

**THE EFFECTS OF SYNTHETIC
PHONICS TEACHING ON READING
AND SPELLING ATTAINMENT**

A SEVEN YEAR LONGITUDINAL STUDY

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EXECUTIVE SUMMARY

1. We report here a study of the effectiveness of a synthetic phonics programme in teaching reading and spelling. Around 300 children in Primary 1 were divided into three groups. One group learnt by the synthetic phonics method, one by the standard analytic phonics method, and one by an analytic phonics programme that included systematic phonemic awareness teaching without reference to print. At the end of the programme, the synthetic phonics taught group were reading and spelling 7 months ahead of chronological age. They read words around 7 months ahead of the other two groups, and were 8 to 9 months ahead in spelling. The other two groups then carried out the synthetic phonics programme, completing it by the end of Primary 1.

2. We have followed the progress of all of these children for 7 years, examining their performance in word reading, spelling and reading comprehension. At the end of Primary 2, the boys performed equally well in word reading, regardless of which method they had started with in Primary 1. However, the girls read words significantly less well if they had started with the standard analytic phonics programme. Furthermore, both boys and girls were behind in spelling if they had started with the standard analytic phonics programme, even if it had been supplemented with systematic phonemic awareness training.

3. At the end of Primary 7, word reading was 3 years 6 months ahead of chronological age, spelling was 1 year 8 months ahead, and reading comprehension was 3.5 months ahead. However, as mean receptive vocabulary knowledge (an index of verbal ability where the average is 100) was 93 at the start of the study, this is a group of children for whom normal performance might be expected to be below average for chronological age on standardised tests. Therefore this may be an underestimate of the gains with this method.

4. In all 35 countries surveyed in an international study, including Scotland, it was found that the boys' reading comprehension was significantly behind that of the girls'. In the present study, the boys' word reading was significantly ahead of that of the girls' from Primary 3 onwards; by the end of the study in Primary 7 they were 11 months ahead of the girls. In spelling, the boys were significantly ahead of the girls in Primaries 4, 6 and 7, being 8.6 months ahead by the end of the study. They were also 3 months ahead of girls in reading comprehension, but this difference was not statistically significant. However although the boys read better than the girls, they nevertheless reported a less favourable attitude to reading.

5. It had been expected that children from disadvantaged homes would perform less well than those from advantaged homes. However, this was not statistically significant for word reading and spelling until Primary 7 (and only marginally so for reading) and was only significant for reading comprehension in Primaries 5 and 7.

6. In the early years of the study, the level of underachievement was very low. For example, in Primary 3, only 0.8% of the children were more than two years behind chronological age in word reading, with 0.4% being behind in spelling, and 1.2% being behind in reading comprehension. However, by Primary 7 this had increased to 5.6% behind in word reading, 10.1% behind in spelling, and 14.0% behind in reading comprehension. It is

possible that these levels of underachievement are quite moderate for children with a somewhat below average level of receptive vocabulary knowledge. This could be established by carrying out a study of a control sample learning to read by the standard analytic phonics approach.

7. Teachers and Head Teachers have responded very favourably to the programme, having found that the children's reading and spelling skills are very accelerated, that underachievers can be detected earlier and that the children are very motivated.

8. Overall we conclude that the synthetic phonics approach, as part of the reading curriculum, is more effective than the analytic phonics approach, even when it is supplemented with phonemic awareness training. It also led boys to reading words significantly better than girls, and there was a trend towards better spelling and reading comprehension. There is evidence that synthetic phonics is best taught at the beginning of Primary 1, as even by the end of the second year at school the children in the early synthetic phonics programme had better spelling ability, and the girls had significantly better reading ability.

CHAPTER ONE INTRODUCTION

BACKGROUND

1.1 There has been much debate in recent years about just how children should be taught to read. The phonic approach, whereby children are shown that letter sounds are a guide to the pronunciation of words, has a long history, starting to develop in the nineteenth century (Morris, 1984). In this approach, the sounds of the letters of the alphabet are taught, and children learn the correspondences between letters and groups of letters and their pronunciations (Adams, 1990).

ANALYTIC PHONICS

1.2 In analytic phonics, the predominant method in the UK, letter sounds are taught after reading has already begun, children initially learning to read some words by sight, often in the context of meaningful text. However, we have found that the analytic phonics component of the reading programme in Scotland was generally taught in a separate lesson devoted to word study (Watson, 1998). In order to teach the letter sounds whole words sharing a common initial letter sound are presented to children, e.g. 'milk', 'man', 'mother' (Harris and Smith, 1976). Attention is drawn to the /m/ sound heard at the beginning of the words. When all of the letter sounds have been taught in this way, attention is then drawn to letters at the ends of words, then in the middle, in consonant-vowel-consonant (CVC) words. Therefore children learn about letter sounds in the context of whole words. At this stage, which can be at the end of the first year at school, children may also be taught to sound and blend CVC words, e.g. /c/ /a/ /t/ -> cat, but this is not a feature of all analytic phonics schemes, although it used to be in Scotland. After mastering consonant-vowel-consonant words, children are taught about vowel and consonant digraphs and shown word families of similarly spelt words, e.g. 'cake', 'bake', 'make', 'lake'; 'coat', 'boat', 'float' etc. These spelling patterns used to be learnt by rote, with children chanting the words in unison in class, although this approach is not used now. Phonic readers also used to be widely available, some of which used very stilted text to reinforce phonic spelling patterns.

1.3 The analytic phonics method fell foul of the growing move towards child-centred education, which sought to introduce a greater emphasis on meaning and purpose in educational activities. Piaget, in a philosophical tradition stemming back to Kant and Rousseau, theorised that children were active learners, who constructed knowledge for themselves. Piaget did not specifically address learning to read, but his work encouraged teachers to tailor the teaching of reading and writing to the individual child's learning rate. At its extreme all structured lessons were abandoned, as at the William Tyndale School in London, where it was believed that child-centred education implies standing back from direct teaching in order to avoid interfering with natural growth (Blenkin and Kelly, 1987). However, many children failed to learn to read and write at this school.

1.4 Analytic phonics fell into disfavour because it was often implemented in a rote manner, and because it was usually carried out without reference to the reading of meaningful text. As part of the emphasis on children learning for themselves and carrying out meaningful activities, the whole language approach to reading developed. It was felt that it was of paramount importance that children read meaningful material; it was thought that they could learn for themselves the relationship between letters and sounds. Unfamiliar words were to be

identified by using context, rather than the 'bottom up' approach of looking at individual words and applying phonic knowledge to decode the words. Added to this was the view that as some words in the English language are irregularly spelt, the phonic approach is ineffective and leads to inaccurate pronunciation, the word 'yacht' being an extreme example of a word not amenable to being read by a such an approach.

1.5 We have carried out a number of studies to examine the effects of different types of teaching programmes on children's progress in learning to read. Watson (1998) carried out a study of 228 children learning to read in Scotland, where an analytic phonics scheme was a core component of the reading programme. The children started to learn to read by sight, but also had phonics lessons where they learnt about letter sounds at the beginning of words. This phase was completed around March of the first year at school. When tested at this stage, the children were reading 5 months below chronological age on the British Abilities Word Reading Test (Elliott, 1977). The children were then taught about CVC words, e.g. 'cat', 'sun', 'pen', with attention being drawn to letters in all position of words. Near the end of the summer term, around 2 months after the previous test phase, the children were reading only 1 month below chronological age. Towards the end of the third year at school, the girls were reading words 6.6 months above chronological age and were age appropriate in spelling. However, there was a much poorer outcome for boys, who although they read words 3 months above chronological age, were 4 months behind for their age in spelling (Schonell and Schonell, 1952). When comprehension was measured at the end of the year, the girls were reading text appropriately for chronological age, but the boys were 5 months behind. At this point, nearly 10% of the children were reading 12 or more months behind chronological age, 9.4% of the girls and 10.4% of the boys.

1.6 However, in carrying out this study Joyce Watson noticed that one class was making better progress than the others. The pace of analytic phonics teaching was accelerated in this class; the children were learning about letters in all positions of CVC words several months earlier than the other classes, and were taught to sound and blend letters to pronounce unfamiliar words. The gains these children made compared to the other classes were still apparent at the end of the third year at school.

SYNTHETIC PHONICS

1.7 This led us to look at synthetic phonics, which is a very accelerated form of phonics that does not begin by establishing an initial sight vocabulary. With this approach, before children are introduced to books, they are taught letter sounds. After the first few of these have been taught they are shown how these sounds can be blended together to build up words (Feitelson, 1988). For example, when taught the letter sounds /t/ /p/ /a/ and /s/ the children can build up the words 'tap', 'pat', 'pats', 'taps', 'a tap' etc. The children are not told the pronunciation of the new word by the teacher either before it is constructed with magnetic letters or indeed afterwards; the children sound each letter in turn and then synthesise the sounds together in order to generate the pronunciation of the word. Thus the children construct the pronunciation for themselves. Most of the letter sound correspondences, including the consonant and vowel digraphs, can be taught in the space of a few months at the start of their first year at school. This means that the children can read many of the unfamiliar words they meet in text for themselves, without the assistance of the teacher. By contrast in analytic phonics, whole words are presented and pronounced by the teacher, and the children's attention is only subsequently drawn to the information given by letter sound

correspondences. Typically in Scotland with the analytic phonics approach, it would not be until the third term of the first year at school that children would be made aware of the importance of letter sound correspondences in all positions of words, whereas in synthetic phonics this is done at the start of the year. The full analytic phonics scheme is usually not completed until the end of the third year at school.

AIMS AND OBJECTIVES

1.8 In this report we present the findings of a 7 year study in which we examined the effects of teaching synthetic phonics on literacy attainment. In an earlier study we had found that 5 year old children getting a supplementary synthetic phonics programme had better word reading, spelling and phonemic awareness skills than children getting a supplementary analytic phonics programme (Johnston and Watson, 2004).

1.9 In the new study we first of all wanted to examine whether children made better progress in reading and spelling when taught by the synthetic phonics approach, compared with the analytic phonics approach, when the programmes were carried out by the class teachers. Secondly, a key part of our study was to examine whether training in hearing sounds in spoken words, without showing the children print or letters, is an effective part of the school curriculum.

1.10 In the first year of the study we therefore carried out an experiment comparing synthetic phonics teaching with a) a standard analytic phonics programme, and b) an analytic phonics programme supplemented by a phonemic awareness training programme (see Chapter 3). An attempt was made to assign the classes to groups so that social class background was equated between the 3 teaching programmes. A complete match proved impossible, and one programme had to contain more children from less well off backgrounds than the other two programmes. It is well known that children from poorer backgrounds do less well in literacy attainment, so it was decided to make a rigorous test of synthetic phonics teaching by giving this programme to the group that had the preponderance of children from less well off backgrounds. After two terms in these programmes, all of the children were taught by the synthetic phonics method, completing the programme by the end of Primary 1. Testing before the study started and after it finished was carried out by researchers blind to the programmes by which the children were being taught.

1.11 We have now followed the progress of these children until the end of their primary schooling (Chapters 4 to 8). These years relate to Primaries 1 to 7 in Scotland. The equivalent years in England and Wales are Reception Class followed by Years 2 to 6 and in Northern Ireland Years 1 to 7.

CHAPTER TWO TESTS USED THROUGHOUT THE STUDY

VERBAL ABILITY

2.1 It was outwith our resources to carry out IQ tests on these children, but it was important to gain some measure of ability, as reading has been found to correlate with IQ. One common test of verbal ability in IQ tests is vocabulary knowledge. In this study, therefore, receptive vocabulary knowledge was tested with the British Picture Vocabulary Scale (Dunn and Dunn, 1982) in Primary 1. This yields scores standardised for age, with a mean of 100. In this test, children are read out a word and shown four pictures. Their task is to point to the picture that represents the spoken word. Vocabulary knowledge has been found to be the best single predictor of school success (Dale and Reichert, 1957).

LITERACY SKILLS

Letter Knowledge

2.2 This was pre and post tested in Primary 1. Pupils were shown a sheet with all 26 letters of the alphabet (not in alphabetical order) in lower case print. Each child was asked to give the name and the sound for each letter. Percentage correct performance in producing (i) names and (ii) sounds was calculated for each child.

Emergent Reading

2.3 The Clay 'Ready to Read' Word Test (Clay, 1979) was used in Primary 1 pre and post test. Each child was asked to read a practice word (not scored) followed by 15 very high frequency single words. This test was devised by Clay to include words known by children at the very earliest stage of learning to read. Percentage correct performance was calculated for each child.

Word Reading

2.4 The British Ability Scales Word Reading Test (Elliott, Murray and Pearson, 1977) was used from Primary 1 to Primary 5. In Primary 1, it was used in September and March. Thereafter it was used in May/June, near the end of each Session, until the end of Primary 5. It is a standardised individually administered single word reading test, containing regular and irregular words. It contains relatively few words at the level of initial readers, yielding reading ages up to 14.5 years, so the Clay Test was additionally used in order not to underestimate reading ability in the early stages. For May/June in Primary 6 and 7 the word reading section of the Wide Range Achievement (Wilkinson, 1993) test was used because a high proportion of children were at ceiling on the BAS Word Reading Test by Primary 5.

Reading comprehension

2.5 The Primary Reading Test (France, 1981) was administered in May/June of Primary 2 and Primary 3. This is a group measure of reading comprehension using cloze procedure; sentences with missing words are presented and the child has to select the appropriate word

from a list of alternatives. Thereafter the Group Reading test (Macmillan Unit, 2000) was used in May/June from Primary 4 to Primary 7.

Spelling

2.6 The Schonell Spelling Test (Schonell and Schonell, 1952) was used in May/June from Primary 1 to Primary 6. A list of words is dictated to the class. Each word is read out singly and then again in a sentence. In May/June Primary 7 the spelling section of the Wide Range Achievement test was used, as too many children were at ceiling on the Schonell Test. Unlike the Schonell, the WRAT spelling test was administered individually.

Nonword reading

2.7 Nonword reading tests measure phonic reading skill. The children were asked to read simple CVC nonwords pre and post test i.e. hig, nal, kug, bis, gok, dep, foy, kun, ged, lar, jek, lan, mip, pos, ruk, dal, ped, fik, lom, sul. For a correct score, all three sounds had to be correct in context free English pronunciation. That is, a sound was correct if it had that pronunciation in any English word.

2.8 Underachieving children were asked to read both CVC nonwords and five different types of one syllable nonwords, 12 of each type, namely, words with initial consonant blends, final consonant blends, vowel digraphs, vowel lengthening silent 'e' and initial consonant blends with vowel digraphs. Children are told that the nonwords are made up and do not make sense as they are not real words. Children are asked to say each nonword and they are categorised as accurate if an acceptable pronunciation is produced.

Irregular words

2.9 In March of Primary 1 an analysis was made of the children's ability to read 7 irregular words from the BAS Word Reading Test. These were selected as being difficult to read on the basis of sounding and blending the letters. The percentage of correct items for each child was calculated. The items were 'the, one, you, said, money, light, glove'.

Reading by analogy

2.10 In March of Primary 1, at the end of the 16 week programme, the children were asked to read a list of 40 words. They were then asked to read 5 clue words that would assist them in reading the 40 words by analogy on second showing, i.e. prior exposure to 'ring' should facilitate the pronunciation of 'sing'. In order to ensure that all of the children knew how these words were pronounced, if the child could not read the word, it was pronounced for them. These clue words were then removed, and the 40 words shown again. The gain in reading skill after exposure to the clue words was assessed. The items were taken from Muter, Snowling, and Taylor (1994).

PHONOLOGICAL SKILLS

Phoneme Segmentation.

2.11 To test the children's ability to segment words into phonemes, the Yopp-Singer Test (Yopp, 1988) was used pre and post test in Primary 1. There were 3 practice items, the first item being demonstrated by the researcher and the child attempting the other two items. The test stimuli consisted of 2 and 3 phoneme words. Each child was asked to say the word spoken by the researcher and then say all the sounds in the word. An item was scored correct if all phonemes had been correctly segmented.

Generating rhyme.

2.12 The children were asked to generate rhyming words pre and post test in Primary 1. Both the tester and the child had a hand puppet. Nursery rhymes were discussed to make the task clear to the children. For practice the researcher's puppet 'said' a word and each child was asked to produce a rhyming word through his/her puppet. Twelve words were read out one at a time, using the experimenter's puppet (" hop, tall, hen, dog, man, coat, tail, door, tree, jump, tin, next") and for each word pupils were asked to give rhymes. The mean percentage number of rhymes given by each child was calculated; nonwords were accepted as rhymes.

SOCIAL BACKGROUND QUESTIONNAIRE

2.13 We developed a questionnaire to ask parents about their educational levels, attitudes to literacy learning, and their and their children's usage of books and libraries. See Appendix 1. This was sent out in January when the children were in Primary 6.

ATTITUDES TO READING

2.14 The ATR2 questionnaire (Ewing and Johnstone, 1981) was developed at the former Dundee College of Education, one of the purposes of the design being to elicit information about how positive children were about reading. We administered it to the children in Primary 7. See Appendix 2.

DEPRIVATION INDEX

2.15 Each school was assigned a score on the Deprivation Index devised by Clackmannanshire Council. This index is based on the percentage of unemployed, of households without a car, of the number of children and no earners, of the number of young lone parents, of school clothing grants, of free school meals, and of parents of social class 1 or 2. The schools in the sample considered disadvantaged had scores from 0.10 to 2.12, and those considered advantaged ranged from -0.59 to -0.93. The index we used was devised for the years 1997- 1998, which was when the study started.

CHAPTER THREE PRIMARY 1

COMPARISON OF THE EFFECTIVENESS OF ANALYTIC AND SYNTHETIC PHONICS TEACHING

3.1 In the present study we wished to investigate whether analytic phonics teaching would be found to be as effective in developing reading and spelling skills as synthetic phonics if there was an additional phonological awareness training programme.

3.2 Altogether we studied 304 children in 13 Primary 1 classes in Clackmannanshire. Our interventions began shortly after the children started school at around the age of 5. We had three teaching programmes for the class teachers to implement.

ANALYTIC PHONICS ONLY GROUP

3.3 Four classes were taught about the relationship between letters and sounds using an analytic phonics approach (see Chapter 1).

ANALYTIC PHONICS+ PHONOLOGICAL AWARENESS GROUP

3.4 Four classes carried out a programme where in addition to analytic phonics teaching, children were taught how to segment and blend spoken words at the level of both rhymes and phonemes, without the aid of print or letters.

SYNTHETIC PHONICS GROUP

3.5 Five classes of children were taught by a synthetic phonics approach (see Chapter 1).

3.6 The programmes lasted for 16 weeks, the children receiving their interventions via scripted whole class programmes which lasted for 20 minutes a day.

3.7 The children in each of the three groups were assigned the deprivation scores that Clackmannanshire Council had calculated for their school. Using the Council's classification of these scores into advantaged and disadvantaged, it was found that the groups differed in degree of deprivation, $F(2,299)=140.8$, $p<.001$. Newman Keuls tests showed that the synthetic phonics group were more deprived than the other two groups, who did not differ from each other. It was important to examine the effects of socio-economic status, as significant social class differences in reading have been found. In the National Child Development Study (Davie et al, 1972), children whose fathers' had unskilled occupations had 5 times the reading problems of children whose fathers' had professional or managerial jobs, at the age of 7. More recently, Stuart, Dixon, Masterson and Quinlan (1998) have shown that in Reception, Year 1, and Year 2 classes in London, the children with middle class parents had significantly better word reading skills than those with working class parents. Finally, Duncan and Seymour (2000) have found that children in Primary 1 in Scotland show social class differences in word reading ability, children from better off homes reading better. Thus as the synthetic phonics group was more deprived than the other 2

groups, if it showed better literacy skills, then this would be the opposite of what would be predicted from the socio-economic backgrounds.

RESULTS

3.8 At pre-test, see Table 3.1 for means and standard deviations, the children in the three groups were found to be matched on all tasks except for knowledge of letter sounds $F(2,301)= 3.3, p<.04$; the analytic phonics only group knew more letter sounds than the other two groups.

3.9 At the first post test, see Table 3.1 for means and standard deviations, it was found that the groups differed in single word reading ability (British Ability Scales Word Reading Test, Elliott *et al* 1977), $F(2,289)= 30.7, p<.001$; Newman Keuls tests showed that the synthetic phonics group children had significantly higher reading ages than the other two groups, who did not differ from each other. The groups also differed on the more sensitive test of emergent reading (Clay, 1979), $F(2,289)= 27.2, p<.001$; Newman Keuls tests showed that not only did the synthetic phonics group children perform better than the other two groups, but the analytic phonics only group performed better than the analytic phonics+phonological awareness group. There was a group difference in nonword reading, $F(2,289)= 57.8, p<.001$, Newman Keuls tests showed that nonword reading was better in the synthetic phonics group than the other two groups, and that the other two groups did not differ from each other. There was also a group difference in the ability to spell dictated words (Schonell & Schonell, 1952), $F(2,289)= 57.7, p<.001$; Newman Keuls tests showed that the synthetic phonics group had higher spelling ages than the other two groups, who did not differ from each other. Knowledge of letter sounds was also differentially affected by the training schemes, $F(2,289)= 74.2, p<.001$; Newman Keuls tests showed that the synthetic phonics group were ahead of the other two groups, although at the pre-test they had been behind the analytic

TABLE 3.1

Mean chronological age, IQ (BPVS), reading age (British Ability Scales Word Reading test), spelling age (Schonell spelling test), emergent reading (Clay Ready to Read Test), letter sound knowledge, phoneme segmentation (Yopp-Singer Test), rhyme skills, and nonword reading (standard deviations in brackets), pre-test and first post-test, Study 2

Research Group	Age	BPVS	Reading Age	Spelling Age	Emergent Reading	Letter Knowledge	Phonemic Segmentation	Rhyme Skills	Nonwords
Pretest	Years	Standardised Score	Years	Years	%	%	%	%	%
Analytic phonics Controls, n=109	5.0 (0.3)	92.5 (15.1)	4.9 (0.1)	5.0 (0.1)	0.9 (4.8)	9.0 (15.4)	4.5 (18.3)	17.9 (30.6)	0.3 (1.8)
Analytic phonics + phonological awareness, n=78	5.0 (0.3)	90.2 (14.0)	4.9 (0.4)	5.0 (0.1)	2.1 (12.5)	3.9 (8.8)	2.7 (9.9)	21.9 (33.1)	0.6 (4.6)
Synthetic Phonics n=117	5.0 (0.5)	95.2 (16.8)	4.9 (0.1)	5.0 (0.0)	0.7 (6.2)	6.7 (14.3)	4.1 (14.5)	20.0 (29.1)	0.0 (0.0)
First Post-Test									
Analytic phonics controls n=104	5.4 (0.3)	-	5.4 (0.6)	5.2 (0.4)	37.8 (24.0)	58.1 (24.7)	17.2 (27.4)	26.4 (36.6)	8.8 (22.4)
Analytic phonics + phonological awareness, n=75	5.4 (0.3)	-	5.4 (0.7)	5.3 (0.5)	23.9 (25.6)	59.9 (24.8)	34.7 (44.6)	36.4 (36.4)	15.8 (29.3)
Synthetic phonics n=113	5.5 (0.3)	-	6.04 (0.8)	6.0 (0.7)	53.4 (30.1)	90.1 (14.5)	64.8 (37.9)	46.5 (29.1)	53.3 (41.2)

phonics group. There was also a group difference in phoneme segmentation skill as measured by the Yopp-Singer Test (Yopp, 1988), $F(2,289)= 57.1, p<.001$; Newman Keuls tests showed that although the analytic phonics+ phonological awareness group was significantly better at this task than the analytic phonics only group, both of these groups were outperformed by the synthetic phonics group. The groups differed in their ability to produce rhymes for auditorily presented words, $F(2,289)=6.8, p<.001$. Finally, in terms of irregular word reading, the groups were found to differ, $F(2, 289)=10.3, p<.001$. Newman Keuls tests showed that the synthetic phonics group outperformed the analytic phonics only group, but not the analytic phonics+phonological awareness group; the two analytic phonics groups did not differ from each other. See Table 2 for means and standard deviations. Newman Keuls tests showed that the synthetic phonics children read these items better than the other two groups, who did not differ. Thus the synthetic phonics trained group outperformed the analytic phonics trained group, despite being from significantly less advantaged homes.

3.10 An examination was also made at the first post-test of ability to read words by analogy. See Table 3.2 for means and standard deviations. The children were asked to read a list of 40 words. They then read 5 clue words that would assist them in reading the 40 words by analogy on second showing, i.e. prior exposure to 'ring' should facilitate the pronunciation of 'sing'. These clue words were then removed, and the 40 words shown again. The items were taken from Muter, Snowling, and Taylor (1994). The gain in reading skill after exposure to the clue words was assessed. It was found on the analogy task that there was an interaction between groups and pre- and post- test reading performance, $F(2,289)= 19.1, p<.001$. Newman Keuls tests showed that the synthetic phonics children were the only group to show an increase in reading skill between pre- and post-test, and they also showed superior reading to the other groups in both test sessions. There was a significant difference between groups in clue word reading, $F(2, 289)= 23.5, p<.001$, Newman Keuls tests showing that the synthetic phonics group read the clue words significantly better than the other two groups. Analysis of covariance was therefore used to control for differences in cue reading ability; there was still a significant group difference in gains in word reading at post-test, $F(2, 288)= 7.6, p<.001$, in favour of the synthetic phonics group. A similar analysis with reading age as the covariate also showed a significant difference between the groups in gain scores $F(2,288)=8.8, p<.001$. Thus the ability to read by analogy could not be accounted for in terms of the superior word recognition ability of the synthetic phonics taught group, it indicates a qualitative difference in their approach to reading.

TABLE 3.2

Mean % correct on Analogy Reading Task and Irregular Word Reading at end of training programme (first post-test), Study 2

Research group	Pre-test scores	Clue word reading scores	Post-test scores	Irregular words
Analytic phonics controls, n=104	2.9 (12.0)	6.3 (18.3)	2.6 (9.3)	21.4 (19.5)
Analytic phonics + phonological awareness, n= 75	4.9 (15.8)	11.4 (27.3)	5.5 (16.2)	15.3 (23.1)
Synthetic phonics, n=113	16.9 (25.7)	30.5 (32.9)	22.7 (23.7)	30.2 (25.4)

3.11 After the first post-test, the two analytic phonics groups carried out the synthetic phonics programme, completing it by the end of their first year at school. The synthetic phonics taught children spent this time consolidating their learning rather than working on further grapheme to phoneme correspondences. In May of the following school year, 15 months after the end of the programme, all of the children were re-tested on the standardised tests of single word reading and spelling. See Table 3.3 for means and standard deviations.

TABLE 3.3

Mean chronological age, mean word reading age (British Ability Scales Word Reading test), and mean spelling age at second post-test, 15 months after termination of the programme, after all groups had been introduced to synthetic phonics.

<i>Research Group</i>	Age	Reading Age	Spelling Age
Analytic phonics controls , n=95	6.7 (0.3)	7.4 (0.9)	7.5 (0.7)
Analytic phonics and phonological awareness, n=66	6.7 (0.4)	7.6 (1.3)	7.4 (0.7)
Synthetic phonics n=103	6.8 (0.3)	7.7 (1.1)	7.8 (0.9)

3.12 There was no longer a significant difference in reading between the three groups, $F(2,265) = 2.8, p=.064$, although it was close to significance. Separate analyses by sex showed that boys' word reading skills did not differ according to what group they had initially been in, $F(2,138)<1$, but girls' did, $F(2,124)= 4.0, p<.02$. Newman Keuls tests for the girls showed that the synthetic phonics group (mean reading age 7.8 years, S.D. 0.9) and analytic phonics plus phonemic awareness training group (mean reading age 7.7 years, S.D. 0.9) both outperformed the analytic phonics only group (mean reading age 7.3 years, S.D. 0.9), and did not differ from each other. In spelling there was a significant difference between groups $F(2, 261) =7.4, p<.001$. Newman Keuls tests showed that the synthetic phonics group had better spelling than the other two groups, who did not differ from each other. Reading and spelling scores were found to be significantly above chronological age, $F(1,267) = 193.2, p<.001, F(1,264)= 337.6, p<.001$, respectively. On the test of reading comprehension (Primary Reading Test, France, 1981), there was no significant difference between groups, $F(2,255)=2.0, p>.05$.

3.13 An examination was also made of whether the children's reading comprehension test scores were higher than the chronological ages; this was found to be the case, $F(1,256)= 53.9, p<.001$. See Table 3.4 for means and standard deviations.

TABLE 3.4

Mean chronological age, mean reading comprehension age (Primary Reading Test), second post-test, 15 months after termination of the programme, after all groups had been introduced to synthetic phonics.

<i>Research Group</i>	Age	Reading Age
Analytic phonics	6.8	7.0
controls , n=89	(0.3)	(1.0)
Analytic phonics + phonological awareness, n=64	6.7	7.0
	(0.4)	(1.0)
Synthetic phonics	6.8	7.3
n=105	(0.3)	(1.1)

SUMMARY

3.14 This chapter examined the extent to which children learning by a synthetic phonics approach read and spelt better than children taught either by a standard analytic phonics approach, or by a standard analytic phonics approach supplemented by phonemic awareness training. It was found that:

- At the end of the experimental programmes, the synthetic phonics group read 7 months ahead of chronological age, and 7 months ahead of the other two groups. They were also 7 months ahead of chronological age in spelling, and spelt 8 to 9 months ahead of the other two groups.
- At the end of Primary 2, the girls who had had the programme at the start of schooling read better than those initially taught by the standard analytic phonics approach. However, the timing of this programme had no impact on the boys' word reading skills at the end of Primary 2.
- At the end of Primary 2, the early-taught synthetic phonics group (boys and girls) spelt better than the other two groups

CHAPTER FOUR PRIMARY 2 TO PRIMARY 7

WORD READING, SPELLING AND READING COMPREHENSION IN BOYS VERSUS GIRLS

4.1 The purpose of these analyses was to examine the extent to which the synthetic phonics programme had boosted literacy skills over what would be expected for chronological age from Primary 2 to Primary 7, whether the gains in literacy skill increased or decreased over time after the end of the programme, and whether there were any differences between boys and girls in literacy skills.

WORD READING FROM PRIMARY 2 TO PRIMARY 7

4.2 A three way analysis of variance was carried out, there being one between subjects factor of sex (boys versus girls) and two within subjects factors, time (Primary 2 to Primary 7) and word reading advantage (the extent to which reading exceeded chronological age). In this analysis there were 105 boys and 97 girls. See Table 4.1 for means and standard deviations, and Figure 4.1.

4.3 A main effect of sex was found, $F(1,200)=5.8$, $p<.02$. There was also a main effect of time, $F(5,1000)=1911.81$, $p<.001$, and a main effect of word reading advantage, $F(1,1000)=229.20$, $p<.001$, with reading age exceeding chronological age. There were also second order interactions between word reading advantage and sex, $F(1,1000)=4.0$, $p<.05$, and word reading advantage and time, $F(5,1000)=68.1$, $p<.001$. However, these were subsumed by a third order interaction between word reading advantage, time, and sex, $F(5,1000)=2.56$, $p<.03$. Newman Keuls post hoc tests showed that word reading was ahead of chronological age at all ages. It was also found that boys and girls performed the same in word reading at Primary 2, but thereafter the boys read better than the girls.

4.4 Scheffe tests were carried out to compare pairs of means. These analyses showed that for both boys and girls, the advantage for reading age over chronological age was greater at Primary 7 than all previous years, showing that the increment in reading skills for chronological age was still increasing 6 years after the programme had ended. It was also found that in Primaries 6 and 7, the boys showed a significantly greater advantage of reading age over chronological age than the girls. By the end of the study the children were reading 3.5 years ahead of chronological age, with the boys reading around 11 months ahead of the girls.

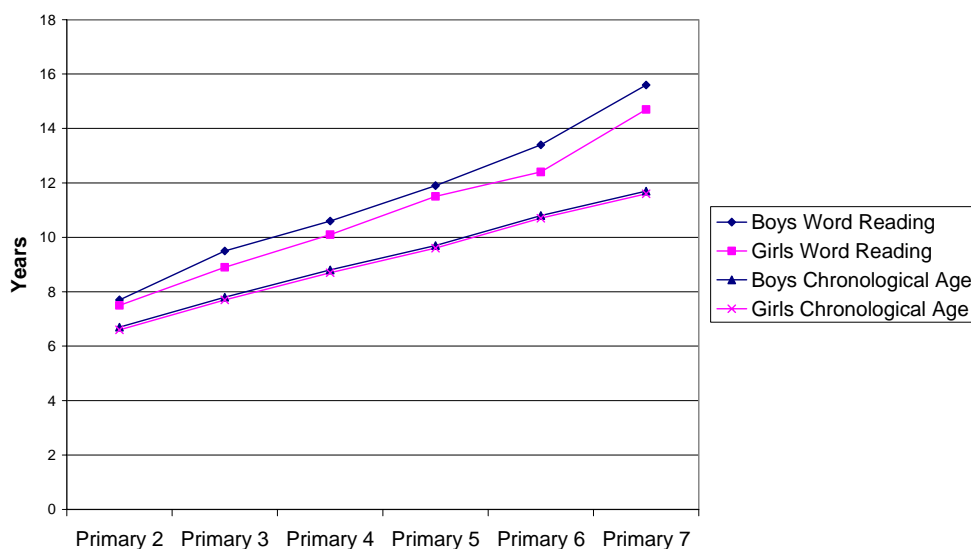
TABLE 4.1

Mean word reading ages, chronological ages and word reading advantage (extent to which word reading exceeds chronological age) in years for boys (B) and girls (G), Primary 2 to Primary 7 (standard deviations in brackets).

	Primary 2		Primary 3		Primary 4		Primary 5		Primary 6		Primary 7	
	B	G	B	G	B	G	B	G	B	G	B	G
Word reading age	7.7 (1.1)	7.5 (1.1)	9.5 (1.9)	8.9 (1.9)	10.6 (1.9)	10.1 (1.9)	11.9 (2.1)	11.5 (2.1)	13.4 (3.0)	12.4 (3.0)	15.6 (3.2)	14.7 (3.2)
Chronological age	6.7 (0.3)	6.6 (0.3)	7.8 (0.3)	7.7 (0.3)	8.8 (0.3)	8.7 (0.3)	9.7 (0.3)	9.6 (0.3)	10.8 (0.3)	10.7 (0.3)	11.7 (0.4)	11.6 (0.4)
Word reading advantage	1.0	0.9	1.7	1.2	1.8	1.4	2.2	1.9	2.6	1.7	3.9	3.1

FIGURE 4.1

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



SPELLING FROM PRIMARY 2 TO PRIMARY 7

4.5 A three way analysis of variance was carried out, there being one between subjects factor of sex (boys versus girls) and two within subjects factors, time (Primary 2 to Primary 7) and spelling advantage (the extent to which spelling exceeded chronological age). In this analysis there were 95 boys and 84 girls. See Table 4.2 for means and standard deviations, and Figure 4.2.

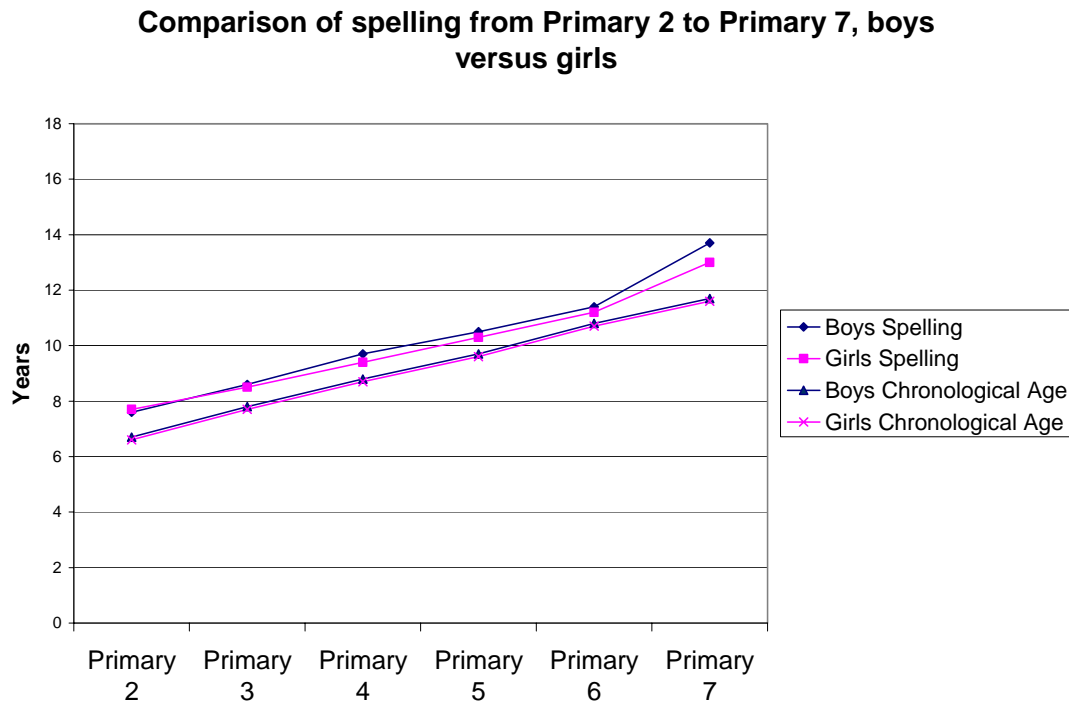
4.6 There was no main effect of sex, $F(1,177)=2.06$, N.S. There was a main effect of spelling advantage, $F(1,885)=87.13$, $p<.001$, with spelling age exceeding chronological age, and of time, $F(5,885)=2523.35$, $p<.001$. However, these factors also interacted with each other, $F(5, 885)=27.47$, $p<.001$, and with sex, $F(5,885)= 2.56$, $p<.026$. Newman Keuls tests on the sex by spelling advantage by time interaction showed that spelling was ahead of chronological age at all ages for both boys and girls, but that the boys spelt better than the girls in Primaries 4, 6 and 7. The advantage for boys was small in Primaries 4 and 6, but by Primary 7 they were spelling 8.6 months ahead of the girls. Scheffe post hoc tests were carried out to compare the advantage in spelling age over chronological age across time. These analyses showed that the advantage at Primary 7 was greater than it had been in all previous years for both boys and girls, showing that the effect had increased with time. No other factors interacted.

TABLE 4.2

Mean word spelling ages, chronological ages and spelling advantage (extent to which spelling exceeds chronological age) in years for boys (B) and girls (G), Primary 2 to Primary 7 (standard deviations in brackets).

	Primary 2		Primary 3		Primary 4		Primary 5		Primary 6		Primary 7	
	B	G	B	G	B	G	B	G	B	G	B	G
Spelling age	7.6 (0.8)	7.7 (0.8)	8.6 (1.0)	8.5 (1.0)	9.7 (1.2)	9.4 (1.2)	10.5 (1.4)	10.3 (1.4)	11.4 (1.4)	11.2 (1.4)	13.8 (3.2)	13.0 (3.2)
Chronological age	6.7 (0.3)	6.6 (0.3)	7.8 (0.3)	7.7 (0.3)	8.8 (0.3)	8.7 (0.3)	9.7 (0.3)	9.6 (0.3)	10.8 (0.3)	10.7 (0.3)	11.7 (0.4)	11.6 (0.4)
Spelling advantage	0.9	1.1	0.8	0.8	0.9	0.7	0.8	0.7	0.6	0.5	2.1	1.4

FIGURE 4.2



READING COMPREHENSION FROM PRIMARY 2 TO PRIMARY 7

4.7 A three way analysis of variance was carried out, there being one between subjects factor of sex (boys versus girls) and two within subjects factors, time (Primary 2 to Primary 7) and reading comprehension advantage (the extent to which reading comprehension exceeded chronological age). In this analysis there were 89 boys and 88 girls. See Table 4.3 for means and standard deviations, and Figure 4.3.

4.8 There was no main effect of sex, $F(1,175)=1.47$, N.S. There was a main effect of reading comprehension advantage, $F(1,875)= 16.65$, $p<.001$, with reading comprehension age exceeding chronological age, and of time $F(5,875)= 22874.00$, $p<.001$. However, these factors also interacted, $F(5,875)=195.01$, $p<.001$. Newman Keuls tests showed that reading comprehension was ahead of chronological age at all age levels. Scheffe tests showed that the reading comprehension advantage was greater at Primary 2 than at Primary 7, showing that the advantage of reading comprehension age over chronological age had decreased over time, although it was still significant. The children in Primary 7 were now comprehending what they read 3.5 months above what would be expected for their chronological age, whereas at Primary 2 there had been a 7 months advantage.

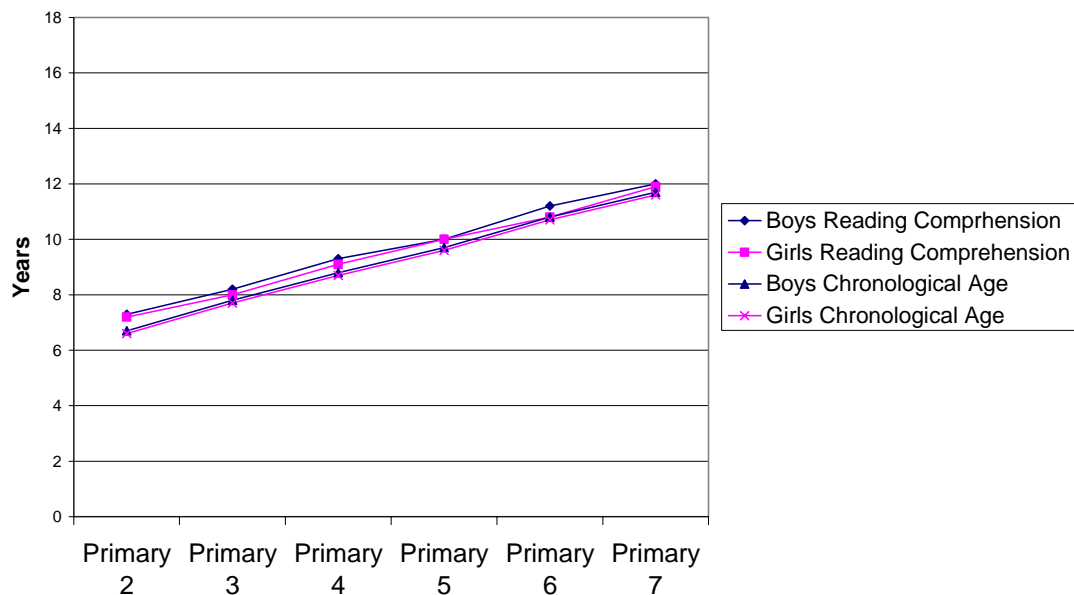
TABLE 4.3

Mean reading comprehension ages, chronological ages and reading comprehension advantage (extent to which word reading exceeds chronological age) in years for boys (B) and girls (G), Primary 2 to Primary 7 (standard deviations in brackets).

	Primary 2		Primary 3		Primary 4		Primary 5		Primary 6		Primary 7	
	B	G	B	G	B	G	B	G	B	G	B	G
Reading Comprehension age	7.3 (1.1)	7.2 (1.1)	8.2 (1.1)	8.0 (1.1)	9.3 (1.4)	9.1 (1.4)	10.0 (1.3)	10.0 (1.3)	11.2 (2.0)	10.8 (2.0)	12.00 (2.0)	11.9 (2.0)
Chronological age	6.7 (0.3)	6.6 (0.3)	7.8 (0.3)	7.7 (0.3)	8.8 (0.3)	8.7 (0.3)	9.7 (0.3)	9.6 (0.3)	10.8 (0.3)	10.7 (0.3)	11.7 (0.4)	11.6 (0.4)
Reading Comprehension advantage	0.6	0.6	0.4	0.3	0.5	0.4	0.3	0.4	0.4	0.1	0.3	0.3

FIGURE 4.3

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



SUMMARY

4.9 In this chapter we compared the performance of boys versus girls from Primary 2 to Primary 7.

- We found that although the boys and the girls read words equally well in Primary 2, from Primary 3 to Primary 7 the boys performed significantly better than the girls
- The boys spelt better than the girls in Primaries 4, 6, and 7.
- The analyses also showed that the advantage for chronological age the children showed in word reading and spelling was increasing over time, years after the intervention had ended

CHAPTER FIVE PUPIL AND TEACHER QUESTIONNAIRES

5.1 In this chapter we examine the children's attitudes to reading in their last year at school and also report the teachers' views of the programme.

ATTITUDES TO READING

5.2 In June of Primary 7, the children filled in a questionnaire that asked them about their attitudes to reading (ATR2, Ewing and Johnstone, 1981, see Appendix 2). An overall score was calculated, the higher the score the more positive the child's attitude, see Table 5.1. In Ewing and Johnstone's (1981) original study, girls were found to have a more positive attitude to reading than boys. There was a similar finding in the PIRLS study of 10 year olds in 35 countries (Mullis, Martin, Gonzalez, & Kennedy 2003), where it was also found that more girls than boys reported reading fiction, while comparable percentages of girls and boys read non-fiction.

TABLE 5.1

Primary 7 ATR2 Attitudes to Reading Questionnaire, mean score (standard deviations in brackets)

	Boys	Girls
Attitude score	53.6 (13.3)	61.1 (13.3)
N	116	108

5.3 The maximum possible score was 90. A one way analysis of variance showed that the girls had a more positive attitude to reading than the boys, $F(1, 222)=17.7$, $p<.001$.

5.4 We added three questions of our own (See Appendix 2)

Are you a member of a public library outside school?

The mean for the boys was 1.5 and for girls it was 1.3, $F(1,221)=4.7$, $p<.001$. As a higher score for this question indicated more 'no' responses, this means that fewer boys belonged to a public library than girls.

How much do you like reading?

It was found that girls reported liking reading more than boys (mean for boys 3.2, mean for girls, 3.8), $F(1,222)= 14.3$, $p<.001$.

How much fiction/non-fiction do you read?

A higher score here indicated greater fiction reading. The mean for boys was 3.4, and the mean for girls was 3.3. There was no significant difference in responses made by boys versus girls, $F(1,222) < 1$. The mean scores indicate that the children's average score fell between the category of reading equal amounts of fiction and non-fiction and the category of reading more fiction than non-fiction. Thus there was a slight skew towards more fiction reading in the sample. Most studies show boys to read more non-fiction than girls (Mullis et al 2003), so this was an atypical finding.

TEACHERS' VIEW OF THE SYNTHETIC PHONICS PROGRAMME

5.5 At the end of the seven year longitudinal study, a short Questionnaire was distributed to each of the eight schools in the study to find out the teachers' reactions to the effects of the synthetic phonics programme on reading and spelling attainment. All were returned, some completed by teachers who had delivered the programme, others by the head teachers themselves. It should be noted that these comments do not necessarily relate to the programme when it was first implemented, and may relate to the programme as currently implemented. The teachers' responses are as follows:

5.6 *Do you feel that the teaching of reading, spelling and writing has become more accelerated in Primary 1 since the synthetic phonics programme started?*

School	Teachers' Responses
1	Yes, definitely accelerated. However, for the last two years, composite classes have had to be used and this type of management slowed down the pace.
2	Yes. Best results ever achieved – never seen before in 30 years of teaching. One child writing own story aged 4. Writing and spelling amazing. I would normally have expected such work at Primary 3 stage. Children also very motivated. (Primary 2 teacher).
3	Yes.
4	Yes, without doubt. Teachers, pupils and parents enjoy the challenging pace, the systematic approach and the daily routine.
5	Yes. There is a quicker pace to the teaching of phonics and writing. The reading scheme was introduced six years ago and complements the skills taught in the synthetic phonics programme.
6	Yes. Previously only worked on 26 single sounds in P1 – blending didn't start to P2. Holistic approach has seen acceleration and improved attainment in reading/spelling scores.
7	Yes.
8	Children read faster, using phonological awareness to aid independent writing. Care should still be taken to balance pace of lessons, consolidation and retention. Children have more ownership and understanding of why they need sounds and how they read.

5.7 *Do you feel that since the programme started teachers have higher expectations of the level that can be achieved in reading, spelling and writing in Primary 1?*

School	Teachers' Responses
1	Teachers do have higher expectations though it can depend on the teacher e.g. a late entrant to teaching and a composite class.
2	Yes. Children are reading earlier because they are blending the sounds that they know. Improved confidence is helping their spelling and writing too.
3	Yes.
4	Yes. When staff are challenged, this helps to motivate them to challenge pupils.
5	Yes, there has been a raising of overall expectations of the children. This is especially so with children who require additional support in these areas.
6	Definitely. Building on success and earlier intervention to support less able pupils keep up with the pace and this is paying dividends. We know our children can achieve therefore don't make excuses e.g. 'this is an area of deprivation'. We make a difference and we can prove it!
7	Expectations were raised initially. The accelerated pace of teaching and learning became the norm. Over 7 years the pace has varied.
8	Much higher expectations but with the appropriate supports given as suggested in the programme and use of personal judgment.

5.8 *Do you feel that children needing learning support are detected sooner? At what stage are they identified now and at what stage would they have been typically identified before the programme started?*

School	Teachers' Responses
1	We have always tried to identify children needing learning support as early as possible, usually before Christmas. However with the synthetic phonics programme we can now recognise whether the problems are auditory/visual.
2	Yes. Children are now being identified by the end of the Christmas term in Primary 1. Before the programme started this was probably not done until the end of Primary 1 and into Primary 2.
3	Yes. We are monitoring progress in Primary 1 and beginning catch-up groups in the summer term. Learning Support in place for children by early Primary 2. Often this would have been P3 before the programme started.
4	Yes. Identified pre-Christmas. Prior to the programme, pre-Easter.

5	Due to the steps in teaching phonics, we are able to offer support earlier by utilising our support staff in activities modelled in class by teachers. We have found that for some children this “catch-up” group situation whereby they have additional 10 minutes support time regularly is all that is required to support their learning.
6	Yes. Support for Learning is involved in providing support for those pupils who require extra reinforcement or who have had a period of absence (necessary because of pace of programme) in flexible groups from November of P1 onwards. Previously Support for Learning intervention would have been at the beginning of P2 because pace of teaching was so slow in P1.
7	Gains are identified clearly due to having baseline assessments. Any children who are not gaining in line with expectations are noticed quickly. Teachers would use a range of informal/formal assessments, professional judgment being to the fore. Children would be identified as they are currently - what we would have done about it is another question.
8	Yes. By the end of the first set of letters children who may have difficulty can be highlighted. By Christmas some of these children will no longer be a concern as they needed time to settle and adapt to school. By January, Primary 1, it is very clear who will need significant support.

5.9 Please add any other comments you would like to make.

School	Teachers' Responses
1,2,3	No extra comments.
4	Synthetic phonics sets the standard'
5	We have found the synthetic approach very positive and effective. Our pupils in P1-P3 continue to achieve steadily. We continue to review and monitor the learning and teaching programme in this area and the support strategies that we have in place.
6	Involvement with synthetic phonics was a professional 'life-changing' experience that changed the teaching of English language in our school.
7	The children are very good decoders and encoders to a certain level. Comprehension levels are not in line with the decoding and encoding skills. *
8	Synthetic phonics has provided staff development opportunities alongside curricular development and has empowered both teachers and pupils.

*It should be noted that there are limitations on increasing reading comprehension, such as listening comprehension, verbal ability, general knowledge and memory. These factors have

less effect on the development of word reading and spelling skills. Therefore it is harder to increase reading comprehension than word reading and spelling.

5.10 It can be seen that teachers have found that the children's literacy skills are much improved, that the less able pupils seem to gain particular benefit and that the children experiencing difficulties can be detected much earlier than they were before. It is also evident that teachers now have much higher expectations of what their pupils can achieve.

SUMMARY

5.11 In this chapter we examined children's attitudes to reading and teachers' views of the programme.

- It was found that the girls showed a more positive attitude to reading than the boys, and made more use of the public library, despite having lower word recognition skills
- No difference was found between boys and girls in the extent to which they read fiction, contrary to the findings of an international study of 10 year olds in 35 countries
- The teachers felt that reading, spelling and writing skills had been greatly accelerated by the programme
- In terms of detecting children needing learning support, teachers reported that they were now able to do this much earlier.

CHAPTER SIX PRIMARY 7

CORRELATIONAL ANALYSIS OF PARENTAL QUESTIONNAIRES, ATTITUDES TO READING QUESTIONNAIRE, DEPRIVATION INDEX AND LITERACY SKILLS

DEPRIVATION SCORES, ATTITUDE TO READING AND LITERACY SCORES

6.1 For boys and girls together, the less deprived the home, the better the children were at word reading ($r(235)=-0.24, p<.0010$ and spelling ($r(238)=-0.19, p<.004$). In the less deprived homes there were reported to be more children's ($r(112)=-0.20, p<.03$) and adults' ($r(112)=-0.24, p<.02$) books, and the adults showed greater use of the public library, ($r(112)=0.20, p<.04$). The more deprived the home the less likely it was that the children had attended a mother and toddler group ($r(112)=0.19, p<.05$), a playgroup, ($r(112)=0.35, p<.001$), or been looked after by a child minder ($r(112)=0.23, p<.02$). There was no association between deprivation score and the children's attitude to reading, ($r(222)=.09, N.S.$), nor was it associated with the value the parents placed on learning to read ($r(110)=-0.16, N.S$) or spell ($r(111)=-.07, N.S$).

6.2 There were some differences in the correlations shown by boys and girls separately. For boys, the less deprived ones had a better attitude to reading ($r(114)=-0.20, p<.04$) and liked reading more ($r(114)=-0.24, p<.02$). They also had better word reading ($r(117)=-0.25, p<.01$). Parents from less deprived backgrounds had more books at home ($r(58)=-0.29, p<.03$), and their boys were more likely to have been to a playgroup ($r(58)=0.32, p<.02$). All of the boys whose parents had filled in a questionnaire had attended a nursery, so no correlations could be computed for this variable. There was no association between the deprivation score and having parents who thought that learning to read was important ($r(56)=-0.02, N.S$).

6.3 For girls, unlike boys, there was no association between the deprivation index and their attitude to reading ($r(106)=.05, N.S$), or how much they liked reading, ($r(106)=.07, N.S$). As for boys, girls from less deprived homes were better at word reading ($r(115)=-0.21, p<.025$) and spelling ($r(115)=-0.20, p<.04$), and they were more likely to have been to a playgroup ($r(51)=0.36, p<.01$). However, unlike boys, the less deprived girls were more likely to have parents who thought that learning to read was important ($r(51)=-0.33, p<.02$).

PARENTAL FACTORS, ATTITUDE TO READING AND LITERACY SCORES

6.4 For boys and girls together, the mothers' and fathers' level of education correlated ($r(89)=0.30, p<.005$). Mothers' education correlated with the number of children's books in the house ($r(110)=0.43, p<.001$). For both mothers and fathers, there were significant correlations between educational level and the number of books for adults in the house ($r(110)=0.35, p<.001, r(89)=.50, p<.001$ respectively). The less educated the mothers and fathers the less likely their children were to attend mother and toddler groups ($r(110)=-0.21, p<.03, r(89)=-0.35, p<.001$, respectively); it was also found for fathers that the lower their educational level, the less likely their children were to go to playgroups ($r(89)=-0.32, p<.002$). The more educated the fathers the more likely the children could read letters

($r(89)=-0.33$, $p<.001$) and write letters ($r(89)=-0.33$, $p<.001$) of the alphabet before starting school.

6.5 For boys, mothers' educational level was associated with more books in the house for children ($r(57)=0.40$, $p<.003$), and both mothers' and fathers' educational level was associated with the number of books in the house for adults ($r(57)=0.38$, $p<.003$, $r(47)=0.46$, $p<.001$, respectively). Greater attendance at mother and toddler groups and playgroups was associated with higher level of fathers' educational level only ($r(47)=-0.39$, $p<.01$, $r(47)=-0.40$, $p<.01$, respectively). All of the boys had attended a nursery class, so no correlations could be computed. The mothers' educational level was associated with greater adult use of the library ($r(57)=-0.34$, $p<.01$). The ability to write letters in preschool was associated with the fathers' educational level ($r(47)=-0.31$, $p<.04$).

6.6 For girls, unlike boys, mothers' and fathers' educational level was associated with word reading ($r(58)=0.29$, $p<.03$, $r(39)=0.30$, $p<.054$), spelling ($r(58)=0.40$, $p<.002$, $r(39)=0.36$, $p<.02$) and reading comprehension skills ($r(55)=0.40$, $p<.002$, $r(38)=0.36$, $p<.03$). The higher the mothers' educational level the more books there were in the house ($r(50)=0.45$, $p<.001$) and the number of books for adults in the house increased as mothers' and fathers' educational level increased ($r(50)=0.32$, $p<.03$, $r(39)=0.56$, $p<.001$, respectively). The more educated the mother the less likely the child could write letters of the alphabet in preschool ($r(50)=0.32$, $p<.02$), whereas for fathers, the more educated they were the more likely their daughters could read ($r(39)=-0.57$, $p<.001$) and write the alphabet ($r(39)=-0.37$, $p<.02$) in preschool. The more educated the mother, the more likely it was that the girls attended a mother and toddler group ($r(50)=-0.28$, $p<.004$) or playgroup ($r(50)=-0.30$, $p<.03$). Only two girls did not attend a nursery class, so correlations were not computed.

ATTITUDES TO READING, PARENTAL FACTORS AND LITERACY

6.7 For both boys and girls, a positive attitude to reading was associated with better word reading ($r(220)=.16$, $p<.02$) and spelling ($r(219)=0.15$, $p<.025$). A more positive attitude was also associated with reading more fiction ($r(222)=0.14$, $p<.04$) and greater use of the library, by parents ($r(100)=-0.30$, $p<.001$), and by children ($r(98)=-0.43$, $p<.001$). A positive attitude was associated with being able to write their names ($r(100)=-0.26$, $p<.009$) and being able to write letters of the alphabet ($r(100)=-0.24$, $p<.02$) before starting school.

6.8 For boys, a positive attitude to reading was associated with good word reading ($r(112)=0.23$, $p<.02$ skills, being less deprived ($r(114)=-0.20$, $p<.04$), and being able to write their name at preschool ($r(54)=-0.27$, $p<.05$).

6.9 For girls, a positive attitude to reading was associated with good word reading ($r(106)=0.19$, $p<.05$) spelling ($r(106)=0.28$, $p<.005$) and reading comprehension skills ($r(102)=0.25$, $p<.02$). A positive attitude also correlated with ability to read ($r(44)=-0.30$, $p<.05$) and write ($r(44)=-0.34$, $p<.02$) letters in preschool.

SUMMARY

6.10 In this chapter we analysed the parental questionnaire and the pupil questionnaire on attitudes to reading

- It was found that the less deprived the home the better the children's word reading and spelling in Primary 7, the more children's and adults' book there were in the home, and the greater the adults' use of the library
- Children with parents of high educational level, and children who came from less deprived backgrounds, were more likely to have attended a playgroup. The more education the fathers had had the more likely it was that the child could read and write letters of the alphabet in preschool
- Children with a more positive attitude to reading had better word reading and spelling skills, read more fiction, and were more likely to be able to read and write letters of the alphabet before starting school. They and their parents also made greater use of the library
- No correlation was found between the deprivation index and the extent to which parents valued learning to read

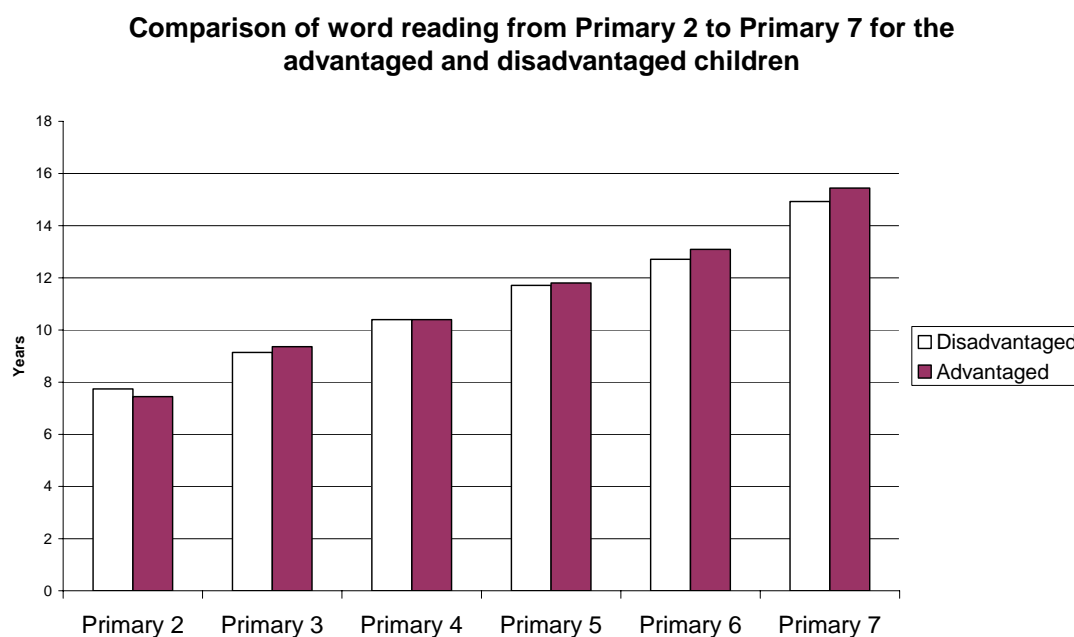
CHAPTER SEVEN PRIMARY 2 TO PRIMARY 7

COMPARISON OF READING AND SPELLING ATTAINMENT FOR ADVANTAGED AND DISADVANTAGED CHILDREN

7.1 A comparison was made of all the children categorised by Clackmannanshire Council as attending schools in deprived areas (hereafter called disadvantaged) with those attending schools in non-deprived areas (hereafter described as advantaged). An analysis was undertaken of the children's word reading, spelling and reading comprehension skills from May/June Primary 2 through to the end of Primary 7. For these analyses, it was necessary to compare children who were available for testing on all six occasions. The numbers vary slightly on the three measures, in order to preserve a reasonable size of sample for each test.

7.2 For word reading, a two way analysis of variance was carried out, with one within subjects factor, time (reading from Primary 2 to Primary 7), and one between subjects factor, background (advantaged versus disadvantaged). There were 106 disadvantaged and 96 advantaged children. See Figure 7.1

FIGURE 7.1

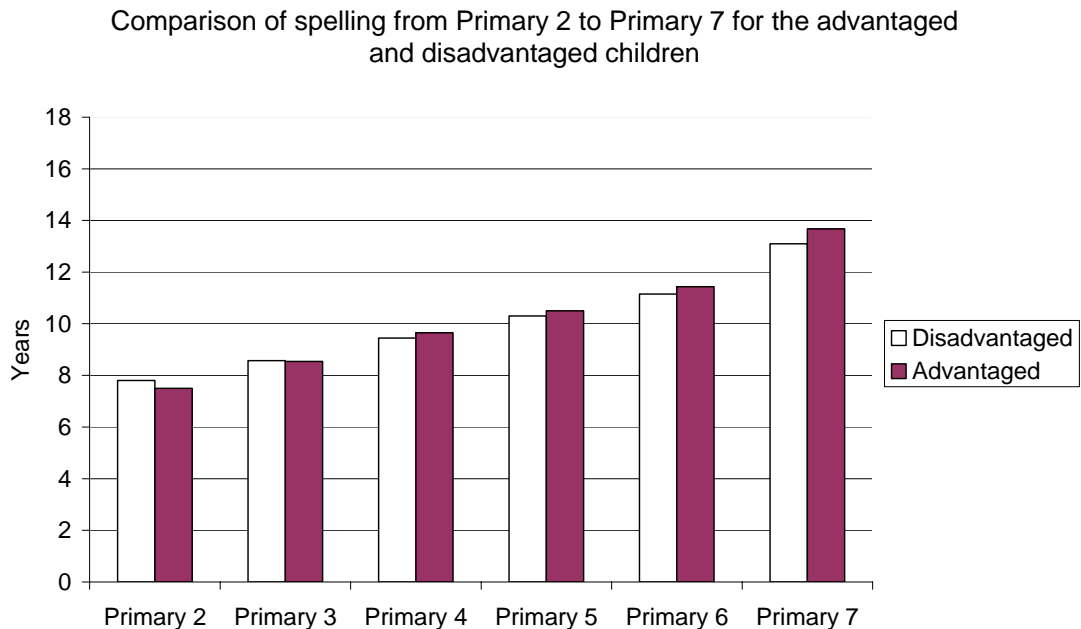


7.3 No main effect of background was found, $F(1,200) < 1$. A main effect of time was found, $F(5,1000) = 719.0$, $p < .001$. Time did not quite interact with background, $F(5,1000) = 2.0$, $p < .079$, however a circumspect post hoc analysis was carried out. Newman Keuls tests showed that at Primary 7 the advantaged children read better than the disadvantaged children, but not in any of the previous years. The advantage at this stage was 6.2 months.

7.4 For spelling, a two way analysis of variance was carried out, with one within subjects factor, time (spelling from Primary 2 to Primary 7), and one between subjects factor,

background (advantaged versus disadvantaged). There were 93 disadvantaged and 86 advantaged children. See Figure 7.2.

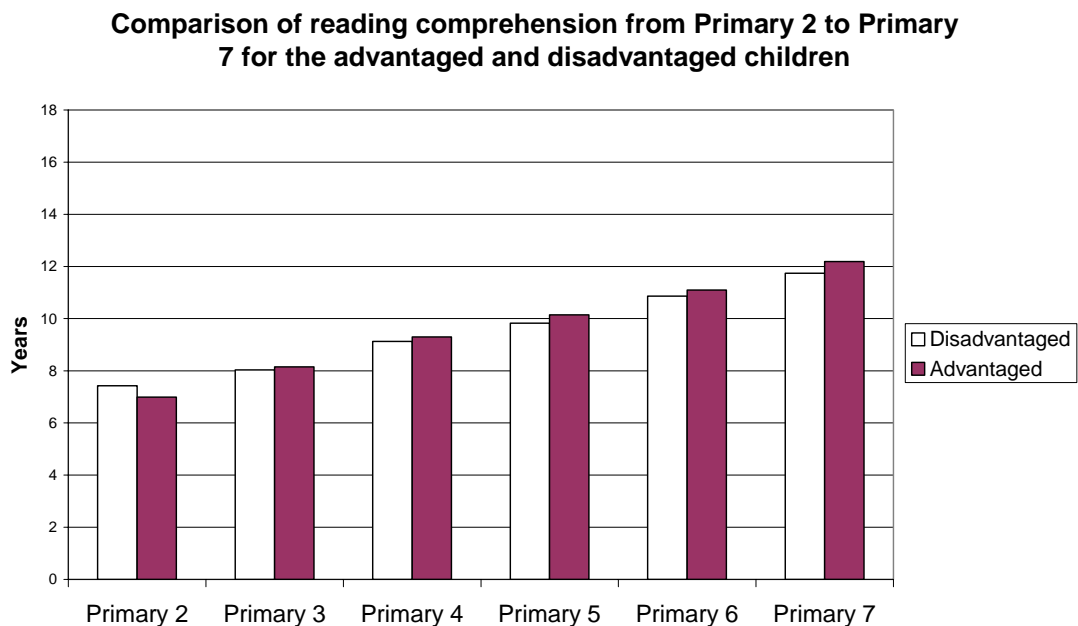
FIGURE 7.2



7.5 No main effect of background was found, $F(1,177) < 1$. There was a main effect of time, $F(5, 885) = 2404.45$, $p < .001$, and this interacted with background, $F(5,885) = 2.39$, $p < .036$. Newman Keuls tests showed that the advantaged children only performed better than the disadvantaged children at Primary 7, being 5.8 months ahead at this stage.

7.6 For reading comprehension, a two way analysis of variance was carried out, with one within subjects factor, time (reading comprehension from Primary 2 to Primary 7), and one between subjects factor, background (advantaged versus disadvantaged). There were 94 disadvantaged and 83 advantaged children. (See Figure 7.3).

FIGURE 7.3



7.7 No main effect of background was found, $F(1,175)<1$. There was a main effect of time, $F(5, 875)=708.7$, $p<.001$, and this interacted with background, $F(5,875)=5.5$, $p<.006$. Newman Keuls tests showed that at Primary 2 the disadvantaged children performed better than the advantaged children. However, the advantaged children performed better than the disadvantaged children at Primary 5 and Primary 7. The advantage at Primary 7 was 5.5 months.

7.8 This split into advantaged and disadvantaged groups may underestimate the differences between the children from poorer and better off homes, as some children were from mildly disadvantaged areas and other were from mildly advantaged areas. A further comparison was carried out therefore between the two schools who had the lowest and the highest scores on the deprivation index. At the most disadvantaged school 54.73% of children received free school meals, whereas at the most advantaged 12.25% of the children got free school meals.

7.9 For word reading, there were 20 disadvantaged and 35 advantaged children available for comparison. It was found that there was a main effect of background, $F(1,53)=4.3$, $p<.042$ and a main effect of time, $F(5,265)=175.1$, $p<.001$. These two factors interacted, $F(5, 265)=11.0$, $p<.001$. Newman Keuls tests showed that at Primary 6 and 7 the advantaged children performed better, but did not do so in earlier years.

7.10 For spelling, there were 19 disadvantaged and 34 advantaged children available for comparison. It was found that there was no main effect of background, $F(1,51)=<1$. There was a main effect of time, $F(5,255)=126.8$, $p<.001$. These two factors interacted, $F(5, 255)=10.3$, $p<.001$. Newman Keuls tests showed that at Primary 7 the advantaged children performed better, but did not do so in earlier years.

7.11 For reading comprehension, there were 18 disadvantaged and 33 advantaged children available for comparison. It was found that there was no main effect of background, $F(1,49) < .1$. There was a main effect of time, $F(5,245) = 198.9$, $p < .001$. These two factors interacted, $F(5, 245) = 4.0$, $p < .003$. Newman Keuls tests showed that at Primary 2 the disadvantaged children were ahead, but in Primaries 4, 5 and 7 the advantaged children performed better.

SUMMARY

7.12 In this chapter we examined whether children from disadvantaged homes read and spelt less well than children from advantaged homes

- The children from disadvantaged homes did not read words less well than those from advantaged homes, although this was close to significance in Primary 7.
- The children from disadvantaged homes only spelt less well in Primary 7
- For reading comprehension the disadvantaged children were ahead in Primary 2, but were behind in Primary 5 and 7

CHAPTER EIGHT PRIMARY 1 to PRIMARY 7

UNDERACHIEVING CHILDREN

PROPORTION OF UNDERACHIEVERS FROM PRIMARY 1 TO PRIMARY 7

8.1 In previous sections, analyses have been carried out on the same sample of children from Primary 2 to Primary 7 for word reading, spelling, and reading comprehension. This was so that an exact measure could be made of how much performance on these tests increased year by year. However, this procedure excludes all of the children that were not present for testing in even one year, and therefore may leave out some low achievers.

8.2 The question arises as to how to define underachievement. In studies of reading disorders, performing more than two years below chronological age is considered to constitute a severe literacy disorder so this categorisation has been adopted here. The numbers who were more than 1 year behind chronological age also have been calculated . (See Table 8.1)

TABLE 8.1

Number of pupils in May/June of Primary 2 more than 1 and 2 years behind chronological age in word reading, spelling, and reading comprehension, percent in brackets

	More than 1 year behind			More than 2 years behind		
	Boys	Girls	Total	Boys	Girls	Total
Word reading N=268	5 (3.5%)	1 (0.8%)	6 (2.2%)	0	0	0
Spelling N=265	3 (2.2%)	0	3 (1.1%)	1 (0.7%)	0	1 (0.4%)
Reading comprehension N=258	8 (6.0%)	5 (4.0%)	13 (5.0%)	0	0	0

8.3 As the children were around 6 years 8 months of age at this stage (Primary 2) and the lowest scores obtainable on these tests was around 5.0 years, a child could only be over two years behind chronological age in literacy skills if they had entered school a year late. However, it can be seen that the proportion of children reading and spelling more than 1 year behind was very modest. The vast majority of the children had made a good start in literacy acquisition.

TABLE 8.2

Number of pupils in May/June Primary 3 more than 1 and 2 years behind chronological age in word reading, spelling, and reading comprehension, percent in brackets

	More than 1 year behind			More than 2 years behind		
	Boys	Girls	Total	Boys	Girls	Total
Word reading N=251	4 (3.1%)	1 (0.8%)	5 (2.0%)	2 (1.6%)	0	2 (0.8%)
Spelling N=253	8 (6.1%)	2 (1.6%)	10 (4.0%)	1 (0.8%)	0	1 (0.4%)
Reading comprehension N=245	25 (20.5%)	19 (15.5%)	44 (18.0%)	2 (1.6%)	1 (0.8%)	3 (1.2%)

8.4 By Primary 3 it is feasible to examine whether some children were showing a serious lag between their age and their literacy attainments (see Table 8.2). The children were around 7 years and 8 months old (primary 3) and it can be seen that only a small proportion were performing below a 5 years and 8 months level (See Table 8.2 above).

TABLE 8.3

Number of pupils in May/June Primary 4 more than 1 and 2 years behind chronological age in word reading, spelling, and reading comprehension, percent in brackets

	More than 1 year behind			More than 2 years behind		
	Boys	Girls	Total	Boys	Girls	Total
Word reading N=252	11 (8.6%)	4 (3.2%)	15 (6.0%)	0	0	0
Spelling N=249	13 (10.3%)	9 (7.3%)	22 (8.8%)	1 (0.8%)	0	1 (0.4%)
Reading comprehension N=245	23 (18.9%)	15 (12.2%)	38 (15.5%)	1 (0.8%)	3 (2.4%)	4 (1.6%)

8.5 The children were around 8 years and 8 months old at this stage (Primary 4) with a very small proportion performing below a 6 years 8 months old level (See Table 8.3 above)

TABLE 8.4

Number of pupils in May/June Primary 5 more than 1 and 2 years behind chronological age in word reading, spelling, and reading comprehension, percent in brackets

	More than 1 year behind			More than 2 years behind		
	Boys	Girls	Total	Boys	Girls	Total
Word reading N=245	15 (12.1%)	6 (5.0%)	21 (8.6%)	4 (3.2%)	0	4 (1.6%)
Spelling N=239	17 (14.3%)	13 (10.8%)	30 (12.6%)	3 (2.5%)	1(0.8%)	4 (1.7%)
Reading comprehension N=240	23 (19.2%)	23 (19.2%)	46 (19.2%)	9 (7.5%)	1 (0.8%)	12(5.0%)

8.6 At the age of around 9 years and 8 months of age (Primary 5) a modest proportion of children are behind in word reading and spelling, but more children are experiencing problems with reading comprehension. (See Table 8.4 above)

TABLE 8.5

Number of pupils in May/June Primary 6 more than 1 and 2 years behind chronological age in word reading, spelling, and reading comprehension, percent in brackets

	More than 1 year behind			More than 2 years behind		
	Boys	Girls	Total	Boys	Girls	Total
Word reading N=239	16(12.3%)	20 (17.0%)	36 (15.1%)	10(8.3%)	10 (8.5%)	20(8.4%)
Spelling N=235	20 (16.5%)	17(14.4%)	37(15.7%)	6(5.0%)	1(0.8%)	7(3.0%)
Reading comprehension N=235	36 (30.8%)	33(28.0%)	69 (29.4%)	21 (18.0)	17 (14.4%)	38(16.2%)

8.7 At around 10 years and 8 months of age (Primary 6) there been a noticeable increase in children with low levels of word reading ability, and reading comprehension problems are more apparent. (See Table 8.5 above)

TABLE 8.6

Number of pupils in May/June Primary 7 more than 1 and 2 years behind chronological age in word reading, spelling, and reading comprehension, percent in brackets

	More than 1 year behind			More than 2 years behind		
	Boys	Girls	Total	Boys	Girls	Total
Word reading N=236	12(10.0%)	16(13.6%)	28(11.9%)	8(6.7%)	5(4.3%)	13(5.6%)
Spelling N=237	27(22.5%)	30(25.6%)	57(24.0%)	14 (11.7%)	12 (10.3%)	24(10.1%)
Reading comprehension N=228	36(31.0%)	27(24.0%)	63(27.6%)	21(18.1%)	11(9.8%)	32(14.0%)

8.8 At 11 years and 8 months of age (Primary 7) the proportion of word reading problems had fallen back a little from Primary 6 levels, but the level of reading comprehension problems was static.

8.9 The skills trained by the synthetic phonics programme –word reading and spelling– showed quite low levels of children experiencing severe problems. However, it will be necessary to collect control data to establish what would be typical levels of underachievement in a non-synthetic phonics programme.

8.10 The proportion of children having difficulties in reading comprehension is much higher, although given that mean performance was still significantly above what would be expected for chronological age, the proportion of children in difficulty may be modest compared with other literacy programmes.

8.11 What is not clear from the above analysis is the extent to which literacy problems were stable. That is, does the child who makes a slow start always lag behind? Juel (1988) has argued that this is so. In the next section we examine in detail the progress of one low achieving child from Primary 1 to Primary 7 and compare his progress with that of a group of 16 children who in Primary 4 were reading 12 months or more behind chronological age.

A CASE STUDY

BACKGROUND

8.12 AF was one of the pupils involved in the research study. As a pre-school child, he was described as being globally poor with both receptive and expressive language. He had attended a Pre-5 Language Unit housed in the school for an extra year. Multi-agency services, in conjunction with AF's mother, made the decision to defer his entry to formal schooling for one year to improve his self esteem and confidence, his social and emotional development and enhance his life experiences. On entering Primary 1 in August 1997, his

chronological age was 5.9 years and he was allocated a Supervisory Assistant to support his learning.

PRIMARY 1 to PRIMARY 3

PRE AND POST TESTS

- 8.13 Two weeks after entering school in September, pre-tests were carried out with all of the children who would be involved in the research, including AF. Receptive vocabulary knowledge was tested using the British Vocabulary Scale (Dunn & Dunn, 1982). This yielded a score of 54 for AF giving a percentile ranking of below –1. Pre-tests were then carried out on the following range of literacy and phonological awareness tasks and AF’s scores are given.

Test used	AF’s response
<i>Literacy skills, letter knowledge, word reading, spelling and nonword reading.</i>	
Letter knowledge:26 letters- names sounds	AF knew one letter name (3.8%) He did not know any letter sounds.
British Ability Scales Word Reading	Nil score. Notional reading age of 4.9y (59m) recorded.
Schonell Spelling Test	Nil score Notional spelling age of 5.0y (60m) recorded
Nonword reading – 20 CVC words	Nil score
<i>Phonological Skills, phoneme segmentation and rhyme generation.</i>	
Yopp-Singer Test -22 words	Nil score
Rhyme Generation -12 words	Nil score

ANALYTIC PHONICS TAUGHT FOR TERMS 1 AND 2, PRIMARY 1

8.14 AF’s class was one of the Primary 1 classes allocated to the Analytic phonics and phonemic awareness group (AP+PA). With the AP+PA classes, a phoneme-and-rime awareness programme was carried out for 10 minutes a day for 8 weeks before Christmas and 8 weeks after Christmas, involving the analysis and synthesis of sounds in spoken words **without reference to print** (Cunningham, 1990). Daily phonics teaching was also carried out for 10 minutes per day using a systematic but gradual analytic method, whereby one letter sound per week was introduced in the initial position of words together with learning to form letters.

8.15 The pre and post test results for both the AP+PA group and for AF are shown in Table 8.7. Irregular word reading was also included for the post-test (see Chapter 2), the words being selected from the BAS Word Reading Test judged as being difficult to read by sounding and blending. The BPVS test was not repeated for the post-test in March of Term 2.

TABLE 8.7

AF's pre and post test scores compared with scores of the analytic phonics + phonemic awareness research group (AP+PA) in September Term 1 (pre-test) and March Term 2 of Primary 1 (post-test) 1997/98.

	Pre-Test Primary 1 September		Post-Test Primary 1 March	
	AF	AP+PA	AF	AP+PA
Chronological Age (years)	5.9	5.0	6.3	5.4
BPVS	54	90.2	-	-
Reading Age (years)	4.9	4.9	4.9	5.4
Spelling Age (years)	5.0	5.0	5.0	5.3
Letter knowledge (names)	3.8%	12.3%	0%	12.03%
Letter knowledge (sounds)	0%	4.73%	42%	59.19%
Phoneme segmentation	0%	2.7%	0%	34.7%
Rhyme generation	0%	21.9%	0%	36.4%
Nonword reading for sounding and blending CVC sequences	0%	0.6%	0%	15.8%
Irregular words			0%	15.3%

8.16 It can be seen from the above figures that AF has progressed to some degree in his knowledge of letter sounds (42%) (11 letter sounds). However, until pupils can blend 3 sounds together accurately, they do not have an adequate self-teaching system and both AF's reading and spelling remained at floor level, as they were at the pretest. AF had had 2 terms in school being taught by analytic phonics, paying attention to the initial letter of words and guessing the rest of the word. So far, the blending process with print had not formed part of the daily programme. It must also be worthy of note that in spite of being in the AP+PA programme and receiving very specific phoneme and rime awareness training without alphabetic stimuli, AF has made no progress in developing phonological awareness skills compared with the rest of the AP+PA research group (n =78) who now had mean scores of 34.7% for phonemic awareness and 36.4% for rhyme generating ability respectively.

PRIMARY 1 JUNE TERM 3

SYNTHETIC PHONICS TAUGHT TO ANALYTIC PHONICS + PHONEMIC AWARENESS GROUP AND THE ANALYTIC PHONICS ONLY GROUP

8.17 After the post-test analyses had been carried out in March of Primary 1, all of the children in the analytic phonics and AP+PA groups (including AF) were taught using the

synthetic phonics programme. In May of the following school year, Primary 2 (1999) all of the children were re-tested on the BAS Word Reading Test, the Schonell Spelling Test and the reading comprehension Primary Reading Test (France, 1981). Table 8.8 shows that AF's reading age had increased by 8 months, now that he can follow a systematic procedure to read unknown words. His spelling age still remained at floor level but this could have been due to slow development of his handwriting skills. Both AF's reading and spelling age are well below the average ages for the children in his AP+PA group.

TABLE 8.8

AF's scores compared with the scores of the analytic phonics + phonemic awareness group (AP+PA) in June of Term 3 Primary 2 (1999) alongside AF's post-test scores in Primary 1 March of Term 2 for comparison.

	Primary 1 March Term 2	Primary 2 June Term 3	
	AF	AF	AP+PA
Chronological Age (years)	6.3	7.6	6.7
Reading Age (years)	4.9	5.6	7.6
Spelling Age (years)	5.0	5.0	7.4

INDIVIDUAL EDUCATIONAL PROGRAMME (IEP)

8.18 AF had a history of delayed speech and language development coupled with a hearing difficulty which had a direct bearing on his speech abilities. In November of Primary 2 the multi-agencies involved with AF highlighted the following areas of concern and agreed upon achievable success criteria. It was also noted that AF needed immediate feedback and constant reassurance.

8.19 Areas of concern which were highlighted were poor coordination and delayed language development.

- **POOR CO-ORDINATION.** A motor movement programme was initiated to improve spatial perception, spatial awareness and fine motor control.
- **DELAYED LANGUAGE DEVELOPMENT.** A language therapy programme was implemented, to be taught and monitored by the speech therapist and the learning support teacher, to improve poor articulation, oral communication, listening and attention skills, spatial concepts, and understanding of grammatical structures. Listening ability was deemed an area of comparative strength that should be fostered, whilst continuing to improve his sound blending, visual memory, visual discrimination and visual closure.

IDENTIFYING % OF LOW ACHIEVERS

8.20 At the end of Primary 2, an examination was made of how many children in the total sample (i.e. all 3 initial research groups) were experiencing reading problems. Only 2.2% of the children had reading ages more than 12 months behind chronological age. From the above Table 8.8, it can be seen that AF was included in this 2.2%, performing 24 months below his chronological age. Although his chronological age was 11 months ahead of the other children, AF had of course received the same amount of schooling as the other children.

8.21 Table 8.9 below shows the mean reading and spelling ages for total sample in Primary 3 (n=251) who were now reading 17 months ahead of chronological age and spelling 9 months ahead of chronological age. AF's reading age at this time was 6.1 years, 31 months behind his chronological age of 8.7 years. The proportion of children reading 12 months or more behind chronological age was now 2.0%, AF being now more than 2 years behind his chronological age. No score for AF's spelling was available for this test period. It is likely that AF had not been presented for the class spelling test as it required a written response and his handwriting skills were developing at a slow rate.

TABLE 8.9

AF's chronological, reading and spelling ages compared with the chronological, reading and spelling ages of the total sample of pupils in June of Term 3 of Primary 3 (2000).

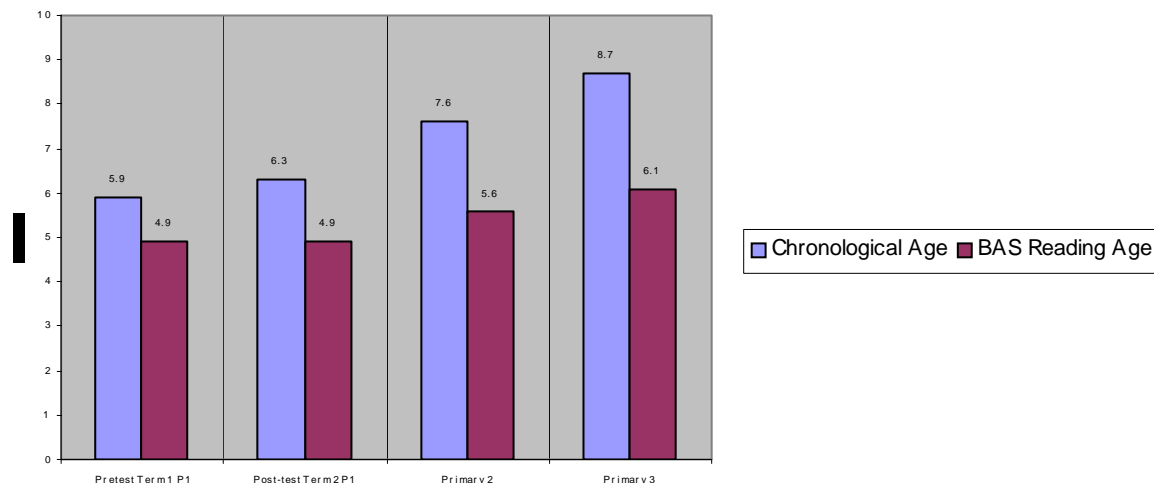
Primary 3, June Term 3

	AF	Total sample
Chronological Age (years)	8.7	7.75
Reading Age (years)	6.1	9.2
Spelling Age (years)	-	8.5

8.22 The following figure (Fig.8.1) traces the differences between AF's chronological age and word reading age from the initial pre-test in September of Term 1 Primary 1 to June of Term 3 of Primary 3. It is noteworthy that there was no improvement between AF's reading age at the start of schooling and at the end of the second term, during which period he was being taught by an analytic phonics and phonemic awareness training programme, 4.9 years being the score we assigned to non-readers. However, once he had been introduced to the synthetic phonics programme and he was able to sound and blend successive letters to read unknown words, his word reading began to improve.

FIGURE 8.1

Differences between A.F's chronological age and reading age from Primaries 1-3.



PRIMARY 4 to PRIMARY 5

DETAILED EXAMINATION OF LOW ACHIEVERS, TERM 2 PRIMARY 4.

8.23 In January of Primary 4, 30 children recording a reading age of 6 or more months below chronological age at the end of Primary 3, plus 2 teacher referrals of children who were giving cause for concern, were selected for a more detailed examination on a range of related tasks. 10 children were found to be reading 12 months or more below their chronological age at this time (including AF).

8.24 The results for AF for the detailed examination in January of Primary 4 are shown in Table 8.10 alongside the results for the post test in March of Primary 1 (Table 8.7) and the scores for the children reading 12 months or more behind chronological age. In general, the total sample was tested in May/June each year but supplementary testing of underachievers was carried out in March.

TABLE 8.10

AF's scores for literacy and phonological skills in March of Term 2, Primary 1 (Table 8.7) and his scores in January of Term 2 Primary 4, compared with literacy and phonological awareness scores in January of Primary 4 for children reading 12 months or more behind chronological age for comparison.

	AF Mar P1	AF Jan P4	Pupils 12months or more behind CA, Jan P4, N=9
Chronological age (years)	6.3	9.3	8.4
Reading age (years)	4.9	6.8	7.2
Spelling age (years)	5.0	7.0	7.0
Letter knowledge (names)	0%	7.7%	78%
Letter knowledge (sounds)	42%	100%	87%
Phoneme segmentation	0%	100%	66.7%
Generating rhyme	0%	0%	75%
Nonword reading,sounding and blending CVC sequences	0%	100%	87.2%

8.25 The above Table 8.10 demonstrates that AF now had a higher level of letter sound knowledge and phoneme segmentation than the average for the other 9 pupils reading more than 12 months behind chronological age. His score on the non-word reading test shows that he could now sound and blend letter sounds to pronounce CVC unfamiliar words – **the critical skill in the synthetic phonics approach**. AF's reading age was now 30 months below chronological age. At this time he carried out a spelling test with written words and we now have a score for his spelling. AF was spelling at 28 months below his chronological age at the start of Term 2, Primary 4.

ANALYSIS OF READING AND SPELLING INACCURACIES IN JANUARY OF PRIMARY 4.

8.26 An analysis of AF's inaccurate responses for the BAS Word Reading Test is quite revealing. The following examples reveal that he is processing all of the letters in each word, e.g.

January Primary 4 – word reading

Test word	AF's attempt	Test word	AF's attempt
ring	rink	skin	skip no- skin
sport	sp-or-t initial consonant blend correct, could not blend sounds into the word	climb	c-l-i-m-b sounding each letter, could not blend sounds into the word
ladies	ladies using the short /a/ vowel sound	lawn	l-a-nn not yet recognising vowel digraph /aw/

8.27 We can see that AF can use the phonics letter sound procedure he has been taught but that he is still having difficulty with the blending process. There are a number of such examples in his responses e.g. sport, climb and lawn. However, he managed to realise that 'skip' was incorrect and changed it to the required 'skin'.

8.28 AF's inaccurate attempts at spelling also demonstrate that he was using phonics to spell the word, e.g.

Test date January Primary 4, Spelling

Test word	AF's attempt	Test word	AF's attempt
hay	hai	call	col
year	yeer	boat	boot

From AF's attempts the teacher can gain an insight into what is required for teaching purposes e.g.

- 'hai' for 'hay' – AF has the wrong spelling for the vowel digraph. He needs to know that /ai/ is used in the middle of a word, and that /ay/ is used at the end of the word; the same goes for /oi/ and /oy/. This is a spelling rule that he needs to learn.
- 'yeer' for 'year' – AF needs to know when to use /ea/ and when to use /ee/, i.e. to know when the word 'looks right'.
- 'boot' for 'boat' – AF also needs to distinguish the /oo/ and /oa/ sound. AF seems to know that he needs a vowel digraph but is not sure which one 'looks right'.

- ‘col’ for ‘call’ – This is a phonic spelling but AF needs to know that the short vowel /o/ sound can also be spelt as ‘a’ as in ‘call’.

HANDWRITING SKILLS

8.29 Looking at AF’s handwriting in the spelling test:

- his letter formation was recognisable
- he was using a ‘flick’ on appropriate letters
- there were no reversals of letters and
- he was not joining up the letters

JUNE OF PRIMARY 4

8.30 In June 2001, at the end of Primary 4, the 10 children who had been reading 12 months below chronological age in January were again assessed in reading and spelling along with the total sample of children. It was found that no child in the sample was 2 or more years behind in reading, AF’s reading age now being 23 months below chronological age

8.31 Research studies of reading disorders for this age group typically select children who are 2 or more years behind in reading. Therefore, on this criterion, none of the children would be categorised as being severely reading disordered. Nevertheless, there was continued concern for AF.

8.32 At this stage an analysis of the reading and spelling errors made by all children identified as reading 12 months or more behind chronological age was carried out. There were now 16 children in this category. Although the principle of sounding and blending had been grasped, it seemed likely that the children had not taken the next step for themselves and seen the regularities in English orthography. However, one of the peripatetic Support for Learning (SfL) teachers had observed that some of the children expected to read words automatically and appeared to have forgotten the synthetic phonics procedure for tackling unknown words. They had forgotten what to do and needed to revisit the more complex phonic rules. It was decided to design a supplementary programme to help these 16 pupils (7% of the total sample) overcome their weaknesses. It was envisaged that this programme, Phonics Revisited, could be started in Primary 5 after the diagnostic testing had been administered.

DIAGNOSTIC TESTING IN PRIMARY 5

8.33 In Term 2 of Primary 5 (March 2002), the 16 children described above carried out reading, spelling and vocabulary tests. It was found that only 11 of the 16 pupils (including AF) were still reading 12 months or more behind chronological age after testing, a drop from 7% to 4.5% of the total sample. We also administered a diagnostic test of phonics knowledge using nonwords to assess the ability of the children to read various orthographic structures. (See Table 8.11) Using nonwords is a better test of phonic skill than using real

words, as it removes the effects of specific word knowledge. Five different types of one syllable nonwords were generated, there being 12 of each type, namely

- initial consonant blends e.g. ‘plud’
- final consonant blends e.g. ‘wolp’
- vowel digraphs e.g. ‘yoot’
- vowel lengthening silent ‘e’ e.g. ‘sode’
- initial consonant blends and vowel digraphs e.g. ‘blain’

8.34 The diagnostic test of phonics knowledge (Table 8.11) showed that items with initial and final blends were read well. Difficulties with vowel digraphs and vowel lengthening silent ‘e’ were found. However, it is noteworthy that AF scored well above the average, recording 49 correct from 60 nonwords. His few inaccuracies were in the categories of silent ‘e’ and vowel digraphs. It is also interesting to note that his BPVS score (a measure of vocabulary knowledge) was now 75 (a percentile rank of 5) compared with a score of 54 in September of Primary 1, Term 1. This is, however, still below the average of 101.1 for the other 10 pupils being tested.

TABLE 8.11

AF’s scores for reading, spelling, vocabulary and nonword reading in February/ March of Term 2, Primary 5 together with the average scores for children reading 12 months or more behind chronological age

	AF	Pupils 12m or more behind CA, N = 10
Chronological age (years)	10.3	9.4
BPVS (Receptive vocabulary knowledge)	75	101.1
Reading age (years)	9.08	7.9
Spelling age (years)	8.9	7.8
Initial consonant blends	91.6%	72.5%
Final consonant blends	100%	75.8%
Vowel digraphs	100%	39.9%
Vowel lengthening silent ‘e’	75%	19.2%
Initial blends and vowel digraphs	75%	51.6%

8.35 AF’s reading and spelling ages were 9.1 years and 8.9 years respectively. He was now reading 15 months below chronological age, and spelling 17 months below chronological age, compared with reading 30 months below and spelling 28 months below chronological age in January of Primary 4.

ANALYSIS OF A F'S READING AND SPELLING INACCURACIES IN FEB/MARCH OF TERM 2 PRIMARY 5

8.36 AF's reading and spelling responses were very illuminating. For example, on the BAS Word Reading Test in January of Primary 4, AF reached item 26, before he started to struggle with the words, pronouncing each letter sound accurately but being unable to blend them together. This did not now prove to be the case in March, Primary 5. AF read the first 60 words fluently and accurately. The attempts for the final 30 words again demonstrated that he was using the initial synthetic phonics procedure well, processing all of the letter sounds in each word and he attempted every word in the test.

Examples of AF's attempts

Test word	AF's attempt	Test word	AF's attempt	Test word	AF's attempt
territory	territor	ceiling	keeling	tentacle	ten-tackle
obscure	obscurr	exert	eexert	diameter	dime-etter
velocity	vello-kitty	criterion	criteron	jeopardy	joe-pardy

His weaknesses seemed to be:

- not knowing when to use c/k
- when 'c' sounds hard or soft
- when 'u' sounds its name instead of the short vowel sound /u/

8.37 However, looking at the attempts above ('ten-tackle' for 'tentacle', 'ime-etter' for 'diameter', 'vello-kitty' for 'velocity' and 'joe-pardy' for 'jeopardy') AF was beginning to break up the long words. The principle of sounding and blending letters was now firmly established and he was starting to take the next step for himself, namely **blending syllables**. This was important, as his SfL teacher could now concentrate on the procedure for blending syllables into words.

SCHONELL SPELLING TEST

8.38 In January Primary 4, AF attempted 30 words. This time, i.e. in March of Primary 5, he attempted 70 words. Examples of incorrect spellings in Primary 4 had included 'hai' for 'hay', 'col' for 'call', 'yeer' for 'year' and 'boot' for 'boat'. The spelling of all of these words was now correct. In the first 35 words, the only inaccuracies were 'pay' for 'pie', 'site' for 'sight' (although 'might' was correct) and 'brote' for 'brought'. However, his knowledge of the vowel digraphs 'igh' and 'ough' was still weak. In the next 35 words, there was evidence that after he had written a word, if he did not think it 'looked right' he scored out/rubbed out and tried again.

8.39 From his attempts, however, it was obvious that he was using phonemic spelling e.g. 'slipery' for 'slippery', 'pashent' for 'patient', 'generis' for 'generous'. This too was a valuable tool for the teacher to decide when to introduce syllable spelling, i.e.

- breaking a word into syllables
- spelling each syllable and
- blending the syllables into the desired word.

8.40 For some of the words, we wondered if AF was hearing them correctly e.g. ‘safedy’ for ‘safety’, ‘count’ for ‘account’, ‘simala’ for ‘similar’. However, a conversation with the SfL teacher did not support this idea. He did, however, have a speech problem and perhaps it may be that when he repeated the word to be spelt, this is how he ‘heard’ his own voice.

8.41 A further reason could be how he linked auditory language with the visual aspect, he may have thought ‘account’ was ‘a count’, count being the noun. The word ‘account’ could be outwith his aural vocabulary. AF did however spell correctly words such as ‘mistake’, ‘stayed’, ‘join’, ‘direct’, ‘final’, ‘bargain’ and ‘library’.

HANDWRITING

8.42 Looking at AF’s handwriting on the spelling response sheets, the letters were recognisable and the words were written within the spaces on the grid. However, there was still no sign of him joining up the letters and the letters M, J and L were written using the upper case version although they were written the same size as if they had been lower case. There were also examples of where he knew the word did not ‘look right’ e.g. ‘fair’ for ‘fare’, ‘voo’ for ‘view’, both of his first attempts being scored out.

PHONICS REVISITED

8.43 The Phonics Revisited programme was designed to be implemented by the class/SfL teacher, and was distributed to the relevant teachers during the second half of Primary 5. Phonics Revisited dealt with the more complex phonic rules that needed further reinforcement, based on the analysis of the test response sheets of the pupils reading 12 months or more behind chronological age. Rules covered were, for example,

- silent ‘e’
- silent letters ‘l’, ‘b’, ‘k’, ‘w’, ‘u’
- vowel digraph rules ay/ai, oy/oi, ow/ ou, ow/oa, aw/au, ie and ue
- the concept of word families.

8.44 By June of Term 3, Primary 5, the whole sample of children including the low achievers were again tested on the BAS Word Reading Test, the Schonell Spelling Test and the reading comprehension Primary Reading Test (France 1981) along with the total sample of children. AF’s scores and the mean scores for all of the children are shown in Table 8.12.

TABLE 8.12

AF's chronological, reading, spelling and comprehension ages compared with the chronological, reading, spelling and comprehension ages of the total sample of pupils in June of Term 3 Primary 5 (2002)

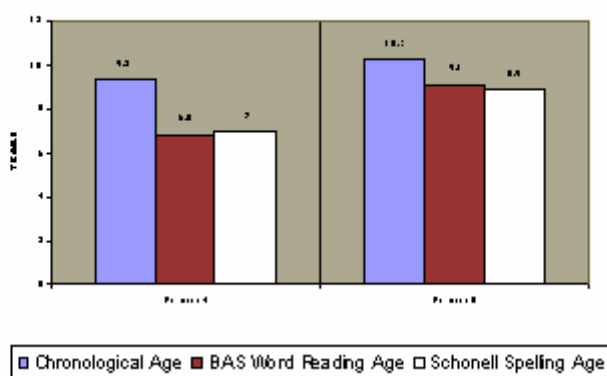
	AF	Total sample
Chronological Age (years)	10.6	9.7
Reading Age (years)	9.2	11.6
Spelling Age (years)	8.9	10.3
Primary Reading Test (years)	8.0	9.9

8.45 AF was reading 17 months and spelling 20 months below his chronological age, compared with the total research cohort who were now reading 23 months, and spelling 8 months, above their chronological age. This time we had a reading comprehension score from AF of 8.0 years, but he did not attempt all of the examples on the last page.

8.46 The following figure (Fig.8.2) shows AF's chronological, reading and spelling ages in Primary 4 and Primary 5. It is noteworthy that there was now very little difference between his reading and spelling ages. Furthermore, there had been a noticeable improvement from the Primary 4 to the Primary 5 testing which may have been due to the implementation of the Phonics Revisited programme.

FIGURE 8.2

Differences between A.F.s Chronological Age and Reading and Spelling Ages in Primaries 4-5



PRIMARY 6

8.47 In March Term 2, Primary 6, the 11 pupils who had been reading 12 months or more below chronological age in June of Primary 5 were tested again for BAS Word Reading, Schonell Spelling and nonword reading. Only 9 of these pupils then remained in the category of reading 12 months or more behind chronological age (including AF). The diagnostic

nonword test still highlighted weaknesses with vowel digraphs and silent ‘e’. This was not the case with AF, however. He now only recorded 3 inaccuracies; i.e., for ‘folt’ he read ‘fawlt’, for ‘kour’ he read ‘koor’ and for ‘troag’ he read ‘troog’.

8.48 Table 8.13 shows that AF’s reading age was now 10.2 years, 15 months below his chronological age. His spelling age was 10.1 years, 16 months below his chronological age. The Table also shows that for the first time, AF’s reading and spelling ages were ahead of the remaining 8 children who were reading more than 12 months behind chronological age.

TABLE 8.13

AF’s chronological, reading and spelling ages in March of Term 2, Primary 6 (2003) compared with the average chronological, reading and spelling ages for children reading 12 months or more behind chronological age.

	AF	Pupils 12 months or more behind CA, N=8
Chronological age (years)	11.4	10.4
Reading age (years)	10.2	8.02
Spelling age (years)	10.1	7.9

ANALYSIS OF READING AND SPELLING INACCURACIES IN TERM 2 PRIMARY 6

BAS WORD READING TEST, MARCH OF PRIMARY 6.

8.49 In March of Primary 5, when the underachievers were tested, AF had read the first 60 words fluently and accurately. He now read the first 74 words fluently and accurately including the words ‘territory’, ‘ceiling’, ‘tentacle’ and ‘jeopardy’ which had been inaccurate in Primary 5. Again, AF attempted to read all of the words and only 13 words were inaccurately read, including those , which were also incorrect in Primary 5:

Examples of AF’s attempts in Primary 5 and Primary 6

Test word	AF’s attempt	Test word	AF’s attempt	Test word	AF’s attempt
P5 obscure	obscurr	exert	eexert	diameter	dime-etter
P6	obscur	exert	exet	diameter	di-meter
P5velocity	vello-kitty	criterion	criteron	jeopardy	joe-pardy
P6	vel-oticity	criterion	criterion	jeopardy	jeopardy
P6 nomadic	no maydic	lethal	leh thal	aborigine	a borigin

8.50 The Primary 5 analysis showed how AF was beginning to break up the words into smaller parts but he appeared to need more practice at blending the syllables together. AF was in the process of being introduced to this procedure at this time by the SfL teacher.

SCHONELL SPELLING TEST.

8.51 In March of Primary 5, AF attempted 70 words. In the first 35 words this time, the words 'pie' and 'sight' were now correct but for the word 'brought' AF still wrote 'brote'. In the second 35 words, 'slippery' and 'patient' were now correct but 'jeneris' for 'generous' was still inaccurate. AF still appeared to be using phonemic spelling e.g. 'headick' for 'headache', 'inress' for 'increase', 'copys' for 'copies', 'gest' for 'guest'. For the longer words, he did not seem yet to be breaking up the word into smaller parts to facilitate spelling, e.g. 'instushonn' for 'institution', 'orkrista' for 'orchestra'. AF was concentrating on the procedure for using spelling rules at this time. The next procedure for him would be:

- learning to break up the desired word into syllables
- spelling each syllable and
- blending the syllables together into the required word.

HANDWRITING

8.52 From the spelling response sheets, there were a number of examples where he had attempted 'joined-up' writing, the combinations g and h, g and e, e and a, e and e, and e and n were joined. There was still evidence of some upper case letters being used, e.g. M, L and R, but written in the same size as the lower case version would have been.

8.53 We also administered the One Minute Reading Test to the total sample of children taken from the Manual of The Dyslexia Screening Test (Fawcett and Nicolson, 1996). The manual states that "this test is different from other English tests of single word reading, because it demands that the child produces a speeded as well as an accurate performance" The test provides an At Risk Index and each child's score falls into one of the following categories. Table 8.14 below also shows the number of the 9 pupils reading 12 months or more below chronological age alongside the numbers of the remaining pupils forming the total sample (n = 233) falling into each category.

TABLE 8.14

Scores for speed and accuracy of performance on the One Minute Reading Test of 9 low achievers reading 12 months or more below chronological age (including AF) compared with scores for the remaining 233 pupils of the total sample of pupils in June of Primary 6 (2003).

Category of Performance		Low achievers, N=9	Remaining total sample of pupils N = 233
Above average	+	0	70
Mid-range	0	2	154
Below average	1	1	9
Well below average	2	6	0
Exceptionally poor	3	0	0

8.54 AF scored 55 compared with the mean score for the other 8 children of 16.5. It is certainly noteworthy that AF falls into the “mid-range performance” and indeed his score was the highest of the 9 children tested.

INDIVIDUAL EDUCATION PROGRAMME (IEP) FOR LANGUAGE.

8.55 At this time, just before AF entered Primary 7, in his Individual Education Programme (Language) the SfL teacher was concentrating on:

- a) spelling rules and alternative spellings, i.e. does the word ‘look right’, ‘try the other digraph’ type of approach
- b) introducing the blending of syllables for tackling unknown words,
- c) investigating AF’s problems with handwriting,
- d) investigating AF’s problems with reading comprehension.

IEP FOR READING AND SPELLING.

8.56 The SfL teacher had noticed that AF was succeeding in tasks where he had a systematic, defined procedure to follow i.e. the synthetic phonics systematic procedure for tackling unknown words for reading and spelling - seeing, sounding and blending successive letters to read words, and hearing, sounding, writing and blending successive letters to spell and pronounce words. She was now introducing the blending procedures for tackling

unknown 2/3 syllable words, identifying syllables, sounding and blending successive letters of the separate syllables then sounding and blending successive syllables to read the word. As the SfL teacher was concentrating on spelling rules and alternative spelling, it would be some time before she could introduce the procedure for spelling 2/3 syllable words. She only worked with AF for the three 45 minute sessions per week.

IEP FOR HANDWRITING

8.57 The SfL teacher continued to be concerned about AF's handwriting so she arranged for him to see an Occupational Therapist. The Occupational Therapist worked with AF in conjunction with a Physiotherapist who concentrated on strengthening his handwriting skills. The SfL teacher and supervisory assistant were also involved in carrying through the handwriting programmes on a daily basis. More emphasis was put on recording through using the computer and learning to touch type to boost his confidence to enable him to work faster and more efficiently.

IEP FOR COMPREHENSION

8.58 AF's performance for reading comprehension did not match his performance in word reading. AF was unavailable for this test in Primary 6. However, at the end of Primary 5, his chronological age was 10.6 years whereas his reading comprehension age was 8.0 years (noting that he did not actually complete the paper). It could be that the effort involved in reading the words left little processing capacity for him to comprehend what he was reading (Stanovich, 1986). To read both fluently and with comprehension, it is crucial that AF should proceed beyond reading at the surface level of the text without comprehension, graduating to reading with both fluency and comprehension.

8.59 To start to help AF move towards this goal, and bearing in mind how successful AF had been with tasks where he had a clear procedure to follow, the SfL teacher devised specific initial procedures for AF to follow starting at sentence level, e.g. identifying a sentence in a piece of text, highlighting key word(s) in a sentence, reading the key word, reading round the key word, returning to the beginning of the sentence and reading the whole sentence again. She would then ask questions about the sentence to which he responded orally. This was to help him read and get the meaning of a sentence and to build up his self-esteem and confidence. The SfL teacher devised a series of progressive procedures for comprehension that AF could follow to help him achieve the goal of reading fluently and with comprehension.

PRIMARY 7

8.60 AF's Individual Education Programme for reading, spelling and comprehension was implemented during Primary 7. At the end of March of Term 2, Primary 7, when low achievers were tested, only 9 of the original 16 pupils in the category of reading 12 months or more behind chronological age remained available for testing (including AF) Table 8.15 shows the scores for AF and the mean % scores for the remaining 8 children. The BPVS test was not administered at this time. For the first time, AF's reading age was now above his chronological age. For comparison the scores for March of Term 3 Primary 5 are also shown.

TABLE 8.15

AF's chronological, reading and spelling ages and scores for nonword reading categories together with the average chronological, reading and spelling ages and scores for nonword reading categories for children reading 12 months or more behind chronological age in March of Term 2 Primary 7 (2004) and March of Term 2 Primary 5 (2002) for comparison

	March Primary 5		March Primary 7	
	AF	Pupils 12m or more behind CA, N=10	AF	Pupils 12 months or more behind CA, N=8
Chronological age (years)	10.3	9.4	12.4	11.4
BPVS	75	101.1	-	-
Reading age (years)	9.08	7.9	13.1	8.8
Spelling age (years)	8.9	7.8	10.5	8.3
Initial consonant blends	91.6%	72.5%	100%	81%
Final consonant blends	100%	75.8%	100%	78.6%
Vowel digraphs	100%	39.9%	100%	46.4%
Vowel lengthening silent 'e'	75%	19.2%	100%	52.4%
Initial blends and vowel digraphs	75%	51.6%	100%	53.6%

8.61 Not only is AF's reading age now **9 months above his chronological age** but for each category of the nonword diagnostic reading test, he scored 100%, well above the average scores for the other 8 pupils reading 12 months or more behind chronological age. Although AF's spelling was now 23 months below chronological age, it is still well above the average for the other 8 pupils.

ANALYSIS OF READING AND SPELLING INACCURACIES IN MARCH OF TERM 2 PRIMARY 7

BAS WORD READING TEST

8.62 At this time, AF's reading age was now 13.1 years, 9 months above his chronological age. He read the first 85 words of the test fluently and accurately except for the word 'dough' for which he read 'do'. Of the 5 remaining words, he read 'jeopardy' accurately again. His inaccuracies were: 'choose' for 'chaos', 'emharassing' for 'emphasise', 'aborine' for 'aborigine' and 'criteron' for 'criterion'. As all of the other words had been read swiftly,

fluently and accurately, he tried to read these words in similar fashion and did not attempt to use the blending of syllables strategy which he had been learning.

SCHONELL SPELLING TEST.

8.63 AF's spelling age was 10.5, 23 months below his chronological age. AF again attempted 70 words. For the first 35 words, he was 100% correct. For the second 35 words, he scored 20 correct. The following errors were noted:

'ireland' for 'island': 'fair' for 'fare': 'irn' for 'iron': 'cam' for 'calm': 'headake' for 'headache': 'logh' for 'lodge': 'stile' for 'style': 'cushoin' for 'cushion': 'acount' for 'account': 'institoin' for 'institution': 'simaler' for 'similar': 'jenerasse' for 'generous' and 'ocustra' for 'orchestra'. Some of these inaccurate attempts are 'good' attempts e.g. ireland, fair, headake, stile, cushoin and acount.

8.64 AF also seemed to be using the alternative spelling strategy of whether or not the word 'looked right'. There were a number of examples where he had scored out his first attempt and tried another version. It is hoped that learning to use syllabic spelling will help AF as much as the syllable reading seems to have done with the multi-syllabic words.

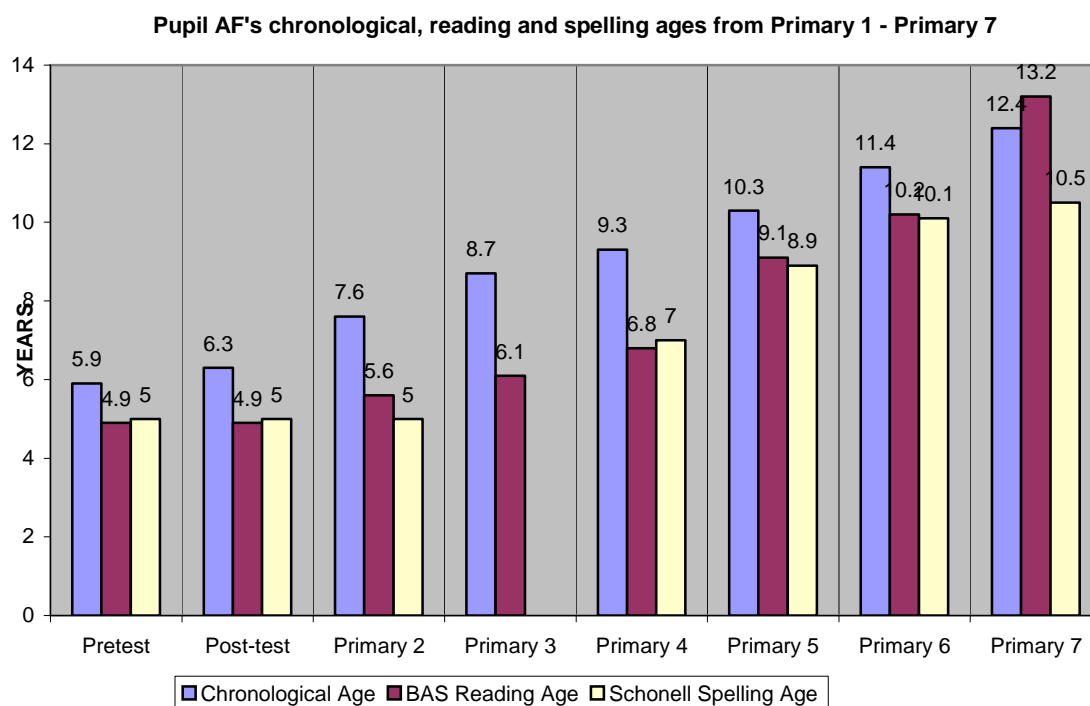
HANDWRITING

8.65 There was a noticeable improvement in AF's handwriting from the spelling response sheet. The words were written with 'joined-up' writing, they were written in ink, there was only one example of using the upper case M instead of the lower case version.

PRIMARY 1 TO PRIMARY 7

8.66 The following figure (Fig.8.3) shows AF's chronological, reading and spelling ages from Primary 1 to Primary 7.

FIGURE 8.3



SPELLING

8.67 It was disappointing to see that AF's spelling at the Primary 7 testing was below his chronological age by 23 months whereas this had been 16 months below in Primary 6. The spelling element of his Individual Education Programme for Language had been concentrated on spelling rules and alternative spelling. The blending procedure for spelling 2/3 syllable words was currently being taught. It has already been noted that there was a noticeable improvement in his handwriting on the spelling response sheet. It is possible that AF had been concentrating on this as he gained more confidence with his 'joined-up' writing.

READING

8.68 From the above Figure (Fig.8.3) it can be seen that the crucial times for AF's reading age improvement were:

- at Primary 2 **AFTER** the introduction of the systematic synthetic phonics procedure
- at Primary 5 **AFTER** the Phonics Revisited programme, and
- at Primary 7 **AFTER** the introduction of sounding and blending successive syllables for reading unknown 2/3 syllable words.

8.69 At the end of Primary 7, the comments by the SfL teacher on AF's School Report included:

- Motivation to learn has greatly improved
- Handwriting has improved and is much more legible
- He is a good reader.
- His fluency has improved and his ability to find answers in the text has greatly improved with the introduction of a number of strategies.
- His spelling is fairly good.

OBSERVATIONS

8.70 After the initial analytic phonics+phonemic awareness programme, AF was a non-reader and a non-speller. His reading received a boost after carrying out the synthetic phonics programme. He also benefited from the Phonics Revisited programme, which he carried out in Primary 5, and learning to blend syllables in Primary 7. From a most unpromising start he ended his primary schooling reading 9 months above chronological age, although spelling was nearly two years below chronological age. However, his spelling was only a year below the average for the chronological age of his class.

8.71 This study has highlighted the need to identify children whose literacy skills lag behind those of their classmates as early as possible. Diagnostic testing could take place earlier than it was done in this case study to cater for individual needs and weaknesses. However, we found that the need to revisit the more complex phonics rules, e.g. problems with vowel digraph and vowel lengthening silent 'e' words were common to all of the low achievers.

DEVELOPING CRITICAL BLENDING SKILLS

8.72 It has already been pointed out that sounding and blending successive letter sounds to pronounce unfamiliar words is the critical skill in the synthetic phonics approach. In January of Primary 4, we saw that once the principle of sounding and blending letters had been firmly established, AF made a tentative start towards taking the next step for himself, i.e. blending successive word parts of longer words. This indicated that he was probably ready to be taught the systematic procedure for sounding and blending successive syllables to read and spell unknown words. The syllable reading procedure formed part of his Individual Education Programme for reading in Primary 6 and 7.

8.73 This successful procedure, providing pupils with a strategy for reading and spelling words of more than one syllable, could follow on from the initial synthetic phonics programme, probably in Primary 2/3. Indeed, this development of blending procedures for both spelling and reading has been taken forward from the phonemic levels to the levels of syllables, morphemes and word parts of multi-syllabic words. Programmes have been devised in conjunction with the Clackmannanshire Primary Adviser with the Literacy Development Officer and a working group of teachers to incorporate syllable/morpheme sounding and blending for spelling and reading, and sounding and blending successive word parts for spelling and reading multi-syllabic words. This programme is at present being piloted and evaluated in different schools and could be implemented from Primary 2/3 right through to Primary 7.

SUMMARY

8.74 This chapter (a) examines the proportion of underachieving children and (b) examines in detail the progress of one low achieving child from Primary 1 to Primary 7, comparing his performance with that of parallel groups of low achieving children reading more than 12 months behind chronological age at each stage.

- In the early years of the study, after the synthetic phonics programme, it was found that the level of underachievement was modest but had increased by Primary 7
- There was a small core of low achievers. Some children improved with extra help. Others, not initially experiencing problems, fell back over the course of the study
- One child with severe learning difficulties was able, with support for his learning, to read well above the level expected for his age and level of verbal ability

CHAPTER NINE

OVERALL SUMMARY AND CONCLUSIONS

LONG TERM EFFECTS OF LITERACY ATTAINMENT

9.1 At the beginning of Primary 1, one group of children learnt to read using the synthetic phonics programme. They were compared with two groups learning to read by analytic phonics programmes; one of these programmes was a standard analytic phonics programme, but the other one contained intensive training to enable children to hear sounds such as phonemes and rhymes in spoken words. At the end of the 16 week training period, the synthetic phonics group were reading words around 7 months ahead of chronological age, and were 7 months ahead of the other two groups. The synthetic phonics group's spelling was also 7 months ahead of chronological age, and was around 8 to 9 months ahead of the two analytic phonics groups. These groups were spelling 2 to 3 months behind chronological age. The synthetic phonics group also showed a significant advantage in ability to identifying phonemes in spoken words, performing even better than the group that had experienced direct training in this skill, despite the fact that these children were from significantly less advantaged homes than the other children. The phonemic awareness programme was found to have no benefits for literacy acquisition.

9.2 The two analytic phonics taught groups then carried out the synthetic phonics programme, completing it by the end of Primary 1. In the meantime the initial synthetic phonics group consolidated their learning rather than moving on to learn new grapheme to phoneme correspondences. During the course of Primary 2 some children in the original analytic phonics taught groups received extra help, but this was not necessary for the initial synthetic phonics taught group. At the end of Primary 2, the initial synthetic phonics taught children were significantly better spellers, and there was a trend towards better word reading skills. When separate analyses of word reading were carried for boys and girls, it was found that early or late synthetic phonics teaching had no impact on the boys reading attainment. However, the analysis for the girls showed that the early synthetic phonics trained group read words significantly better than the group that had received the standard analytic phonics programme first. We conclude that in order to foster good spelling skills, and to assist girls in learning to read, synthetic phonics should start early in Primary 1.

9.3 We have conducted an analysis of the children's performance from Primary 2 to Primary 7, comparing the same children right through in word reading, spelling and reading comprehension. This was to gain an exact measure of whether the gains the children experienced from the Primary 1 programme were maintained, or whether they increased or decreased. It was found for word reading and spelling that the gain in skill compared with chronological age had increased significantly over the years, even though the training programme had ended in Primary 1. In Primary 2, word reading was found to be 11.5 months ahead of chronological age, but in Primary 7 it was 3 years 6 months ahead. For spelling, in Primary 2 it was 1 year ahead, whereas by Primary 7 it was 1 year 9 months ahead. However, for reading comprehension, a different pattern was shown. In Primary 2 the children were comprehending what they read 7 months ahead of chronological age, but by Primary 7 this had dropped to a 3.5 months advantage.

COMPARISON OF BOYS VERSUS GIRLS IN LITERACY ATTAINMENT

9.4 We also compared the performance of the boys and the girls. In Primary 2, they were found to read words equally well, and there were also no sex differences in spelling ability and reading comprehension. However, in Primary 3 the boys pulled ahead of the girls in word reading and by Primary 7 were reading 11 months ahead of the girls. The boys also spelt better than the girls in Primaries 4, 6 and 7, and by Primary 7 were 8.6 months ahead. The boys were also 3 months ahead of the girls in reading comprehension in Primary 7, but this was not statistically significant. It is very unusual for boys to perform better than girls; in a recent international study of reading comprehension, girls were significantly ahead of boys in all 35 countries (Mullis et al, 2003).

ATTITUDES TO READING

9.5 The girls, despite not having superior literacy skills, had a significantly more positive attitude to reading than the boys on the ATR2 (Ewing and Johnstone, 1981). When answering a direct question about how much they liked reading, girls were found to like reading significantly more than boys. They were also significantly more likely to be a member of a public library. However, when questioned about how much fiction they read, no difference was found between the boys and the girls. This is an atypical finding, as boys are generally found to read less fiction than girls (Mullins et al 2003). It would be desirable to study controls in Scotland in order to determine whether this is unusual. A positive attitude to reading was associated with better word reading and spelling skills, more reading of fiction, and greater use of the public library by the children (and their parents). It was also associated with being able to read and write letters before starting school. However, as these analyses are correlational, one should be cautious about assuming that the findings indicate causation.

FEEDBACK FROM TEACHERS ON THE PROGRAMME

9.6 In response to a request from SEED for final feedback at the end of the seven-year research period, a brief questionnaire was sent to the eight Head Teachers of the schools included in the study. All the Head Teachers responded that, in their view, reading, spelling and writing skills had been accelerated by the synthetic phonics programme. One Primary 2 teacher, with thirty years' experience, also responded, observing that not only had the literacy skills been accelerated but also the results were "the best ever achieved" and would not normally have been expected until the Primary 3 stage. It was also stated that the children were very motivated, enjoyed the programme and had improved confidence in their literacy skills. Indeed, one Head Teacher commented that the synthetic phonics programme had empowered both teachers and pupils and had also provided both staff and curricular development opportunities. Another Head Teacher said that it was a professional 'life-changing' experience. All of the respondents agreed that teachers now had higher expectations of their pupils, one Head Teacher remarking that the accelerated pace of teaching and learning had become the norm. Another Head Teacher of a school in an area of deprivation said that they now knew what the children could achieve and that it was possible to help less able pupils to keep pace with the class. In terms of detecting children needing learning support, most Head Teachers commented that they were able to do this much earlier and one said that for some children only a low level of support time was needed for them to catch up.

EFFECTS OF SOCIO-ECONOMIC STATUS

9.7 An examination was made of the effects of differing socio-economic background, using Clackmannanshire Council's deprivation index. Using this index we divided our sample into advantaged and disadvantaged, according to the Council's categorisation. The expectation was that children from advantaged homes would outperform those from disadvantaged homes. However, for word reading and spelling this was only found to be significant in Primary 7 (only marginally so for reading), where the advantaged children's reading was 6.2 months ahead of that of the disadvantaged children's reading and spelling was 5.8 months ahead. For reading comprehension, the advantaged children were significantly ahead only in Primaries 5 and 7, the superiority at the end of the study being 5.5 months. It is very likely that children learning by the standard analytic phonics approach would show these socio-economic differences much earlier on in their schooling, but further work with a control sample will be needed to examine this issue.

9.8 A questionnaire was sent to the parents in Primary 7, and we achieved a 46.4% response rate. These data were used in correlational analyses, together with Clackmannanshire Council's Deprivation Index. From these analyses we have found that the less deprived the homes the children came from, the better they read and spelt in Primary 7. The parents from less deprived homes reported having more children's and adults' books, and the adults said they made greater use of public libraries. This greater availability of books may explain why socio-economic differences emerge by Primary 7, where home influences may become more important as children spend more time reading independently outside the school curriculum. The children from the less deprived homes were more likely to have attended a mother and toddler group, but virtually all of the children had attended a nursery class. There was no correlation between the deprivation index and the extent to which parents valued learning to read. This equal value placed on education by the less well off may not be found in other parts of the UK, and it would be interesting to establish whether this is so. Having more adults' books in the home was associated with both mothers and fathers having high educational levels, whereas the number of children's books in the home was associated only with the mother's educational level. Interestingly, the more educated the father the more likely the children were to read and write letters of the alphabet before starting school.

UNDERACHIEVERS

9.9 Although the synthetic phonics programme has clearly had a major effect on the literacy skills of these children, it is important to know whether it is just the high achieving pupils who have received a boost, or whether there have also been gains for the lower achieving children. We have no controls for comparison, but we can examine the proportions of low achievers, and the progress of one such child has been studied in detail. We have taken a performance level of more than two years below chronological age as indicating underachievement. This measure cannot be meaningfully made for the children in Primary 2, but is useful from Primary 3 onwards. In Primary 3, only 0.8% of the children were more than 2 years behind in word reading, 0.4% in spelling, and 1.2% in reading comprehension.

By Primary 7, 5.6% were more than 2 years behind in word reading, 10.1% behind in spelling, and 14.0% were behind in reading comprehension.

9.10 The question arises as to whether these low achieving children can be helped to attain normal performance levels. Although a revisiting programme was devised and offered to learning support teachers, we only know of a few children who definitely received the programme. One in particular, AF, has had his progress closely monitored over the last 7 years. AF entered school a year late, primarily due to difficulties in language development. He was entered into our analytic phonics and phonemic awareness training programme, having at the start of schooling no measurable level of phonemic awareness, and being unable to give a single rhyme for a spoken word. His only indication of any literacy skills was being able to give the name of one letter of the alphabet. At the end of the analytic phonics and phonemic awareness training programme he was still a non-reader, had no phonemic awareness or rhyme ability, could only give 3.8% of letter names, and knew no letter sounds. He and his class then carried out the synthetic phonics programme, completing it by the end of Primary 1. At the end of Primary 2 we found that he now had a reading age of 5.6 years, but his spelling age was 5.0 years which indicates that he was not able to spell at this stage. In Primary 3, his reading was 6.1 years and he did not sit the spelling test. By January of Primary 4, his reading age was 6.8 years, his spelling was 7.0 years, and his phonemic awareness and nonword reading scores were 100% correct. At this point, he carried out the Phonics Revisited programme. By the end of Primary 5, his word reading was 9.2 years, his spelling age was 8.9 years, and his reading comprehension was 8.0. This performance was quite creditable given that the actual age of his class was 9.7 years, but as he had entered school a year late, his chronological age was 10.6 years. In Primary 5, we tested his receptive vocabulary knowledge, and he gained a score of only 75, where the average is 100. By the end of Primary 6 his reading age was 10.2 years, and his spelling age was 10.1 years, but this still meant he was lagging behind his chronological age of 11.4 years. At this point he carried out a programme which developed advanced blending skills and a more visual approach to spelling. At the end of Primary 7, when he was 12.4 years old, his reading age was 13.1 years and his spelling was 10.5 years. His reading comprehension, however, had fallen back to 7.1 years. Juel (1988) has argued that children who make a slow start always lag behind. However, it is clear that a child whose low achievement that has its basis in severe language development difficulties can achieve a very creditable level of literacy skills with appropriate teaching methods and learning support tailored to his needs.

CONCLUSION

9.11 It is evident that the children in this study have achieved well above what would be expected for their chronological age according to standardised tests. The actual gains may be much larger than this comparison indicates, as many of the children came from homes experiencing economic deprivation, and receptive vocabulary knowledge scores for the whole sample were somewhat below average. It is hoped that in future work controls matched on socioeconomic background can be studied, so that we can gauge the true gain.

9.12 Overall, we can conclude that a synthetic phonics programme, as a part of the reading curriculum, has a major and long lasting effect on children's reading and spelling attainment. Indeed, these skills were found to be increasing many years after the end of the programme. It is evident that the children have learnt a technique that they can use for themselves, that they have learnt a self teaching technique. Furthermore, although in a recent international study

boys were found to have significantly lower levels of reading comprehension than girls in all 35 countries surveyed, the boys in this study comprehended text as well as the girls'. In fact they were slightly ahead, and if this trend continues in the future, it may become statistically significant. Socio-economic differences in literacy skills were non-existent in the early years of the study, only emerging in the upper primary years. Further work will be needed, however, to establish just how great the gains are in comparison with other approaches to teaching reading.

APPENDIX 1

PARENTAL QUESTIONNAIRE

PLEASE COMPLETE ALL QUESTIONS

For each question, please tick whichever box best fits your answer. Where appropriate, you may tick more than one box. Your answers will be treated in the strictest confidence. Thank you for your help.

Please fill in your child's

First Name _____ Last Name _____ School _____

1. Are you the:
mother father carer (female) carer (male)
2. Did your child go to:
 a mother/toddler group playgroup nursery registered childminder
other none
3. Before starting school, could your child:
read own name? write own name?
read any letters of the alphabet? write any letters of the alphabet?
read any signs, such as Kit-Kat, Smarties etc.?
4. How important do you think it is that your children can read well?
Very important Important Quite important Not important
5. How important do you think it is that your children can spell well?
Very important Important Quite important Not important
6. Is there a public library near you? Yes No
Does your child use it? Yes No
If yes, does your child use it weekly monthly several times per year

Do you use it? Yes No
If yes, do you use it weekly monthly several times per year
7. Does your child mainly read fiction non-fiction equal amounts of
fiction and non-fiction
8. Do you have children's books in your home? Yes No

If yes, how many? 1-10 11-25 26-50 51-100 over 100

Do you have books for yourself in your home? Yes No

If yes, how many? 1-10 11-25 26-50 51-100 over 100

- 9.** Please tell us a bit about your education and that of your partner. Please tick all boxes that apply.

	Mother/female carer	Father/male carer
Left School before Standard Grade or equivalent	<input type="checkbox"/>	<input type="checkbox"/>
Standard Grade or equivalent	<input type="checkbox"/>	<input type="checkbox"/>
Higher Grade or equivalent	<input type="checkbox"/>	<input type="checkbox"/>
SCOTVEC Certificate	<input type="checkbox"/>	<input type="checkbox"/>
HNC or HND	<input type="checkbox"/>	<input type="checkbox"/>
Access Course after leaving school	<input type="checkbox"/>	<input type="checkbox"/>
First or Higher Degree	<input type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input type="checkbox"/>

- 10.** Is there anything you would like to say about the 'Early Learning Initiative'?

APPENDIX 2

ATTITUDES TO READING SECTION 1

Name _____

These questions are about reading. There are no right or wrong answers. We just want to know what you feel about different kinds of reading. Please write your name in the space provided above.

Before you start on this, here are a few questions about yourself to answer.

Section 1.

1. Are you a member of a public library outside of school? Please put a tick in the box for you.

Yes or No

2. How much do you like or dislike reading? Answer by putting a tick in one of the boxes below, the box that is right for you.

1	2	3	4	5
Dislike reading very much	Dislike reading	Neither like or dislike reading	Like reading	Like reading very much

3. How much fiction/non-fiction do you read? Answer by putting a tick in one of the boxes, the one that is right for you.

1	2	3	4	5
Read only non-fiction	Read more non-fiction than fiction	Read equal amounts of fiction and non-fiction	Read more fiction than non-fiction	Read only fiction

Section 2 is over the page.

ATTITUDES TO READING SECTION 2

Section 2

For office
use only

There are 18 sentences listed below. Read each sentence carefully, and when you have read it show us how much you agree or disagree with that sentence by putting a tick in the box which is right for you.

	1	2	3	4	5	
	definitely disagree	probably disagree	not sure	probably agree	definitely agree	
1. I wish we had more television programmes at school instead of books.						21
2. Most books are too long for me.						22
3. I like talking to my friends about books I've been reading.						23
4. I would be disappointed if I got a book or a book token as a present.						24
5. I can understand things better when they are written down.						25
6. If I got the chance I would spend a lot of my spare time reading.						26
7. I am glad I learned to read.						27
8. Reading is something I only do at school.						28
9. It is difficult when you have a lot to read for your school work.						29
10. There are lots of books that I feel I would like to read.						30
11. The more pictures a book has, the better it is.						31
12. I like to get books out of the library (class or school or public).						32
13. I would like to have more time at school set aside for reading.						33

14. People who spend a lot of their spare time reading miss a lot of fun.						34
15. There is too much reading to do in school.						35
16. Reading is boring unless you want to find out something.						36
17. Reading books is the best way to learn things.						37
18. I would like to have a bigger selection of books to read for school work.						38

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