to morphemes. Nunes and Bryant (2006) document evidence that teaching children above the age of seven about written language at the level of the morpheme is beneficial to English spelling and reading. It is still the case that few intervention studies have examined the effects of morphemic instruction and most of those focus on children aged seven years and older. Indeed, Bowers, Kirby and Deacon's (2010) meta-analysis identified only 22 morphological intervention studies, not all of which were conducted in the English Language. They concluded that morphological instruction is beneficial to literacy learners in many languages including English. Importantly they note that there is still a dearth of intervention studies that concern morphology. Carlisle (2010, pp. 464–487) also conducted a meta-analysis of morphological intervention studies and concluded, 'I was further struck by how little has been done since the 1970s to investigate the nature and value of instruction in morphological awareness' p. 481.

English orthography is complex, but it is impossible to know, even though it may seem unlikely, whether young children are capable of learning its complexities without appropriate empirical research. Existing studies generally test the effects of specific