Reading in a Foreign Language April 2009, Volume 21, No. 1
ISSN 1539-0578 pp. 22–36

Early reading strategies in Irish and English: Evidence from error types

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Abstract

For the majority of people in Ireland, Irish is a second language acquired primarily through the schooling system. This study examined the reading strategies children used in response to English and Irish words (presented in isolation), through an analysis of their oral reading errors. Children in their 4th year of schooling attending English-medium schools, immersion schools, and Irish-medium schools in Irish-speaking (Gaeltacht) regions participated. The English-medium school children scored significantly below the other 3 groups on the Irish task; the Gaeltacht school children scored below the other 3 groups on the English task. Overall, the children made significantly more real-word errors on the English task compared with the Irish task and significantly more nonword errors on the Irish task compared with the English task. These findings suggest that children learning to read in English and Irish may adopt different strategies when faced with unfamiliar words from each language.

Keywords: reading, minority language, immersion education, Irish, orthography

This special-theme issue examines reading in languages other than English; this article considers reading of Irish by children schooled through Irish or English. Notwithstanding the name of this journal, Irish is not a foreign language for our sample. While Irish is constitutionally recognised as the first official language of the Republic of Ireland, for the majority of the population, it is a second language (L2) acquired primarily within the schooling system. Most children attend English-medium schools and are taught Irish as a compulsory school subject. However, in recent decades, the Irish-medium schooling sector has expanded rapidly, with an increase from 17 schools in 1972 to 135 schools in 2007 and with an enrolment of about 30,000 pupils. Children attending Irish-medium schools generally come from English-speaking homes (Ó Muircheartaigh & Hickey, in press). In addition to those attending Irish-medium schools within English-speaking regions, slightly less than 10,000 children attend 143 schools within designated Gaeltacht (Irish-speaking) regions (MacDonnacha, Ní Chualáin, Ní Shéaghdha, & Ní Mhainín, 2005). In both Irish-medium and Gaeltacht schools, Irish is the medium of instruction for all subjects (with the exception of English as a school subject).

Irish reading instruction varies considerably across English-medium, Irish-medium, and Gaeltacht schools. For English-medium schools, the *Revised Primary School Curriculum* (National Council for Curriculum and Assessment [NCCA], 1999) recommends that formal

reading in Irish should not commence before Second Class (i.e., the 4th year of schooling), by which point children are expected to have mastered basic English reading and have attained some oral Irish proficiency. The curriculum provides no explicit guidelines for Irish-medium or Gaeltacht schools regarding the sequencing of English and Irish formal reading instruction. Consequently, there is no consensus on best practice, and sequencing (i.e., the order in which Irish and English reading instruction occurs) differs from school to school. Some Irish-medium schools initially commence reading in Irish, others introduce English first, and a minority simultaneously commence reading in both languages. While no figures are available as to the order and timing of sequencing of formal reading in Gaeltacht schools, MacDonnacha et al. (2005) noted that most schools begin formal reading in Irish and English before the end of the 2nd year of schooling.

The Gaeltacht regions of Ireland are primarily rural regions in the west of the country that are largely Irish speaking. The highest concentration of first language (L1) Irish speakers can be found within these regions (Reagan & Osbourne, 2002). Schools operating within these regions are required to accommodate children with mixed Irish language ability (MacDonnacha et al., 2005): Children whose L1 is Irish are typically mixed with L2 learners from English-speaking homes. Furthermore, the number of children coming to school with high levels of Irish language competency in Gaeltacht regions is declining (NCCA, 2007). As a result, Irish has declined as the medium of instruction in a number of schools (Ó Murchú, 2001).

The English and Irish Orthographies

Children in the Republic of Ireland learn to read in both English and Irish at varying points in their schooling. The English orthography is complex, with numerous inconsistencies in its grapheme–phoneme correspondences and, consequently, many exception or irregular words, such as *have*, *shoe*, or *one* (Spencer & Hanley, 2003). Standardisations of Irish spelling have resulted in a relatively good correlation between writing and sound mappings (Ó Laoire, 1997), although inconsistencies remain (see Ó Laoire, 2005). Irish orthography is not as deep as that of English (Hickey, 2006, 2007); however, it is not a transparent language. The Irish alphabet consists of 18 letters: 5 vowels (a, e, i, o, u) and 13 consonants (b, c, d, f, g, h, l, m, n, p, r, s, t), representing about 50 basic sounds. Vowels are either long or short, with a stroke (síneadh) over a vowel indicating that it is long. Syllables may be open or closed. In general, stress is placed on the first syllable of the word if no long vowel or diphthong occurs in any other syllable. The Irish syllable structure permits consonant clusters in both syllable onsets and codas. A distinction is made between consonants that are slender (caol) or broad (leathan) and indicated by surrounding vowels (e.g., *bád* with a broad /d/, “boat,” and *báid* with a slender /d/, “boats”).

Irish shows some of the characteristic features of Celtic languages, including inflectional morphology. Two main types of grammar-dependent initial mutations feature prominently in the Irish orthography: lenition and eclipsis. Lenition alters the sound attributes of a consonant and in writing places an *h* after an initial consonant; for example, the /b/ sound in *bord* (meaning “table”) becomes /w/ or/v/ in bhord. Eclipsis adds a letter or letters to the start of the word and changes the initial phoneme. For example, after the possessive *my*, *bord* (table) becomes *mo bhord* (my table). With the possessive *our*, it reads *mbord*, where *mb* is pronounced /m/ in *ár*

mbord (our table). In Irish, while such changes modify the original phoneme, the eclipsed letter is retained in the spelling. Morphological transparency is thereby evident, but phonological transparency is lacking in such forms. The *mb* in *mbord* is pronounced /m/, with no remaining /b/ sound. Other Celtic languages (e.g., Welsh) overwrite the spelling, maintaining phonological transparency.

Examining Children's Reading Strategies

The word-reading strategies children adopt when reading different orthographies have been the focus of much recent research. One way in which children's early reading strategies have been investigated is through the analysis of oral reading errors. The types of errors children make when encountering an unfamiliar word can be informative regarding the word recognition strategies adopted. For instance, reading errors that are phonologically similar to the target word suggest that a grapheme–phoneme assembly strategy is used. That is, when grapheme–phoneme assembly goes wrong, the probable result is a nonword (Ellis & Hooper, 2001). If children are using a phonological recoding strategy, they are also more likely to attempt to read a word (Hoxhallari, van Daal, & Ellis, 2004). Pronunciations that are phonologically dissimilar from the target suggest the use of non-phonological strategies. According to Ellis and Hooper, when lexical retrieval is erroneous or when partial phonetic cueing is used, the error type is likely to be a word.

A number of studies have found that orthographies that differ in terms of their regularity elicit different patterns of errors. Wimmer and Hummer (1990) demonstrated that children reading German, a regular orthography, tended to make nonword reading errors; children reading English, a more irregular orthography, tend to make whole-word errors (Seymour & Elder, 1986; Stuart & Coltheart, 1988). In a cross-language study, Ellis and Hooper (2001) examined the error types made by young readers of the orthographically regular Welsh language and the more irregular English on frequency-matched tests in the two languages. Children were presented with single words in order of decreasing frequency, and the errors made were categorised as *nonwords*, *real-word substitutions*, or *failures to read*. The Welsh readers tended to produce more nonword errors, while the English readers produced more real-word errors and omissions (i.e., failures to read or non-attempts). On the basis of their findings, Ellis and Hooper suggested that the regularity of an orthography can influence the type of reading strategy adopted. The Welsh readers were more reliant on a grapheme–phoneme conversion strategy than the English readers. The English readers, in contrast, relied to a greater extent on lexical retrieval through partial visual analysis of the target words.

Hoxhallari et al. (2004) compared the reading performance of beginner readers of Albanian with the Welsh and English readers from Ellis and Hooper's (2001) study. The Albanian orthography is fully consistent for both grapheme–phoneme and phoneme–grapheme mappings, and thus is even more regular than Welsh. Like the Welsh readers, nonword reading errors predominated all error types for the Albanian readers. In addition, the Albanian group produced fewer failure-to-read errors than either the English or Welsh readers. Again, Hoxhallari et al. implicated the role of the orthographic transparency of Albanian: The highly consistent orthography invites a grapheme–phoneme assembly strategy, and children tend to attempt more items.

Spencer and Hanley (2003) examined the reading performance of children in Wales learning to read in Welsh with that of children learning to read in English in their 1st year of schooling and again 1 year later. At both time points, the Welsh readers made significantly more phonologically based nonword errors, whereas real-word errors were more common for the English readers. Similarly, Spencer and Hanley conducted an analysis of the error types made by Welsh and English readers at three stages in their 1st year of formal reading instruction. Relative to the Welsh readers, the English readers made a large number of failure-to-read errors. Across the 2nd and 3rd time points, the English readers made significantly more real-word errors than the Welsh readers, who tended to produce nonword errors. Spencer and Hanley suggested that the disparity in error types for the two groups indicates different approaches to reading unfamiliar words.

Children Learning to Read in Two Languages

Considering the reading strategies children adopt is further complicated when children are learning to read in more than one language. In addition to the depth of the orthographies, an influential factor is a child's proficiency in the languages. Geva and Siegel (2000) examined the reading development of L1 English speakers learning to read concurrently in their L1, English, and their L2, Hebrew. Children from Grades 1 to 5 were tested on measures of word recognition in the two languages. Even though Hebrew was their L2, the children demonstrated more accurate word recognition in that language than in their L1, English. Orthography-specific patterns of error were found. The children made significantly more real-word errors when reading the English test items than when reading the Hebrew items, particularly at the younger grades. The analysis of error categories for Hebrew word recognition indicated that the children engaged in a linear left-to-right phonological decoding strategy. Geva and Siegel suggested that the children were more likely to make real-word errors in English than Hebrew because it was their L1. Geva and Siegel proposed that when an orthography is highly consistent, children may develop their word-reading skills, even without adequate linguistic competence. They argue that for a very regular L2, basic reading skills may be less contingent on language proficiency than for a more irregular orthography.

To date, no systematic quantitative analysis of error patterns exhibited by children reading Irish has been reported. Hickey (2005, 2007) provided some examples of the errors typically made by children from English-medium schools in their 4th year of schooling commencing Irish reading. The children in the lower half of the ability range were unsure of some of the most regular grapheme–phoneme correspondences, such as the long vowel sound, and consequently, encountered difficulty with some of the most frequent Irish words. The word *sí* (she) was commonly read as *sé* /s'e:/ (he), and *í* (her) was commonly decoded as /e:/. Other typical errors included reading *tharraing* (pulled) in place of *tháining* (came), the nonword *trasid* for *tsráid* (street) and the English word *fetch* for *féach* (look). The latter error type reflects the influence of the children's L1, English, on Irish reading. Hickey (2007) suggested that the children were engaging in only partial analysis of the Irish words and were over-reliant on initial or salient letters.

The present study was designed to investigate the reading strategies children use when reading in the Irish and English languages, through an analysis of their oral reading errors. Children attending different school types in Ireland engage in different amounts of Irish reading. To reflect the diversity of experience, a number of school types within one region of Ireland were included: Irish-medium, Gaeltacht, and English-medium schools. Two Irish-medium schools were included: one that commenced formal reading in Irish, and another that began with formal reading in English. Children from the participating Gaeltacht school were primarily from Irish-speaking backgrounds. Children from the other three types of schools began to acquire Irish, their L2, only once they started to attend school. All of the children were in their 4th year of schooling (Second Class within the Irish system) and had commenced formal reading in both languages. The selected groups provide a comparison of English-speaking pupils who have recently commenced Irish reading with bilingual or Irish-language proficient children who have experienced Irish reading in the previous 2 years of schooling. Error types are predicted to vary as a function of language, with the English language likely to be associated with more real-word errors, and the Irish language associated with more nonword errors. Error types are also predicted to vary as a function of reading skill. More proficient readers of Irish are expected to make more nonword errors than other error types compared with less skilled Irish readers.

Method

Participants

The participants were drawn from four schools in County Galway. The region has the highest number of primary school children attending Gaeltacht schools in Ireland (MacDonnacha et al., 2005) and has a number of demographically comparable Irish-medium and English-medium schools outside of the Gaeltacht regions. Galway is home to the strongest Irish-language area in Ireland, with 22,377 Irish speakers in the Galway county Gaeltacht alone (76.8% of the total population of the area) and a further 6,878 Irish speakers in the other Galway regions (Central Statistics Office, 2007). The majority of the Irish speakers within the Galway county Gaeltacht report daily use of the language (66.4%). Consequently, many children attending the Gaeltacht-based schools in Galway experience good levels of Irish language support at home. This region was therefore selected to examine reading performance across Irish-medium, Gaeltacht, and English-medium schools.

The principals of 28 schools within the selected region were contacted, and 17 replied indicating their willingness to participate in the study. From these 17 schools, 4 schools (2 Irish medium, 1 English medium, and 1 Gaeltacht) were selected for participation in this study, based on their reading instruction practices and similarity in classroom size, sex ratio, and socio-economic status. Two Irish-medium schools were selected: One began reading instruction in English (English reading first, ERF), and another commenced reading instruction in Irish (Irish reading first, IRF). Children in the ERF school were introduced to reading in English in Senior Infants (2nd year of schooling) and Irish reading in the initial months of First Class (3rd year of schooling). The policy of the IRF school was to introduce reading in Irish between the end of Junior Infants (the 1st year of schooling) and the start of Senior Infants. The children were introduced to English reading towards the end of Senior Infants. The policy of the Gaeltacht

school was to commence Irish reading between the end of Junior Infants and Senior Infants. Children began reading in English between the end of Senior Infants and the initial months of First Class. In the English-medium school, children were formally introduced to reading in English in Senior Infants. Reading instruction in Irish commenced in Second Class, consistent with the *Revised Primary School Curriculum* (NCCA, 1999). The sequencing of the reading instruction across the school samples are summarised in Table 1. Across the four schools, parental consent was received for 90 children to participate, 8 of whom did not participate due to behavioral, academic, linguistic, or practical issues. The participants were 82 Second Class pupils, 43 boys and 39 girls (18 in the ERF school, 21 in the IRF school, 18 in the Gaeltacht school, and 25 in the English-medium school). The ages of the participants were between 7 and 9 years (M = 7.8 years, SD = 0.42).

Table 1. *Sequencing of reading instruction across the school samples*

School	English reading	Irish reading
Irish-medium—English reading first	Senior Infants (2nd year of schooling)	Early First Class (3rd year of schooling)
Irish-medium—Irish reading first	End of Senior Infants	End of Junior Infants/Early Senior Infants
Gaeltacht	End of Senior Infants/Early First Class	End of Junior Infants/Early Senior Infants
English-medium	Senior Infants	Second Class

The majority of children attending the participating Gaeltacht school reported using the Irish language at home. Only 3 came from English-dominant homes. Of the 18 children, 10 reported speaking "more Irish than English" at home, 3 children reported sole use of Irish in the home, and 2 children used Irish and English equally within the home. Of the 3 English-dominant children, 1 spoke only English at home, and 2 spoke "more English than Irish." As is the case in the majority of Gaeltacht schools (see MacDonnacha et al., 2005), a number of children had arrived at the school with very little English, others had varying levels of Irish and English ability, and some children had no Irish at all. All of the children attending the Irish-medium and English-medium schools came from English-speaking homes.

For Irish reading, a mixture of the available Irish textbooks was used, with instruction emphasizing both reading aloud and independent reading. The teachers at the Irish- and English-medium schools reported following a mixed method of instruction (phonics and whole-word strategies) for English reading. Similar textbooks were used in all schools for English reading.

In summary, the four participating schools were all within one county in Ireland, were administered by the same local educational authorities, followed similar curricula, and used similar teaching methods.

Word Reading Tests

Task equivalence is a recurrent methodological issue in bilingual research (Geva & Wade-

Woolley, 2004; Koda, 1994). In a series of studies of reading acquisition in Wales, Hanley and colleagues (e.g., Hanley, Masterson, Spencer, & Evans, 2004; Spencer & Hanley, 2003, 2004) used translational equivalents for their English and Welsh word sets to ensure that words from the two sets were of comparable familiarity. A similar approach was undertaken here. English and Irish single word reading tasks were used that each included 50 words, presented singly in large black font in lower case on a computer screen. The English words were between 2 and 11 letters long, with word frequencies of between 2 and 36,411 occurrences per million, with a mean rating of 1,323 occurrences per million (*SD* = 5,256.54) using the Kucera-Francis (1967) written frequency ratings. The English words were taken from a number of studies of emergent literacy (e.g., Hanley et al., 2004; Masterson, Laxon, & Stuart, 1992; Patel, Snowling, & DeJong, 2004; Seymour, Aro, & Erskine, 2003; Spencer & Hanley, 2004) and additional (more difficult) items were selected using the Kucera-Francis ratings for written frequency. Because it was considered important that the English and Irish words were of similar familiarity, the words in the Irish set were translations of the English words. This method of matching items across languages has been used in a number of recent studies in the Welsh–English context (e.g., Hanley et al., 2004; Spencer & Hanley, 2003, 2004). In the absence of established measures of frequency and age of acquisition for Irish words, translational equivalents were considered the most appropriate method for matching the English and Irish word sets in terms of familiarity. The English and Irish word lists were also matched as much as was feasible for word length, number of syllables, and number of phonemes. All of the English and Irish words were between 2 and 11 letters in length. There was no significant difference between the number of letters in the words in the English (*M* = 4.88, *SD* = 2.01) and Irish sets (*M* = 4.86, *SD* = 2.07), $t(49) = 0.17$, $p = .87$. The number of phonemes in the English word set ranged from two to eight, and in the Irish set, from one to eight. Again, there were no significant differences in the number of phonemes in the English set (*M* = 3.76, *SD* = 1.56) and the number of phonemes in the Irish set (*M* = 3.78, *SD* = 1.45), $t(49) = 0.14$, $p = .89$. The English word set included 33 monosyllabic, 14 disyllabic, 2 trisyllabic, and 1 quadrasyllabic word. The Irish word list contained 33 monosyllabic, 14 disyllabic, and 3 trisyllabic words. No significant difference was found between the number of syllables in the English (*M* = 1.42, *SD* = 6.7) and Irish word sets (*M* = 1.4, *SD* = 6.1), $t(49) = 0.44$, $p = .66$. The participants were required to read up to 50 words in each language. The order of the words on the Irish list was the same as the order of their translations on the English list. The words were placed in order of increasing difficulty to ensure that the youngest children were reasonably familiar with the initial words on the list.

Procedure

All of the children were tested in the language of their school, and each child was tested individually at the back of the classroom. The order of the administration of the English and Irish tasks was counterbalanced across participants. The word reading tasks were discontinued if a child consecutively gave five incorrect responses. Self-corrections were marked as correct responses. The children were encouraged to attempt to answer even if they were unsure and were praised periodically. They were given a short break between the two language tests. The maximum obtainable score for the word reading tasks was 50 for each language.

Scoring

The errors made by the children were recorded for both the English and Irish tasks and were sorted using categories consistent with a number of previous studies (Ellis & Hooper, 2001; Spencer & Hanley, 2003, 2004; Hoxhallari et al., 2004). The error categories were (a) null response or failure-to-read, (b) whole-word substitutions, (c) attempts that resulted in nonword responses, (d) Irish items read as English words, and (e) English items read as Irish words.

A real-word reading error was made when the child said a real word in the target language instead of the target word. Real-word substitutions in the Irish language included reading *glac* (accept) as *glas* (green) or *seanathair* (grandfather) as *sneachta* (snow). The real-word substitutions in the English language included reading *bull* as *ball* or *spear* as *spare*. A nonword reading error was made when a child said a nonword instead of the target word. Irish nonword substitutions included responding with [sil] for *síl* or [tarb] for *tarbh*. For the English tasks, nonword substitution responses included responding with [hig] for *high* or [hom] for *home*. Examples of Irish items read as English included reading *cé* as *see* or *cuid* as *could*. The failure-to-read category included failed attempts to blend (giving just letter sounds), non-responses, and simply naming letters.

Results

The children from the four school groups made 604 errors in total on the English word reading task and 1,477 errors on the Irish word reading task (see Table 2). Figure 1 summarises the reading accuracy of the children from the four school types on the Irish and English tasks. There was a significant interaction between the school type attended and the language of the test, $F(3, 78) = 41.83$, $p < .01$. The main effect of school type, $F(3, 78) = 6$, $p < .01$, and the main effect of the language of the test, $F(1, 78) = 211.24$, $p < .01$, were also significant.

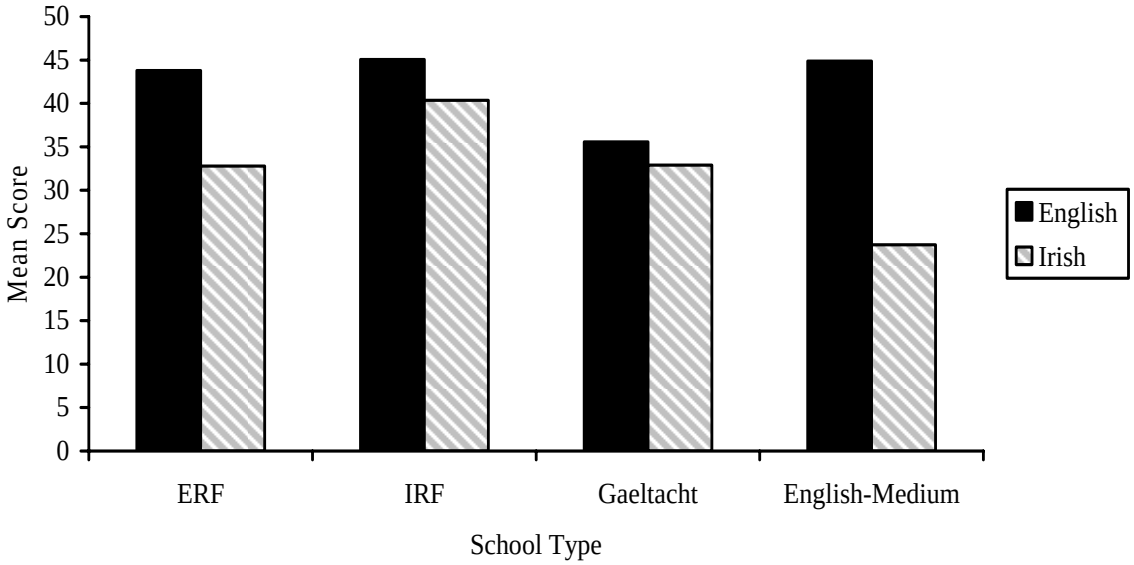

Figure 1. The mean number of words read correctly by school type and language.

Follow-up comparisons using post-hoc Tukey tests indicated that for the English word reading

task, the accuracy scores of the children in the Gaeltacht sample were significantly lower than those of the children in the other three groups ($p < .01$). There were no other significant differences between the groups. For the Irish word reading task, the post-hoc tests differentiated the English-medium sample from the remaining three school groups ($p < .01$). Again, the remaining three groups performed similarly.

The error types made by children in each school group for the English and Irish tasks are presented in Table 2. Overall, real-word errors predominated in response to the English word targets (31.8%), while nonword errors were less common (24.5%). The opposite pattern was evident for the Irish task: Nonword errors were more frequent (25%) than real-word errors (8.3%). The number of failure-to-read errors was high for both the English task (43.7%) and the Irish task (55%).

Table 2. *The types of errors made by each school group for the English and Irish tasks*

English task

School group	Real-word		Nonword		Failure to respond		Total
	n	%	*n*	%	*n*	%	
ERF (*N* = 18)	29	25.89	12	10.71	71	63.39	112
IRF (*N* = 21)	41	39.42	32	30.77	31	29.80	104
Gaeltacht (*N* = 18)	73	28.85	55	21.15	132	50.77	260
English-medium (*N* = 25)	49	38.28	49	38.28	30	23.44	128
Mean (*N* = 82)	192	31.78	148	24.50	264	43.71	604

Irish task

School group	Irish real-word		Nonword		Failure to respond		English real-word		Total
	n	%	*n*	%	*n*	%	*n*	%	
ERF (*N* = 18)	15	4.80	53	17.09	224	72.26	18	5.80	310
IRF (*N* = 21)	18	8.91	75	37.13	77	38.12	32	15.84	202
Gaeltacht (*N* = 18)	38	12.34	61	19.81	172	55.84	37	12.01	308
English-medium (*N* = 25)	52	7.91	180	27.39	339	51.59	86	13.09	657
Mean (*N* = 82)	123	8.33	369	24.98	812	54.98	173	11.71	1,477

Note. ERF = English reading first; IRF = Irish reading first.

A three-way mixed ANOVA was performed to examine the relationships among school type, language of test, and error type. The focus of the first analysis was on the three error types common to the two language sets (nonword reading errors, real-word reading errors in the correct language, and failure-to-read errors). A second analysis was then conducted including the English word substitution errors, reported below. The dependent variable in each analysis was the number of occurrences of each error type. There was a significant School Type × Language × Error Type interaction, $F(6, 154) = 6.27$, $p < .01$. The performance of the specific school groups for each language is summarised in Table 2. For the English word reading task, the ERF-schooled children made significantly more real-word errors ($M = 1.61$, $SD = 1.24$) than nonword

errors (M = 0.67, SD = 0.77), $t(17) = 4.99$, $p < .01$. Conversely, for the Irish task, the same children made significantly more nonword errors (M = 2.94, SD = 1.83) than real-word errors (M = 0.83, SD = 0.51), $t(17) = 5.58$, $p < .01$. For the IRF school group, the difference between the number of nonword and real-word errors made on the English word reading task did not reach significance, $t(20) = 1.12$, $p = .27$. For the Irish task, the IRF-schooled children generally made more nonword reading errors (M = 3.57, SD = 2.5) than real-word reading errors (M = 0.86, SD = 1.35), $t(20) = 4.26$, $p < .01$. The error patterns for the Gaeltacht school group followed the same general trend as the other school groups: Real-word errors were more common than nonword errors on the English test, whereas nonword errors were more frequent than real-word errors for the Irish test. However, these differences in error types did not reach significance for the English task, $t(17) = 1.62$, $p = .12$, or the Irish task, $t(17) = 1.89$, $p = .07$, for this group. Children from the English-medium school group made significantly more nonword substitutions (M = 7.88, SD = 2.18) than real-word substitutions (M = 2.08, SD = 1.71) on the Irish task, $t(24) = 8.64$, $p < .01$. There was no significant difference between the number of real-word errors and nonword errors this group made on the English task, $t(24) = 0.64$, $p = .49$. The interaction between school group and error type across the two languages is shown in Figure 2.

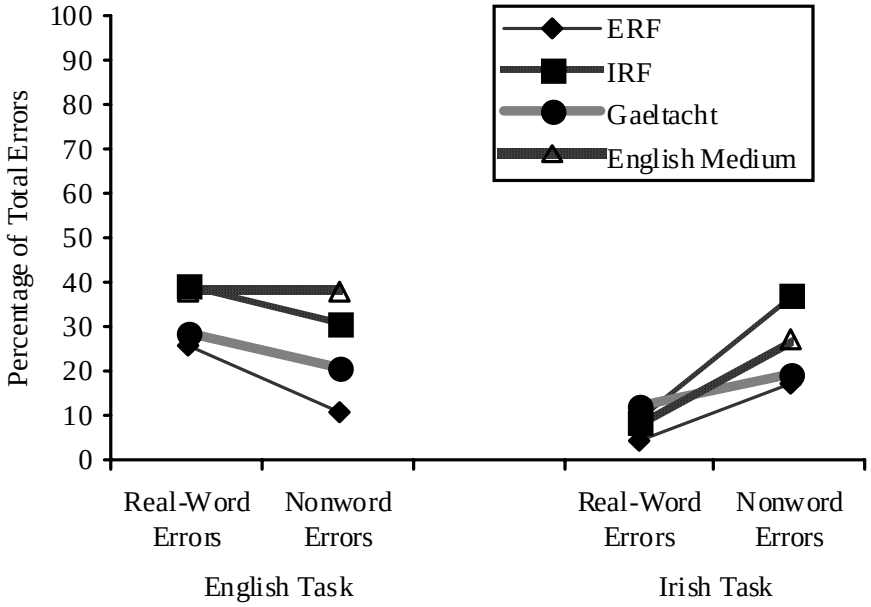

Figure 2. Mean percentage of real-word and nonword errors for the Irish and English tasks across the four school groups.

The interaction between the language of the test and error type was significant, $F(6, 154) = 7.45$, $p < .01$. Overall, the children made more real-word errors than nonword errors on the English task, but more nonword errors than real-word errors on the Irish task. There was a significant interaction between school type and test language, $F(3, 78) = 40.57$, $p < .01$. The children taught through Irish made fewer errors on the Irish task on average than the English-medium schooled children. There was a significant interaction between error type and school type, $F(6, 154) = 7.45$, $p < .01$. Overall, the children from the English-medium school made more failure-to-read errors than the other school groups. The main effects of test language, $F(1, 78) = 156.03$, $p < .01$, error type, $F(2, 77) = 78.41$, $p < .01$, and school type, $F(3, 78) = 5.65$, $p < .01$, were all significant.

In the Irish task, the children made a number of English real-word substitutions. These errors were grouped with the Irish whole-word reading errors to form a *total-word errors* category. A three-way ANOVA was conducted to examine the relationships between school type attended, language of the test, and error type. The Language × Error Type interaction, $F(2, 77) = 36.3$, $p < .01$, the Language × Error Type × School Group interaction, $F(2, 77) = 36.3$, $p < .01$, the Error Type × School interaction, $F(6, 156) = 4.16$, $p < .01$, and the Language × School Type interaction, $F(3, 78) = 37.22$, $p < .01$, were all significant. In addition, the main effect of language, $F(1, 78) = 166.34$, $p < .01$, and the main effect of error type, $F(2, 77) = 39.24$, $p < .01$, were significant. Overall, the children made more nonword errors than total-word errors on the Irish task, while children made more real-word errors than nonword errors on the English task.

Error Types in Irish Reading by Quartile Group

The individual variation in Irish word reading accuracy scores was considerable, even within each class group. To disentangle the effect of reading proficiency from that of the orthography of the Irish language, the sample was divided into four quartile groups based on their accuracy scores on the Irish reading task. Group 4 was the top 25% (best readers); Group 3, the second 25%; Group 2, the third 25%; and Group 1, the fourth 25% (worst readers). Table 3 summarises the error types and accuracy scores of each quartile group.

Table 3. *Error types and accuracy scores (out of 50) for each quartile group for the Irish task*

Group	Mean accuracy score	Nonword errors	Failure-to-read errors	Real-word errors	English substitution errors
1	17.24 (4.99)	5.76 (2.68)	20.67 (6.38)	2.90 (1.79)	3.43 (1.63)
2	27.50 (3.35)	5.35 (3.07)	12.70 (4.16)	1.50 (1.43)	2.95 (2.14)
3	38.00 (2.22)	4.75 (2.31)	4.80 (2.63)	0.95 (0.89)	1.50 (1.43)
4	45.29 (2.92)	2.19 (1.60)	1.33 (1.35)	0.62 (0.87)	0.57 (0.60)

Note. Standard deviations are in parentheses.

A mixed ANOVA was conducted to examine the relationships between the error types on the Irish task and the quartile groups. There was a significant interaction between quartile group and error type, $F(9, 185) = 15.74$, $p < .01$. The main effect of error type, $F(3, 76) = 145.24$, $p < .01$, and the main effect of quartile group, $F(3, 78) = 250.85$, $p < .01$, were both significant. Group 4, the most proficient readers, scored above 84% on the Irish reading task. Contrasts indicated that the children in this group made more nonword reading errors than real-word errors, $F(1, 20) = 16.93$, $p < .01$, or English word substitutions, $F(1, 20) = 22.49$, $p < .01$, or failures to read, $F(1, 20) = 4.93$, $p < .05$. When both English substitutions and Irish real-word errors are grouped together to form a total-real-word error category, nonword errors still predominate for this group. Contrasts again confirmed that the children made more nonword errors than total-real-word errors, $F(1, 20) = 20.36$, $p < .01$, or failure-to-read errors, $F(1, 20) = 4.93$, $p < .05$.

The children in the lowest quartile group scored between 18 and 46% on the Irish task. The children in this group made significantly more nonword reading errors than real-word reading errors, $F(1, 20) = 14.49$, $p < .01$, or English word substitutions, $F(1, 20) = 19.6$, $p < .01$, and significantly more failure-to-read errors than nonword errors, $F(1, 20) = 71.78$, $p < .01$. When

the English word substitutions and Irish real-word errors are grouped together, there is no significant difference between the number of real-word errors and nonword errors, $F(1, 20) = 0.37$, $p = .55$. The children made significantly more failure-to-read errors than nonword errors, $F(1, 20) = 71.78$, $p < .01$.

The Gaeltacht Children: Controlling for Home Language Variability

Three of the children from the Gaeltacht sample were from English-dominant homes. When these children were excluded from the analyses, the mean scores of this group were similar on the Irish task ($M = 62.23$, $SD = 21.44$, for the 15 children, compared to $M = 68.4$, $SD = 24.33$, for the 18 children) and the English task ($M = 68.4$, $SD = 24.33$, for the 15 children, compared to $M = 71.2$, $SD = 23$, for the 18 children. The pattern of error types was the same for the English and Irish tasks as previously reported. The children made similar numbers of real-word errors and nonword errors on the English task, $t(14) = 2.13$, $p = .06$, and similar numbers of real-word and nonword errors on the Irish task, $t(14) = 1.28$, $p = .22$, as did the full Gaeltacht group.

Discussion

Generally, real-word errors were more common than nonword errors in response to the English targets, consistent with previous studies (e.g., Ellis & Hooper, 2001; Spencer & Hanley, 2003, 2004). For the Irish items, conversely, nonword errors were more frequent than real-word errors. This pattern remained when both English substitutions and Irish real-word errors were grouped to form a *whole-word error* category. The trend towards nonword errors found for the Irish task is comparable to that found for young readers of Hebrew (Geva & Siegel, 2000), Welsh (e.g., Ellis & Hooper, 2001; Spencer & Hanley, 2003, 2004) and German (Wimmer & Hummer, 1990). The incidence of failure-to-respond errors was high for both languages across all school groups, however, and the overall higher error rate for Irish words must also be considered.

Children from all four school groups made a number of English word substitutions in response to the Irish items, reflecting interference from the English language. While the poorest readers demonstrated the highest proportion of English word substitution errors, the best readers also experienced some interference from English. This type of intrusion from the English language in Irish reading is consistent with the error patterns described by Hickey (2007). No cross-language errors were made in response to the English items. This finding may be related to the status of the English language relative to the Irish language within the Republic of Ireland: English is far more dominant. For children from English-speaking homes, exposure to Irish text is largely limited to within the classroom. Even for those children from Gaeltacht homes, levels of Irish literacy-related activities can be low. For instance, Hickey (1997) found that Gaeltacht parents of preschoolers did not frequently read children's books aloud to their children and engaged in low levels of Irish reading in general. Further to this, Denvir (2003) suggested that Gaeltacht children, when given a choice, will read in English, a finding that may be related to the dearth of appropriate Irish reading materials. Children from all language backgrounds generally engage in more English reading than Irish reading, and this may be reflected by the unidirectional cross-language interference found here.

All groups in the current study made fewer real-word errors on the Irish task than on the English task. Geva and Siegel (2000), in their study of bilingual readers, suggested that the children may have been more inclined to make real-word errors on the English task because English was their L1. Similarly, for three of our participating school groups, Irish is an L2. Children from the Irish-medium and English-medium schools may have been more likely to make real-word errors on the English test because it was their L1. These children have a smaller vocabulary in Irish than English and consequently, have fewer words available to them for lexical retrieval strategies in that language. The children generally performed more poorly on the Irish task than the English task. While there were no significant differences between the mean Irish word reading scores of the children attending the Irish-medium schools and those attending the Gaeltacht school, word reading proficiency varied considerably within each school group. To disentangle the effects of the orthography from those of reading proficiency, the error types of the best and worst readers were examined. The best Irish readers (top 25%) in the current sample tended to make more nonword reading errors than all other error types. Therefore, the most successful readers appear to use a phonological decoding strategy to read unfamiliar Irish items. The more regular orthography of Irish may support the successful sounding out of items. The poorest readers, on the other hand, produced a similar number of real-word and nonword errors.

While the Gaeltacht school children made nonword errors more frequently than real-word errors on the Irish task, this difference was not statistically significant. The children in this group may have used both whole-word reading and grapheme–phoneme assembly strategies for Irish word recognition. The children in this group were all living within an Irish-speaking community, and all but one reported home use of the language (and only three children came from English-dominant backgrounds). This group might have had a better Irish vocabulary than those children attending the Irish-medium schools. However, previous studies have reported low levels of literacy-oriented activities and typically low levels of Irish reading in Gaeltacht homes (see Hickey, 1997). Despite their oral language proficiency, the children in this group may have had less written Irish language experience, which may explain, to some extent, the mixed strategies that they appear to have used.

In conclusion, the findings suggest that children learning to read in English and Irish may adopt different reading strategies when faced with unfamiliar words from each language. Irish word reading skill varied substantially, resulting in differences in the quantities of error types across individual learners. While the best readers made few errors of any type, those that they did make were primarily nonword errors. Based on the data from single word reading, the conclusion drawn is that the best decoders of Irish use a phonological decoding strategy (which generates nonword pronunciation errors). These “successful” readers have acquired the grapheme–phoneme correspondences of Irish more readily than other readers, and their errors (when they occur) suggest a phonological recoding strategy. Whether instructional practices that promote using such a strategy would benefit beginning readers of Irish remains to be seen.

Acknowledgments

This paper is based on PhD research conducted by the first author and supervised by the second author. The research was supported by funding from An Chomhairle um Oideachas Gaeltachta &

Gaelscolaíochta (COGG), the Irish Research Council for the Humanities and Social Sciences, and a John and Pat Hume Scholarship from the National University of Ireland, Maynooth. The authors gratefully acknowledge this support and thank the school principals, parents, and children involved in this study. The views expressed are the authors' own and do not necessarily reflect those of COGG.

References

Central Statistics Office. (2007). *Census 2006: Principal demographic results*. Dublin, Ireland: Stationery Office.

Denvir, M. (2003). Fadhbanna Oideachais na Gaeltachta agus Cursaí Léitheoireachta do Dhéagóirí [Difficulties with Gaeltacht education and reading matters for teenagers]. In R. Ní Mhianáin (Ed.), *Idir Lúibíní: Aistí ar an Litearthacht agus ar an Léitheoireacht* [In parentheses: Essays on literacy and reading]. Baile Átha Cliath, Ireland: Cois Life.

Ellis, N. C., & Hooper, A. M. (2001). Why learning to read is easier in Welsh than in English: Orthographic transparency effects evinced with frequency-matched tests. *Applied Psycholinguistics*, *22*, 571–599.

Geva, E., & Siegel, L. S. (2000). Orthographic and cognitive factors in the concurrent development of basic reading skills in two languages. *Reading and Writing: An Interdisciplinary Journal*, *12*, 1–30.

Geva, E., & Wade-Woolley, L. (2004). Issues in the assessment of reading disability in second language children. In I. Smythe, J. Everatt, & R. Salter (Eds.), *The international book of dyslexia* (pp. 195–206). Chichester, England: John Wiley & Sons.

Hanley, J. R., Masterson, J., Spencer, L. H., & Evans, D. (2004). How long do the advantages of learning to read a transparent orthography last? An investigation of the reading skills and reading impairment of Welsh children at 10 years of age. *The Quarterly Journal of Experimental Psychology*, *57*, 1393–1410.

Hickey, T. (1997). *Early immersion education in Ireland: Na Naíonraí.* Dublin, Ireland: Institiúid Teangeolaíochta Éireann.

Hickey, T. (2005). Second language writing systems: Minority languages and reluctant readers. In V. Cook & B. Bassetti (Eds.), *Second language writing systems* (pp. 398–421). Clevedon, England: Multilingual Matters.

Hickey, T. (2006). The emergent reader of Irish: Promoting real recognition of the most useful words. In T. M. Hickey (Ed.), *Literacy and language learning: Reading in a first or second language* (pp. 23–40). Dublin, Ireland: Reading Association of Ireland.

Hickey, T. (2007). Fluency in reading Irish as L1 or L2: Promoting high-frequency word recognition in emergent readers. *International Journal of Bilingual Education and Bilingualism*, *10*, 471–493.

Hoxhallari, L., van Daal, V. H. P., & Ellis, N. C. (2004). Learning to read words in Albanian: A skill easily acquired. *Scientific Studies of Reading*, *8*, 153–166.

Koda, K. (1994). Second language reading research: Problems and possibilities. *Applied Psycholinguistics*, *15*, 1–28.

Kucera, H., & Francis, W. N. (1967). *Computational analysis of present-day American English.* Providence, RI: Brown University Press.

MacDonnacha, D., Ní Chualáin, F., Ní Shéaghdha, A., & Ní Mhainín, T. (2005). *Staid reatha na*

scoileanna Gaeltachta/A study of Gaeltacht schools 2004. Dublin, Ireland: COGG.
Masterson, J., Laxon, V., & Stuart, M. (1992). Beginning reading with phonology. *British Journal of Psychology*, *83*, 1–12.
National Council for Curriculum and Assessment (1999). *Revised primary school curriculum.* Dublin, Ireland: Government Publications.
National Council for Curriculum and Assessment (2007). *Language and literacy in Irish medium schools: Supporting school policy & practice*. Dublin, Ireland: Government Publications.
Ó Laoire, M. (1997). The standardization of Irish spelling: An overview. *Journal of the Simplified Spelling Society*, *22*, 19–23.
Ó Laoire, M. (2005). The language planning situation in Ireland. *Current Issues in Language Planning*, *6*, 251–314.
Ó Murchú, H. (2001). *Irish: The Irish language in education in the Republic of Ireland*. Ljouwert/Leeuwarden, The Netherlands: Regional Dossier Mercator Education.
Ó Muircheartaigh, J., & Hickey, T. M. (in press). Academic achievement, anxiety, and attitudes in early and late immersion in Ireland. *International Journal of Bilingual Education and Bilingualism.*
Patel, T., Snowling, M. J., & DeJong, P. (2004). Learning to read in Dutch and English: A cross-linguistic comparison. *Journal of Research in Reading*, *27*, 141–151.
Reagan, T., & Osborn, T. (2002). *The foreign language educator in society: Toward a critical pedagogy*. Mahwah, NJ: Lawrence Erlbaum Associates.
Seymour, P. H. K., & Elder, L. (1986). Beginning reading without phonology. *Cognitive Neuropsychology*, *3*, 1–36.
Seymour, P. H. K., Aro, M., & Erskine, J. M. (2003). Foundation literacy acquisition in European orthographies. *British Journal of Psychology*, *94*, 143–174.
Spencer, L. H., & Hanley, J. R. (2003). The effects of orthographic consistency on reading development and phonological awareness: Evidence from children learning to read in Wales. *British Journal of Psychology*, *94*, 1–28.
Spencer, L. H., & Hanley, J. R. (2004). Learning a transparent orthography at five years old: Reading development of children during their first year of formal reading instruction in Wales. *Journal of Research in Reading*, *27*(1), 1–14.
Stuart, M., & Coltheart, M. (1988). Does reading develop in a sequence of stages? *Cognition*, *30*, 139–181.
Wimmer, H., & Hummer, P. (1990). How German speaking first graders read and spell: Doubts on the importance of the logographic stage. *Applied Psycholinguistics*, *11*, 349–368.

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