

# The effect of orthography on the acquisition of literacy skills

G. Thorstad\*

*The Tavistock Clinic, Child and Family Department, Tavistock Centre, 120 Belsize Lane, London NW3 SBA, UK*

The effect of the regularity of orthography on the acquisition of literacy skills was studied by comparing the reading and spelling of 70 Italian children aged 6-11 years with that of 90 English children learning traditional orthography (t.o.) and 33 children aged 6-7 years learning the initial teaching alphabet (i.t.a.), using an Italian passage for adults which was also translated into English. The Italian children learned to read at an earlier age than the English t.o. children, but not than the English i.t.a. children. The English t.o. and i.t.a. children could read more words than they could spell, whereas the Italian children could spell most of the words they could read and even some they could not read.

The English children read fast and inaccurately, whereas the Italian children read slowly and accurately using a systematic, phonological strategy until 10 years, when they read fast and accurately. All the children used a phonological strategy in spelling, but only the Italians were mostly successful. Thus the results 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.

Learning is an interaction between the learner and what is being learned. Considerable attention is now being given to the possible psychological processes involved in learning literacy skills in adults and children, with and without learning difficulties (Frith, 1980; Snowling, 1987). However, little attention is being given to what is being learned and the effect it might have on the speed and efficiency of learning. Italian children are said to be able to read and spell most words one year after beginning school at the age of six years, yet English children take 10 years to achieve an adult standard (Schonell & Schonell, 1950; Vernon, 1969, 1977) and at least 15 per cent leave school semi-literate (Adult Literacy and Basic Skills Unit, 1990; Reid, 1972; Schonell, 1942). As there is no reason to think that children themselves differ in their ability to learn, it is worth considering if the difference is due to the difference in the regularity of the orthography.

Italian has a high degree of correspondence between grapheme and phoneme, which is reciprocal in reading and spelling. Every letter is pronounced except h, which is always silent. Three rules are needed to produce extra sounds and the sounds of the vowels vary only slightly according to their position in a word. There are no vowel digraphs and double consonants are pronounced. There are also no homophones or homonyms and foreign words are spelled according to Italian rules.

\*Requests for reprints.

In contrast, the English alphabet according to Venezky (1970) has only three consonants which have one sound, cannot be produced by other combinations and are never silent: *n*, *r* and *v*. The five vowels correspond to 48 phonemes and there are 12 vowel digraphs of which six have alternate phonemes according to their position. There are many homophones and homonyms and foreign words are spelled according to their origin. Such confusing associations in the learning material maximize the possibility of negative transfer and retroactive interference.

As a result of the duplication, a knowledge of even the regular grapheme-phoneme correspondence is not sufficient to read and spell English. Instead, knowledge of the same-level constraints of phonotaxis, graphotaxis and alternations, as well as the high-level constraints of morphology and etymology are necessary (Henderson, 1982). In reading, Berdiansky, Cronnell & Koehler (1969) are reported to have found that 166 rules were needed to pronounce 6092 one- and two-syllable words in the vocabularies of nine-year-old children and still 10 per cent were exceptions. In spelling, Hanna, Hanna, Hodges & Rudorf (1966) found that 200 'rules' were needed to translate phonemes into graphemes with a possibility of a 50 per cent level of success. This produces an asymmetry of difficulty between reading and spelling, quite apart from the fact that reading is a recognition task and spelling a recall task.

If Venezky's classification of words according to their orthography is used on the first 100 words which comprise one half of those in common use in children's books in England (McNally & Murray, 1962), then only 33 are predictable and invariant, such as *as* and *that*, 56 are predictable but variant, such as *he*, and 11 are unpredictable high frequency words, such as *of* and *said*. Wijk (1966) also found that 21 per cent of words violated the rules. This brings out clearly the conflict that exists from the beginning, since many of the most unpredictable words are actually some of the shortest and most frequent, so ungeneralizable associations between graphemes and phonemes are being learned.

There have been no spelling reforms in England. A Private Members' Bill in the House of Commons for a spelling reform in 1953 failed, but permission was given to use the initial teaching alphabet (i.t.a.) in schools to see if it would facilitate the learning of traditional orthography (t.o.) (Pitman, 1969). Like Italian it is unambiguous with one phoneme for each grapheme, so that reading and spelling are reversible operations. To achieve this, the existing alphabet was reduced to 23 letters by omitting *k*, *q* and *x* and adding 17 new characters: five long vowels, the character designed with each vowel having an *e* attached to it, six diphthongs and six consonant digraphs each formed from two consonants. All words were spelled as sounded, as in 'wun' for 'one'. Just one reading scheme, the accompanying reading materials and a few storybooks were printed in i.t.a. Children transferred to t.o. books as soon as they had read them all (Downing, 1962). By six years most children could read for enjoyment and write long, imaginative stories (Downing, 1967). An independent evaluation by Warburton & Southgate (1969) gave the main advantage as children's earlier and easier reading and writing, which brought corresponding pleasure and satisfaction. There were no problems in transferring to t.o., but the advantage was lost. As the method entailed extra organization and expense, it was discontinued in an increasing number of schools. It had never been acceptable to all parents.

There is no methodological problem in comparing the efficacy of t.o. and i.t.a. in

English-speaking children, but there is one in comparing the difficulty of t.o. and Italian orthography because they are used in different languages. It is not possible to give the same passage taken from one language to both groups, as that would place one group at a serious disadvantage. Nor can the difficulty be measured by the number of errors that are made, as is usual, because that is what is being tested. Instead, it was decided to take a passage from an Italian magazine for adults that no children could understand and translate it into English. As English t.o. children take about 10 years to learn to read and spell as well as most adults in English, and most Italian and English i.t.a. children achieve it in one year, the difference between the two groups' scores should be so large as to raise a query about the effectiveness of present English orthography.

The hypothesis is that children learning to read and spell in the phonologically predictable systems of Italian and English i.t.a. will progress more quickly than the English t.o. children. In addition, qualitative differences should appear. English t.o. children can usually read more words than they can spell and are unable to spell a word they cannot read, whereas Italian and English i.t.a. children should be able to spell most of the words they can read and a few they cannot. There should also be behavioural evidence that Italian and English i.t.a. children use a systematic phonological approach in reading and spelling, whereas the English t.o. children should tend to use a visual approach in reading and a phonological approach in spelling.

## Method

### *Subjects*

The children learning English t.o. and the Italian children were matched for age and ability. They all attended small country schools, the English children starting at five years and the Italian children at six years. In both cases, according to the teachers, they came from stable homes, where most of the fathers were skilled or semi-skilled workers and most of the mothers did not work. There were 95 English children, 51 boys and 44 girls, and 70 Italian children, 34 boys and 36 girls. Their ages ranged from 6 years to 11 years 5 months. The mean age for both groups was 9 years 2 months.

The 33 English i.t.a. children, 16 boys and 17 girls were aged between 6 years and 6 years 11 months with a mean age of 6 years 7 months. They attended a large primary school in a new suburb on the edge of a south coast town. The intake was of 60 children, but 27 had already read all the i.t.a. books and transferred to t.o. readers, so the sample comprised the comparatively slower readers.

The teaching methods varied in emphasis in all three schools, although all were well applied. The Italian children spent most time in writing in the first year and reading what they had written. There were no graded reading books. The children started with the phonic method, writing a letter many times and saying it as they wrote. Gradually, vowels were joined with consonants and longer words were introduced as they were required. The children were used to writing long words which they did not understand, when they wrote notices to take home to their parents. There was no remedial teaching.

In England the emphasis was on reading. The English t.o. children were taught the sounds of the letters and a basic sight vocabulary. The readers were graded and plentiful with careful introduction of new vocabulary. Children were encouraged to blend the sounds of the predictable invariant new words, but otherwise to 'guess' on the basis of the sound of the first letter and the meaning of the text. Groups of predictable but variant words were systematically taught in spelling. Inevitably, spelling constrained their self-expression in writing. The formation of the letters was taught, but much less attention was paid to their careful reproduction than in Italy and lines were not used. Remedial teaching was available.

The English i.t.a. children were also taught the sounds of the letters and how to blend them to read new words, but they were not used to long polysyllabic words and they had also been encouraged to guess when reading for meaning. There was no need to teach a sight vocabulary. Sufficient practice in spelling was given initially to enable them to write freely, but no specific time was given to it afterwards, since they were going to transfer to t.o. as soon as they had read the available material. No remedial teaching was available at this stage.

### *Material*

It was known that the English children were likely to be within the average ability range, with IQs between 85 and 115, but nothing was known about the Italian children other than that the school had children with special needs who might need to be excluded from the research. Verbal reasoning tests give the highest predictive values for literacy skills, but the transferability of a translated form of a group verbal test to Italian children cannot be assumed. Thus the NFER Non-Verbal test BD (Pidgeon, 1964) was given to children over seven years. The items were in the form of diagrams, but they were assessing logical reasoning rather than spatial ability. Children below seven years were given the Draw-a-Man test (Harris, 1963), which assesses general emotional and social development as much as intellectual development, but could be used to exclude a slow learning child. It was used throughout the group, because the transferability to Italian children needed to be ascertained. Another visuo-motor test, the Plan of a House test (Thorstad, 1974), in which children draw a plan of their own house, was given for the same reason. The Spar reading comprehension test (Young, 1976) and the Schonell spelling test (Schonell & Schonell, 1950) were given to English t.o. children to compare their progress in literacy skills with that of other English children. This spelling test was used because it consists of predictable invariant and variant words which exemplify spelling rules and so is criterion based, as well as being still appropriately standardized (Tidmarsh, Ivorson & Thorstad, 1985). Unlike intelligence tests, this type of attainment test does not have to be restandardized every 20 years.

The passage of 56 words to be read and spelled was about making cement in the Arctic circle. It was taken from an Italian journal for adults with the intention that the subject matter should be unfamiliar to all children, so reducing the influence of the semantic variable. It was translated into English and children read and wrote in t.o. and i.t.a. as they would do normally. The reading age in English needed to read the translation was 13 years using Mugford's technique (1970) for assessment, which is based on the number of letters and syllables in a word and the length of the sentences.

### *Procedure*

The standardized group tests were given to the whole class according to the instructions. The selected passage was later given to the whole class as a dictation, followed by hearing each child read individually the day after. It was not administratively possible to use a counterbalanced design, or to repeat the dictation and the reading using an English passage translated into Italian owing to the disruption caused to lessons. The mis-readings, the mis-spellings and the time taken were recorded.

## **Results**

Although the girls in both the English and the Italian samples made fewer errors in reading and spelling than the boys, the differences were not significant, so the scores were amalgamated.

The English t.o. children did not differ from the Italian children in their mean visuo-motor scores, which were in the average range. The former were also average in reading and spelling when compared with other English children. Their only

higher score was on the non-verbal test. Thus, although there was no reason to think that they were of lower ability than the Italian children, or unrepresentative of English children in their literacy skills, the English t.o. children made significantly more mis-readings and mis-spellings (Table 1).

**Table 1.** Comparison of test scores from English t.o. and Italian children aged 6:0 to 11:4

	English t.o.			Italian			<i>t</i>	<i>p</i>
	<i>N</i>	<i>M</i>	SD	<i>N</i>	<i>M</i>	SD		
Age	95	9:2	17.65	70	9:2	19.77	0.08	n.s.
Non-Verbal	81	118.52	13.29	57	108.26	14.38	4.52	.001
Draw-a-Man	95	96.98	15.36	70	98.77	17.44	0.61	n.s.
Plan	81	101.74	12.19	57	98.54	13.58	1.52	.10
Reading errors	95	6.83	9.89	70	3.16	6.86	2.33	.05
Spelling errors	95	21.22	13.56	70	4.34	7.75	8.15	.001
Reading	82	101.12	11.59	-	-	-	-	-
Spelling	82	9:1	16.49	-	-	-	-	-

The two samples were then divided into three age groups: 6:0-6:11 (English t.o.  $N = 13$ ,  $M = 6:8$ ,  $SD = 3.4$  months; i.t.a.:  $N = 33$ ,  $M = 6:7$ ,  $SD = 3.5$  months; Italian:  $N = 13$ ,  $M = 6:8$ ,  $SD = 3.1$  months); 7:0 - 9:11 (English t.o.:  $N = 49$ ,  $M = 8:9$ ,  $SD = 9.5$  months; Italian:  $N = 24$ ,  $M = 8:6$ ,  $SD = 10.9$  months); and 10:0 - 10:11 (English t.o.:  $N = 25$ ,  $M = 10:6$ ,  $SD = 3.3$  months; Italian:  $N = 26$ ,  $M = 10:6$ ,  $SD = 3.9$  months). This was done in order to look at developmental changes, omitting any children who had not completed the full battery of tests and those who were 11 years and older. There were no differences in the mean ages of the groups or in the means of the visuo-motor tests except in the six-year-olds, where the Italian children scored higher on the Draw-a-Man test ( $t(24) = 4.81$ ,  $p < .001$ ). As before, the English children gained higher means on the non-verbal test in the two older age groups ( $t(71) = 2.33$ ,  $p < .05$ ;  $t(49) = 2.63$ ,  $p < 0.2$ ). The Italian children gained significantly higher mean reading and spelling scores for the six-year-olds ( $t(24) = 3.83$ ,  $p < .001$ ;  $t(24) = 9.10$ ,  $p < .001$ ) and for the seven-, eight- and nine-year-olds ( $t(71) = 3.59$ ,  $p < .001$ ;  $t(71) = 7.50$ ,  $p < .001$ ) and had a higher mean spelling score for the ten-year-olds ( $t(49) = 7.95$ ,  $p < .001$ ).

To see if the higher Draw-a-Man scores were associated with higher reading and spelling scores in the Italian six-year-olds, the product moment correlation test was used, but no relationship was found.

When the mean reading and spelling scores of the 33 six-year-old English i.t.a. children were compared with those of the six-year-old Italian children, no significant difference was found in the mean reading score, but there was a lower mean spelling score ( $t(44) = 7.31$ ,  $p < .001$ ). The English i.t.a. children had significantly higher mean reading and spelling scores than the six-year-old English t.o. children ( $t(44) = 6.63$ ,  $p < .001$ ;  $t(44) = 6.99$ ,  $p < .001$ ).

There were no significant differences between reading and spelling in the Italian children except in the middle group ( $t(24) = 3.61, p < .01$ ), but the three English t. o. groups and the English i.t.a. group all showed an ability to read much better than they could spell ( $t(13) = 7.42, p < .001$ ;  $t(49) = 15.60, p < .001$ ;  $t(25) = 9.68, p < .001$ ;  $t(33) = 21.52, p < .001$ ).

When the words were analysed into those which were read and spelled (RS), read and not spelled (RS), not read but spelled (RS) and neither read nor spelled (RS), it was found that the Italian children could read and spell the same word more frequently than the English t.o. children in all three age groups, demonstrating the symmetrical relation between the skills in Italian and the disconnection that exists in English. As in Bryant & Bradley's (1980) study using regular words, some of the Italian six-year-old children could spell words which they could not read, but not the English children (Table 2). The English i.t.a. children could also more frequently read and spell the same word than the English t.o. children, but not as often as the Italian children. They rarely spelled a word correctly that they could not read (Table 3).

**Table 2.** The relationship between reading and spelling the 56 words in English t.o. and Italian

English t.o.		Italian			<i>t</i>	<i>p</i>		
<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>			<i>SD</i>	
6:0-6:11								
RS	13	12.61	6.78	13	41.46	11.09	8.00	.001
RS	13	18.23	8.90	13	7.15	5.07	3.90	.001
RS	13	0.15	0.37	13	3.38	3.19	3.74	.001
RS	13	25.00	14.11	13	3.85	8.32	4.66	.001
7:0-9:11								
RS	49	34.22	11.36	24	49.29	9.24	5.56	.001
RS	49	16.18	7.12	24	2.83	2.56	8.75	.001
RS	49	1.02	6.99	24	1.71	1.40	0.47	n. s.
RS	49	5.51	6.47	24	2.12	8.35	1.88	n. s.
10:0-10:11								
RS	25	44.30	6.85	26	54.35	2.19	7.10	.001
RS	25	10.08	5.20	26	0.73	1.31	8.88	.001
RS	25	0.16	0.47	26	0.88	1.14	2.94	.01
RS	25	1.64	2.39	26	0.03	0.20	3.40	.001

Key. RS = words read and spelled; RS = words read but not spelled; RS = words not read but spelled; RS = words neither read nor spelled.

All the Italian children used a systematic phonological approach in reading when they came to an unknown word and often the younger children used it with all words. By contrast, the English t.o. children rushed through the reading using syntactic and partial graphemic cues: 'thermometer' was read as 'their mother' at

**Table 3.** The relationship between reading and spelling the 56 words in six-year-old children using English t.o., English i.t.a. and Italian

	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>
		English	t.o.		English	i.t.a.		
RS	13	12.61	6.78	33	26.58	6.10	6.83	.001
RS	13	18.23	8.91	33	23.12	5.72	2.23	.05
RS	13	0.15	0.37	33	0.24	0.70	0.39	n.s.
RS	13	25.00	14.11	33	5.94	5.28	6.79	.001
		Italian			English	i.t.a.		
RS	13	41.46	11.09	33	26.58	6.10	5.88	.001
RS	13	7.15	5.06	33	23.21	5.69	8.94	.001
RS	13	3.38	3.10	33	0.24	0.79	5.51	.001
RS	13	3.35	8.32	33	5.94	5.28	1.03	n.s.

Key. RS = words read and spelled; RS = words read but not spelled; RS = words not read but spelled; RS = words neither read nor spelled.

seven years and 'the motor' and 'the monster' at eight years. This fundamental difference in strategy resulted in the younger Italian children reading more slowly than the English t.o. children. However, the Italian 10-year-old children read significantly faster ( $M = 36.81$  s,  $SD = 12.75$ ) than the English t.o. children ( $M = 47.00$  s,  $SD = 19.09$ ) ( $t(49) = 2.26$ ,  $p < .05$ ). The English i.t.a. children were not as slow as the Italian children, but the difference was not significant. They also used a systematic phonological approach to unknown words.

Eight words were then selected to be compared in English and Italian, because their orthography is similar in both languages. Seven had a common derivation from Latin and one from Greek. They were among the longest words and in American English had frequencies of 52 or less in a million, except for *special* which has a frequency of 250 (Kucera & Francis, 1967). Although the words could be classified as predictable invariant or variant in English, just as they could be in Italian, few of the English t.o. children could read them and even fewer could spell them, whereas most of the Italian children could. The majority of the differences were at the  $p < .001$  level using chi-square (Table 4).

Since these eight words were the most difficult for both English t.o. and Italian, they revealed the difference in literacy skills most effectively (Table 5). Not even the 10-year-old English children could read them as well as the Italians and the difference in spelling ability increased in the older children. The English i.t.a. six-year-olds were as good as the Italians in reading and nearly as weak as the English t.o. children in spelling, except that their attempts were recognizable, whereas the t.o. children often could not attempt to write them at all.

When the relationship between reading and spelling these eight words was examined, it could be seen that the discordance between these abilities increased with age in the English t.o. children, suggesting that ability in spelling does not keep pace with reading in English t.o. as it does in Italian. There was no measurable difference in the English t.o. six-year-olds, because few children could read any of the words.

**Table 4.** Differences between the number of English and Italian children mis-reading and mis-spelling the eight longer, less frequent words with a similar orthography in English and Italian given in percentages and significant differences in chi-squared

Word (English/Italian)	Children mis-reading		Children mis-spelling		$\chi^2$	p	$\chi^2$	p
	English	Italian	English	Italian				
	(N = 95)	(N = 72)	(N = 95)	(N = 72)				
	(%)	(%)						
cement/ <i>cemento</i>	25	8	8.71	*	77	3	92.00	**
correct/ <i>corretto</i>	33	0	30.31	**	62	17	35.10	*
literally/ <i>lateralmente</i>	45	7	30.27	**	99	17	121.00	**
perceptible/ <i>percettibile</i>	61	17	33.64	**	99	19	114.61	**
permits/ <i>permette</i>	31	3	22.08	**	65	12	47.32	**
preparing/ <i>preparano</i>	24	4	13.60	**	79	6	82.71	**
special/ <i>speciale</i>	18	4	8.34	*	81	4	98.19	**
thermometer/ <i>termometro</i>	28	17	3.50	n.s.	83	6	79.26	**

\*  $p < .01$ ; \*\*  $p < .001$ .

**Table 5.** Comparison of English t.o., English i.t.a. and Italian children's ability in reading and spelling the eight longer, less frequent words with a similar orthography in English and Italian

	N	M	SD	N	M	SD	t	p
		English t.o.			Italian			
6:0--6:11								
Reading	13	1.38	2.47	13	5.85	2.54	4.54	.001
Spelling	13	0.00	0.00	13	5.46	2.33	8.45	.001
		English t.o.			English i.t.a.			
Reading	13	1.38	2.47	33	4.58	2.222	4.28	.001
Spelling	13	-0.00	0.00	33	0.46	0.87	1.89	n.s.
		English i.t.a.			Italian			
Reading	33	4.57	2.22	13	5.85	2.54	1.69	n.s.
Spelling	33	0.45	0.87	13	5.46	2.33	10.81	.001
		English t.o.			Italian			
7:0-9:11								
Reading	49	5.22	2.43	24	7.54	0.72	4.50	.001
Spelling	49	1.55	2.27	24	7.42	0.83	12.03	.001
10:0-10:11								
Reading	25	7.08	1.35	26	7.92	0.27	3.12	.01
Spelling	25	2.20	1.85	26	7.77	0.43	14.96	.001



and no child could spell any of them, since the task was well above their ability level. The English i.t.a. children revealed a difference because they could read most of the words but spell very few correctly (Table 6). There was marked difference between the assurance with which the Italian children tackled these long unknown words and the distress seen in the English t.o. children.

**Table 6.** Differences in the reading and spelling difficulty of the eight longer, less frequent words when written in English t.o., English i.t.a. and Italian, as measured by the children's scores

	<i>N</i>	Reading		Spelling		<i>r</i>	<i>t</i>	<i>p</i>
		<i>M</i>	SD	<i>M</i>	SD			
6:0-6:11								
English t.o.	13	1.38	2.47	0.00	0.00	-	-	n.s.
English i.t.a.	33	4.58	2.22	0.46	0.87	.36	11.42	.001
Italian	13	5.85	2.54	5.46	2.33	.81	0.92	n.s.
7:0-9:11								
English t.o.	49	5.22	2.43	1.55	2.27	.48	10.67	.001
Italian	24	7.54	0.72	7.42	0.83	.55	0.83	n.s.
10:0-10:11								
English t.o.	25	7.08	1.35	2.20	1.85	.49	14.65	.001
Italian	26	7.92	0.27	7.77	0.43	.18	1.68	n. s.

## Discussion

Despite the methodological impossibility of exactly matching the difficulty of the passages in Italian with those in English t.o. and i.t.a., the difference in the children's responses was sufficiently large to merit consideration. The hypothesis that children learn to read and spell more quickly when the orthography is predictable and invariant, as in Italian and English i.t.a., was supported. Children were able to use a direct, non-lexical mode of grapheme translation in reading, employing same-level constraints only. The Italian children were almost equally successful in using a phonological decomposition method in spelling.

As a result, Italian children take one year to achieve in reading and spelling what takes English t.o. children three to five years. There were no technical limits to whatever they might want to read and spell. As they are confident in the efficacy of their skills, they approach these tasks more systematically and without the anxiety generated in the English t.o. children.

Since English i.t.a. children could read equally well and spell better than the English t.o. children, there is no reason to argue that the simpler vowel and syllabic structure of Italian (Cossu, Shankweiler, Liberman, Katz & Tola, 1988) completely explains the difference. That they did not spell so accurately as the Italians was probable due to the much greater time and emphasis given to writing and spelling in Italy, reading being secondary (Tutolo, 1983). By contrast, teachers of i.t.a. gave

only minimal time to spelling, much less than t.o. teachers, because they did not want the habits set up to conflict with the t.o. spelling still to be acquired. This illustrates Osgood's empirical law (1949) that when the stimuli are varied, but the response is the same - as in reading i.t.a. and t.o. - then there is positive transfer, but when the verbal stimuli is the same and the responses vary, as in spelling, then there is interference.

As is usually found (Schonell & Schonell, 1950), all the English t.o. age groups showed greater ability in reading than spelling, whereas there was no significant difference in Italian children. This supports the commonly held hypothesis that reading and spelling in English t.o. employ different routes, at least in the beginning a mainly 'visual' route in reading and a mainly phonological route in spelling. By contrast, it was evident from their behaviour that the Italian children used a phonological strategy in both skills.

The only group of children able to spell words they could not read as in Bryant & Bradley's (1980) study with predictable invariant and variant words were the Italian six-year-olds. This was not, in this case, due to different strategies in reading and spelling, but because the children could often spell a long, unknown word phonologically, but could not pronounce it with the stress on the correct syllable.

Just because it is possible to read Italian *using direct grapheme translation*, it does not mean that there can be only one route to the lexicon. The increase in reading speed . in Italian 10-year-olds suggests that they are accessing the lexicon direct. Porpodas (1986) found that Greek children's speed and comprehension in reading was retarded considerably when using articulators suppression by repeating 'Yes', supporting his hypothesis that their reading was at least partly based on pre-lexical phonological representation. As their ages were around eight years, this result could probably be repeated with Italian children of the same age, but those aged 11 years might be impeded less, if they have a direct access route.

As a result of this learner-friendly orthography, Italian children do not need to spend so long learning the mechanisms of literacy skills as English children do, and so have more time for other studies. Nor does the education service need to provide so much remedial teaching, or ensure that textbooks for 14-year-olds require only a reading age of nine years.

Thus these results suggest that all studies in English t.o. literacy skills should make clear that the findings relate to the interaction between subjects and an alphabetic system where the relationship between graphemes and phonemes is rarely predictable and invariant. The strategies that learners might adopt under these circumstances cannot be taken as typical of those orthographies where the relationship between grapheme and phoneme is predictable and invariant, with the result that reading and spelling become reversible operations.

### **Acknowledgements**

The author is grateful to the anonymous reviewers or their invaluable comments. She would also like to thank the staff and pupils of the three primary schools in southern England and one in northern Italy without whose cooperation this work could not have been carried out. The work of Ingrid Paoli in Italy was equally indispensable.

## References

- Adult Literacy and Basic Skills Unit (1990). *How Well Can Young People Read and Write?* London ALBSU.
- Berdiansky, B., Cronnell, B. & Koehler, J. (1969). Spelling-sound relationships and primary form-class descriptions for speech-comprehension vocabularies of 6-9-year-olds. Cited in F. Smith (1973), *Psycholinguistics and Reading*, pp. 87-89. London: Holt, Rinehart & Winston.
- Bryant, P. & Bradley, L. (1980). Why children sometimes write words which they do not read. In U. Frith (Ed.), *Cognitive Processes in Spelling*, pp. 355-372. London: Academic Press.
- Cossu, G., Shankweiler, D., Liberman, I. Y., Katz, L. & Tola, G. (1988). Awareness of phonological segments and reading ability in Italian children. *Applied Psycholinguistics*, 9, 1-16.
- Downing, J. A. (1962). *The Augmented Roman Alphabet*. London: Cassell.
- Downing, J. (1967). *Evaluating the Initial Teaching Alphabet*. London: Cassell.
- Frith, U. (1980). Unexpected spelling problems. In U. Frith (Ed.), *Cognitive Processes in Spelling*. London: Academic Press.
- Hanna, P. R., Hanna, J. S., Hodges, R. E. & Rudorf, E. H. (1966). *Phoneme-Grapheme Correspondences as Cues to Spelling Improvement*. Washington, DC: US Department of Health, Education and Welfare.
- Harris, D. B. (1963). *Children's Drawings as Measures of Intellectual Maturity*. New York: Harcourt, Brace & World.
- Henderson, L. (1982). *Orthography and Word Recognition in Reading*. London: Academic Press.
- Kucera, H. & Francis, W. N. (1967). *Computational Analysis of Present-Day American English*. Providence, RI: Brown University Press.
- McNally, J. & Murray, W. (1962). *Key Words to Literacy and the Teaching of Reading*. London: Schoolmaster Publishing Co.
- Mugford, L. (1970). A new way of predicting readability. *Reading*, 4(2), 31-35.
- Osgood, C. E. (1949). The similarity paradox in human learning. *Psychological Review*, 56, 132-143.
- Pidgeon, D. A. (1964). *Non-Verbal Test BD*. Windsor: NFER-NELSON.
- Pitman, J. (1969). The late Dr Mont Follick - An appraisal. In W. Haas (Ed.), *Alphabets for English*. Manchester: Manchester University Press.
- Porpodas, C. D. (1986). The effect of articulatory suppression on Greek children's reading of Greek. *Educational Psychology*, 6(2), 115-122.
- Reid, J. F. (1972). *Reading: Problems and Practices*. London: Ward Lock Educational.
- Schonell, F. J. (1942). *Backwardness in the Basic Subjects*. Edinburgh: Oliver & Boyd.
- Schonell, F. J. & Schonell, F. E. (1950). *Diagnostic and Attainment Testing*. Edinburgh: Oliver & Boyd.
- Snowling, M. (1987). *Dyslexia: A Cognitive Developmental Perspective*. Oxford: Blackwell.
- Thorstad, G. (1974). Plan of a house test. Unpublished PhD thesis, University of London.
- Tidmarsh, C., Ivorson, A. & Thorstad, G. (1985). Acquisition of English spelling - A pilot study. Unpublished thesis, Tavistock Clinic, London.
- Tutolo, D. (1983). Beginning reading in Italy. *The Reading Teacher*, 36, 752-757.
- Venezky, R. L. (1970). *The Structure of English Orthography*. The Hague: Mouton.
- Vernon, P. E. (1969). *The Standardisation of a Graded Word Reading Test*. London: London University Press.
- Vernon, P. E. (1977). *Graded Word Spelling Test*. London: Hodder & Stoughton.
- Warburton, F. W. & Southgate, V. (1969). *i.t.a.: An Independent Evaluation*. John Murray and W. & R. Chambers.
- Wijk, A. (1966). *Rules of Pronunciation for the English Language*. Oxford: Oxford University Press.
- Young, D. (1976). *Spar Spelling and Reading Tests*. Sevenoaks, Kent: Hodder & Stoughton.