



# Insight 17

**A Seven Year Study of the  
Effects of Synthetic Phonics  
Teaching on Reading and  
Spelling Attainment**

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# A Seven Year Study of the Effects of Synthetic Phonics Teaching on Reading and Spelling Attainment

Rhona S Johnston and Joyce E Watson

## Introduction

We have carried out a study on around 300 children of the effectiveness of a synthetic phonics programme that was taught in Primary 1. Performance on this programme was compared with performance on a typical analytic phonics programme, and also with performance on a similar programme that included a substantial element of phonological awareness training. The synthetic phonics programme was by far the most effective in developing literacy skills. In several publications (Watson and Johnston, 1998, Johnston and Watson, 2003, and Johnston and Watson, 2004) we have charted the development of the children's literacy skills up to the end of Primary 5. In this Insight report we describe the progress the children have made from Primary 1 through to the end of Primary 7, focusing on comparing the attainment of boys with that of girls. We have also examined the extent to which children underachieve when taught by the synthetic phonics programme, and the impact that synthetic phonics teaching has on the literacy skills of children from disadvantaged backgrounds.

There are two major approaches to teaching children the alphabetic principle: analytic and synthetic phonics. Although we describe below how these two types can be distinguished, there is in fact really a continuum from the analytic to the synthetic.

### *Analytic phonics*

Analytic phonics is well known in Scotland, where it has formed part of the early years reading programme for many years. Teaching starts at the whole word level, and then involves showing children patterns in the English spelling system. It is generally taught in parallel with, or some time after, graded reading books, which are introduced using a look and say approach. Children are typically taught one letter sound per week and are shown a series of alliterative pictures and words which start with that sound, e.g. car, cat, candle, cake, castle, caterpillar. When the 26 initial letter sounds have been taught in this way, children are introduced to final sounds, e.g. nap, cup, pip, and to middle sounds e.g. cat, bag, rag etc. This stage is usually reached at the end of Primary 1. At this point some teachers may show children how to sound and blend the consecutive letters in unfamiliar words to be able to pronounce them e.g. 'cuh-ah-tuh' for 'cat'. Starting in Primary 2, initial consonant blends are taught, e.g. 'bl', 'cr', 'sp', followed by final consonant blends, e.g. 'nt', 'ng', 'st'; vowel and consonant digraphs, e.g. 'ee', 'oo', 'ch', 'sh'; and silent 'e', e.g. 'slate', 'blue'. This programme is often completed at the end of Primary 3.

### *Synthetic phonics*

Synthetic phonics is used in Germany and Austria and is generally taught before children are introduced to books or reading. It involves teaching small groups of letters very rapidly, and children are shown how letter sounds can be co-articulated to pronounce unfamiliar words. In a UK version of synthetic phonics, i.e. Hickey's Multi-Sensory Language Course (Augur and Briggs, 1992), the first block of letter sounds is 's', 'a', 't', 'i', 'p', 'n', which make up more three-letter words than any other six letters. Children are shown many of the words that these letters generate (e.g. 'sat', 'tin', 'pin').

In our version of synthetic phonics children use magnetic letters to build up words and to help them understand how letter sounds can be blended together to pronounce the

1. Should children learn letters in words in a sequence i.e. in initial, final and then medial positions?  
With synthetic phonics, letters are shown in all positions of words from the start.

**2. Should reading be taught before spelling?**

In our synthetic phonics programme children are taught to both read and spell right from the start.

**3. Should phonemic awareness be taught in addition to phonics?**

Phonemic awareness training is an integral part of our synthetic phonics programme. This approach was more effective than phonemic awareness training on its own.

**4. At what stage can children read unfamiliar words by analogy with known words?**

The synthetic-phonics-taught children were able to do this by March of Primary 1 but those taught by analytic phonics were not.

words. In order to read a word, the appropriate magnetic letters are set out; the children then blend the letter sounds together, smoothly co-articulating them, whilst pushing the letters together. The approach is also used for learning to spell (and to reinforce blending for reading). The children listen to a spoken word, select the letters for the sounds, and then push the letters together, sounding and blending them to pronounce the word. Consonant blends are not explicitly taught at all as they can be read by blending, although digraphs (i.e. a phoneme represented by two letters e.g. 'sh', 'th', 'ai', 'oa') are taught.

A typical lesson using our scheme would be as follows. Soon after starting school, the children are taught the sounds for the letters 't', 'a', and 'p'. Then a child at the front of the class is asked to select these letters from the teacher's large magnetic board, and to place them in a row below the other letters of the alphabet. The class then give the sounds of the letters, 't', 'a', 'p' and then blend the sounds together to pronounce the word 'tap', whilst the letters are pushed together. Spelling is taught in the same session, the teacher either saying or showing a picture of a word using the letters that have been taught. The children pick out the letters for the sounds that they hear in the word, and place them together on their own magnetic boards. They will then sound and blend, pushing the letters together.

## Findings

Our study was carried out in Clackmannanshire schools in mostly disadvantaged areas, with a few schools from moderately advantaged areas. Three training programmes were conducted with around 300 children for 16 weeks, starting soon after entry to Primary 1. For 20 minutes a day, children were taught either 1) by a synthetic phonics programme, or 2) by an analytic phonics programme modelled on the methods commonly used in Scotland, or 3) by an analytic phonics plus phonological- awareness training programme. At the end of these programmes, the synthetic-phonics-taught group were reading words around 7 months ahead of the other two groups (and were around 7 months ahead for their chronological age), and were spelling around 8 to 9 months ahead of the other groups (and were again performing around 7 months ahead of chronological age) (Watson and Johnston, 1998). The synthetic-phonics taught group also read irregular words better than the other groups, and was the only group that could read unfamiliar words by analogy.

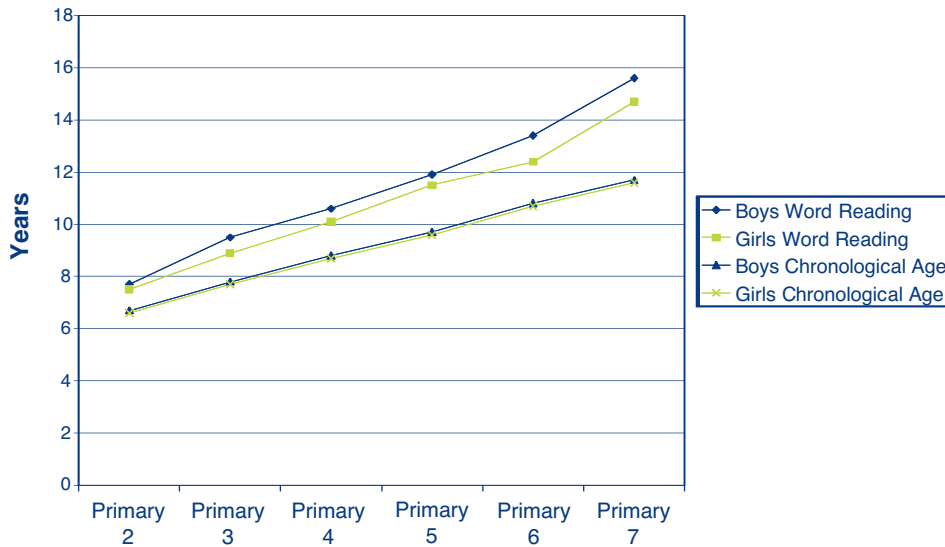
At the end of the initial programme, all of the children who had been taught by the two analytic phonics programmes then carried out the synthetic phonics programme, which they completed by the end of Primary 1. The children's progress in reading and spelling has been studied every year since then.

### *Findings from Primary 2 to Primary 7*

In order to make comparisons across the years, we are reporting the results for the children that were available for testing from Primary 2 to Primary 7, so the figures will differ slightly from previous reports. At the end of Primary 7, word reading was 3 years 6 months ahead of chronological age, spelling was 1 year 9 months ahead, and reading comprehension was 3.5 months ahead. The figures below show how the children progressed from year to year in word reading, spelling and reading comprehension, and whether the boys and girls differed in performance from each other.

## Word reading

Figure 1 Comparison of word reading from Primary 2 to Primary 7, boys versus girls



There were 105 boys and 97 girls available for a word reading comparison across all 7 years of the study.<sup>1</sup> It can be seen in Figure 1 that in Primary 3 the boys pulled significantly ahead of the girls in word reading, and stayed ahead right through to the end of Primary 7. At the end of the study, the boys were reading around 9.5 months ahead of the girls. Word reading was significantly above chronological age throughout the study, but was further ahead of age in Primary 7 than in all previous years. Thus the effects of the initial training programme in Primary 1 were not only maintained until Primary 7, but increased year after year.

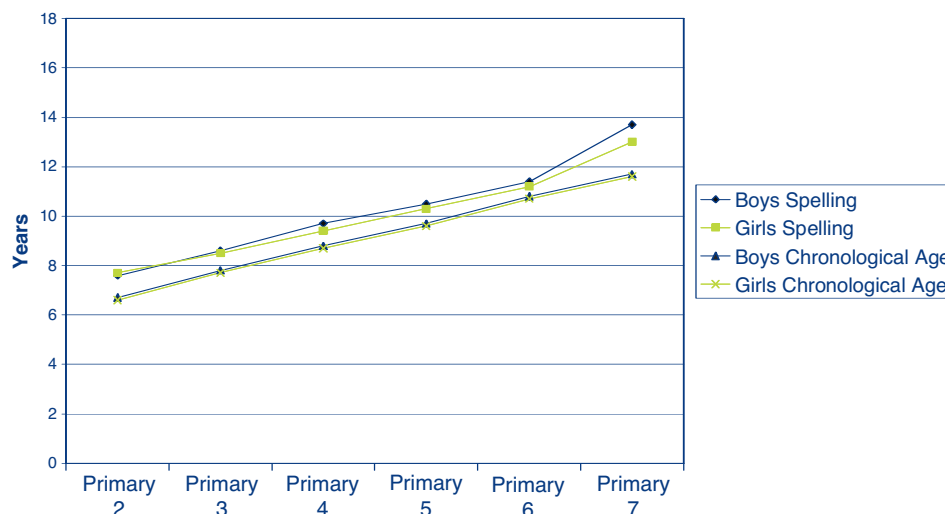
A comparison was also made of the children's progress according to whether they had learnt by the synthetic phonics programme at the beginning of Primary 1, or starting around Easter of Primary 1. It was found that the girls read words better if taught by the synthetic phonics programme from the start of the school year.

5. Do the girls in your class read words better than the boys?

In our synthetic phonics programme, boys and girls read well above expected levels, but the boys were ahead of the girls.

## Spelling

Figure 2 Comparison of spelling from Primary 2 to Primary 7, boys versus girls



<sup>1</sup> From Primary 2 to Primary 5, we used the British Ability Scales (BAS) Word Reading Test (Elliott et al, 1977). From Primary 6 to Primary 7 we used the Wide Range Achievement Test (Wilkinson, 1993), as many of the children were at ceiling on the BAS test.

6. Do you think it matters whether the synthetic phonics programme is taught early or late in Primary 1?

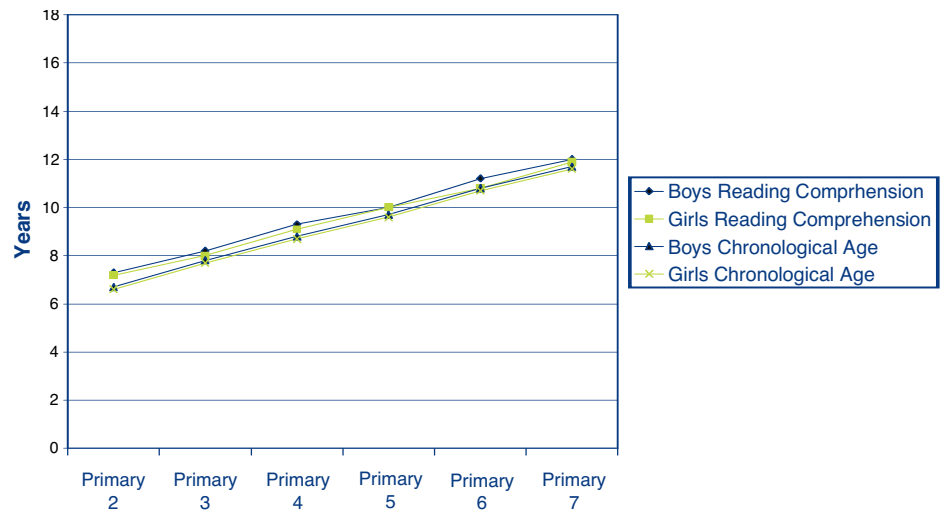
Towards the end of Primary 2, the girls read words better and both boys and girls spelt better, if taught by the synthetic phonics programme at the start of Primary 1

There were 95 boys and 84 girls available for comparison over the 7 years of the study.<sup>2</sup> It can be seen in Figure 2 that in Primary 4 the boys started to pull ahead of the girls. They were significantly ahead in Primaries 4, 6 and 7, being around 8.6 months ahead by the end of the study. Spelling was significantly above chronological age throughout, and was significantly further ahead of age in Primary 7 than in all previous years. As with word reading, spelling skills were still increasing at the end of Primary 7, 6 years after the initial programme was completed.

A comparison was again carried out of the progress the children made according to whether they had learnt by the synthetic phonics programme at the beginning of Primary 1, or starting around Easter of Primary 1. It was found that both the boys and the girls spelt better if taught by the synthetic phonics approach at the start of the school year

### Reading comprehension

Figure 3 Comparison of reading comprehension from Primary 2 to Primary 7, boys versus girls



There were 89 boys and 88 girls available for comparison across the 7 years of the study.<sup>3</sup> Throughout this period, the boys and girls did not differ significantly in reading comprehension, see Figure 3. Reading comprehension was significantly above chronological age throughout, but this advantage was of greater magnitude at Primary 2 than at Primary 7. The children in Primary 7 comprehended what they read 3.5 months above what they would be expected for their chronological age, whereas at Primary 2 there had been a 7 months advantage.

### Socio-economic background

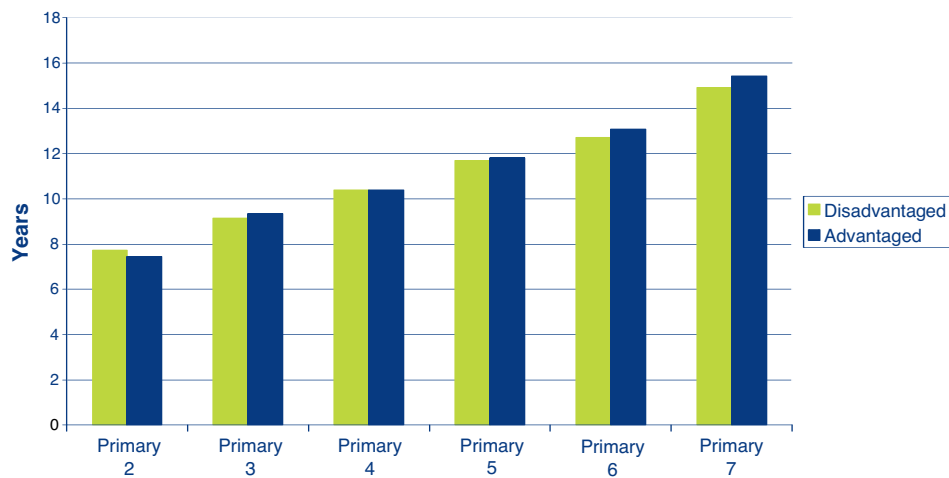
We also split the sample into those from advantaged and disadvantaged homes, according to the region's classification. Children from disadvantaged homes usually perform less well than those from advantaged homes on literacy skills, even as early as Primary 1 (Duncan and Seymour, 2000).

<sup>2</sup> From Primary 2 to 6, we used the Schonell Spelling Test (Schonell and Schonell, 1952), and from Primary 7, we used the Wide Range Achievement (Wilkinson, 1993), as many of the children were at ceiling on the Schonell test.

<sup>3</sup> From Primary 2 to Primary 3 we used the Primary Reading Test (France, 1981), and due to ceiling effects from Primary 4 to Primary 7 we used the Group Reading Test (Macmillan Unit, 2000).

## Reading

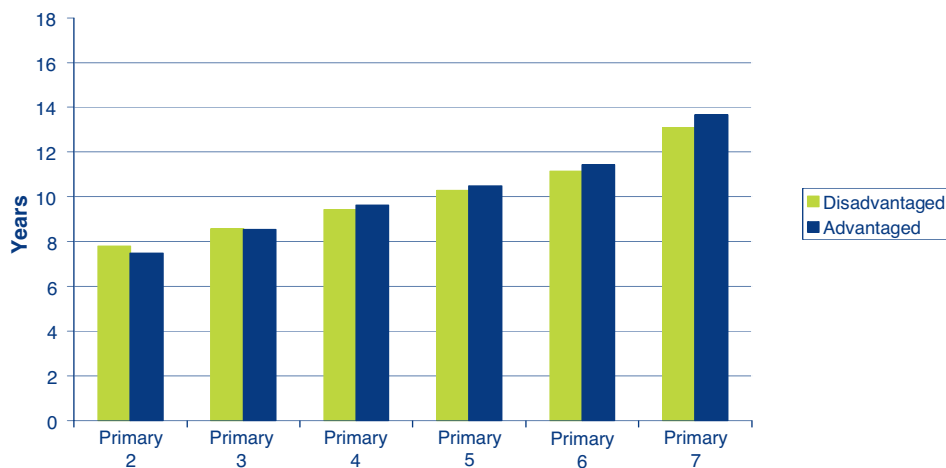
Figure 4 Comparison of word reading from Primary 2 to Primary 7 for the advantaged and disadvantaged children



Our statistical analysis did not find any difference between the performance of the advantaged and disadvantaged children, though one may be emerging in Primary 7, where the children from the less well off homes read words 6.2 months below the level of children from better off homes (see Figure 4).

## Spelling

Figure 5 Comparison of spelling from Primary 2 to Primary 7 for the advantaged and disadvantaged children

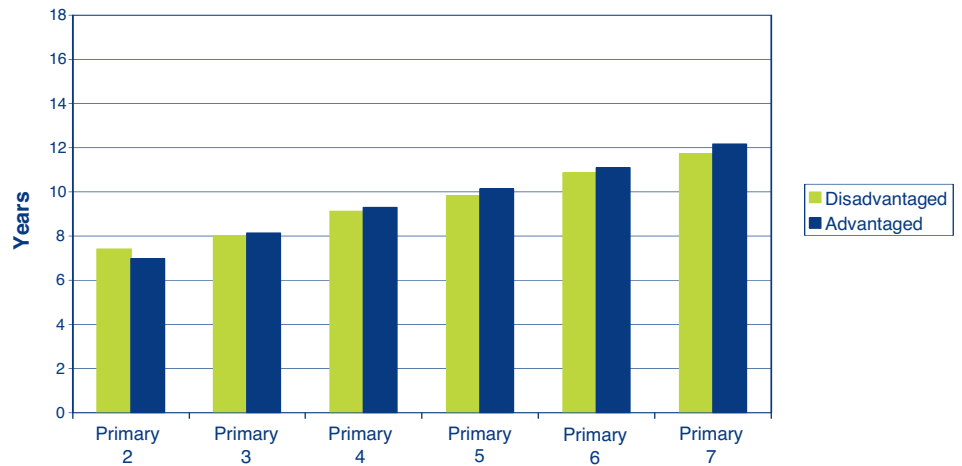


Here we found that the children from disadvantaged homes did perform significantly less well than the advantaged children, but only in Primary 7, when they were 5.8 months behind, see Figure 5.

7. Are children from less well off homes at a disadvantage in learning to read? Generally this is true, but with synthetic phonics teaching the children from disadvantaged homes kept pace with those from more advantaged homes until near the end of primary schooling.

## Reading Comprehension

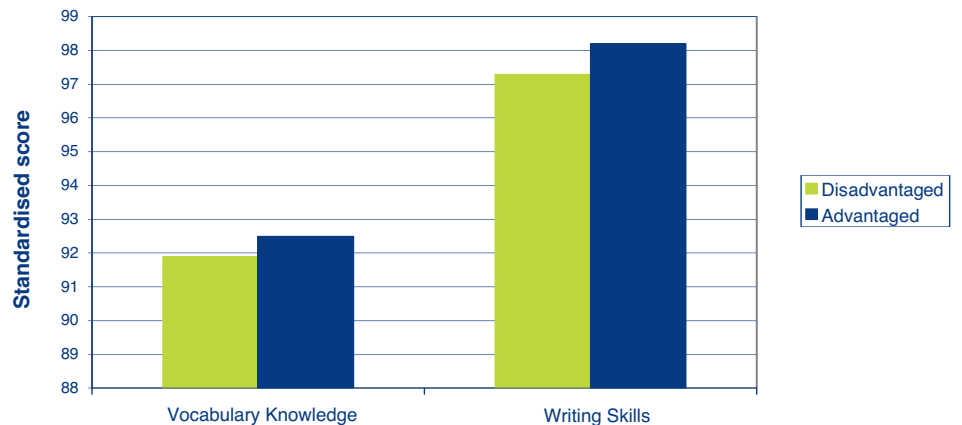
Figure 6 Comparison of reading comprehension from Primary 2 to Primary 7 for the advantaged and disadvantaged children



At Primary 2 the disadvantaged children actually performed better than the advantaged children, see Figure 6. However, the advantaged children performed significantly better than the disadvantaged children at Primary 5 and Primary 7, the advantage at the end of the study being 5.5 months.

## Writing skills for advantaged and disadvantaged children

Figure 7 Comparison of advantaged and disadvantaged children in Clackmannanshire on writing skills at the end of the sixth year at school, n=141



**8. Are children from less well off homes at a disadvantage in learning to write stories?**

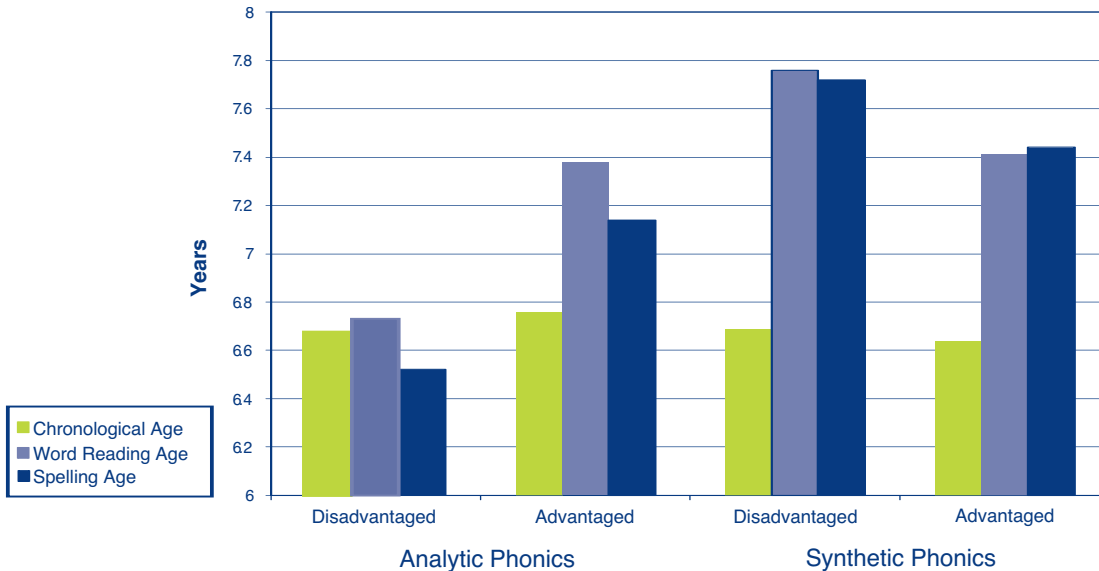
With synthetic phonics teaching, in Primary 6 the children from disadvantaged homes wrote as well as those from moderately advantaged homes.

In Primary 6 we examined 141 of the children's writing skills using the WOLD (Wechsler Objective Language Dimensions, Rust, 1996); average performance on this test is 100. The advanced writing skills tested by the WOLD were not taught in the 16 weeks phonics programme carried out in Primary 1. We also measured the children's vocabulary knowledge in Primary 6, using the English Picture Vocabulary Test (EPVT, Brimer and Dunn, 1996). Mean performance on the EPVT was 92. Given that average performance on this test is also 100, it can be seen that verbal ability was somewhat below average. This is important as vocabulary knowledge is a good predictor of educational achievement. The advantaged and disadvantaged children got scores of 98 and 97 respectively on the writing skills test, which is around 5 points ahead of what would be expected from their vocabulary knowledge scores (see Figure 7).



### Comparison of performance of advantaged and disadvantaged children learning by analytic and synthetic phonics programmes

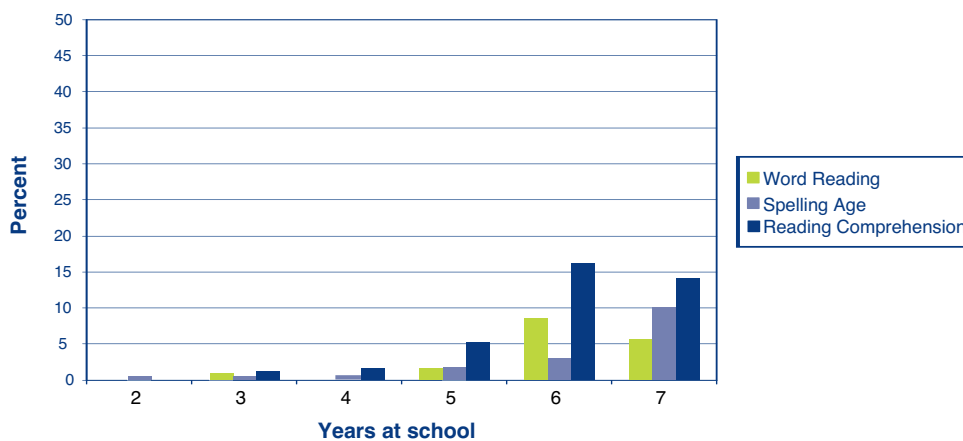
Figure 8 Comparison of children from advantaged and disadvantaged backgrounds learning to read by analytic or synthetic phonics, at the end of Primary 2



It can be seen in this comparison of 193 children that with analytic phonics tuition the advantaged children read and spelt significantly better than the disadvantaged children. However, with synthetic phonics teaching there was no difference in word reading or spelling ability according to social background. (There was a non-significant trend towards the synthetic phonics taught disadvantaged children reading and spelling better than the advantaged ones, but the former had had the synthetic phonics programme right at the start of the school year, whereas the moderately advantaged children had started the programme after Easter of the first year at school). Comparing performance on the two types of phonics programmes, the disadvantaged children read and spelt better with synthetic than analytic phonics teaching, and the advantaged children spelt better with synthetic phonics.

### Underachievers from Primary 2 to Primary 7

Figure 9 Comparison of children more than 2 years behind for their age in word reading, spelling, and reading comprehension, from Primary 2 to Primary 7



9. What proportion of children would you expect to finish primary school with low levels of word reading skill?

With synthetic phonics teaching, only 5.6% of the children were reading words more than two years behind what would be expected for their chronological age.

It can be seen in this analysis of around 200 children that the percentage of low achievers is small, especially considering that this is a fairly low ability sample that comes predominantly from a poor socio-economic background. Even at the end of the Primary 7, only 5.6% of the children were more than 2 years behind chronological age in word reading, 10.1% were behind in spelling, and 14.0% were behind in reading comprehension.

## Conclusion

It can be seen that the gains made in word reading in Primary 1 had increased 6 fold by the end of Primary 7, going from 7 months to 3 years 6 months ahead of chronological age. The gain in spelling was 4.5 fold, going from 7 months to 1 year 9 months ahead of chronological age. This is very unusual, as the effects of training programmes usually wash out rather than increase out (Ehri et al, 2001). Although reading comprehension scores were tending to diminish over time, at the end of the study they were still significantly above chronological age and were good given the children's somewhat below average levels of vocabulary knowledge.

The sample of children studied showed a skew towards coming from less advantaged socio-economic backgrounds, so the gains in literacy skills over what would be expected for chronological age are particularly noteworthy. It was also shown that at the end of Primary 2, children from disadvantaged homes performed as well as those from better off homes if taught by the synthetic phonics programme, whereas with analytic phonics teaching, they did significantly less well. Furthermore, although children from disadvantaged backgrounds usually have poorer literacy skills from the start of schooling, the children from less well off homes in this study were only starting to fall significantly behind at the end of Primary 7, and then were still performing at or above chronological age on word reading, spelling and reading comprehension.

It can be concluded that the synthetic phonics programme led to children from lower socio-economic backgrounds performing at the same level as children from advantaged backgrounds for most of their time in primary school. It also led to boys performing better than or as well as girls.

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