Risk factors in learning to read

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Abstract

Schools are not level playing fields. Children in low-SES schools start behind their high-SES peers and they get further behind as the years of school continue. This chapter is in three parts. The first part describes a longitudinal study in which 88 low- and 23 high-SES 5-year-old children were followed over five years. The results showed that reading and writing success was a high probability for children attending schools in high-SES areas, but much less so for children attending schools in low-SES areas. After two years in school, 3 out of 4 (75 percent) low-SES children were reading below average for their age, whereas this was only the case for 1 in 7 (14 percent) of the high-SES children. After five years of school, half (52 percent) of the low-SES children were at least a year below average for their age compared with only 1 in 12 (8 percent) for the high-SES children. What were the risk factors at school entry for low-SES children? The school entry data showed significant differences between low- and high-SES children in knowledge of the alphabet, phonemic awareness, phonological recoding, and vocabulary knowledge. The second part of the chapter used the longitudinal data to carry out a series of regression analyses to find risk factors in learning to read. The simple view of reading was used as the theoretical benchmark to assess which factors were most important in learning to read and spell. The results showed that alphabet, phonemic awareness, phonological recoding were the main predictors of reading and writing success, and that while language knowledge made a contribution it was not as important. The third part of the chapter presents results of an intervention that focussed on teaching of phonological recoding skills to children with reading disabilities. The results supported the view that successful interventions for at-risk children need to focus on a phonological approach.

Risk factors in learning to read, and what to do about them

Children from low-socioeconomic (low-SES) backgrounds are sometimes referred to as “Struggletown” children (McAlman 1984). They do not have the ”cultural capital” (Bourdieu, 1974) of children from high socioeconomic (high-SES) backgrounds (Nicholson 1997, 1999, 2000). They come from poor families and often from dysfunctional ones. Some children have parents who are nice to them, while others are not so lucky. In New Zealand Alan Duff is a Maori writer who has tried to confront the issue of violent homes through his novels and by starting a programme for poor children called Books in Homes. In Duff's (1990) novel that later became a movie, Once Were Warriors, the children of Jake Heke were raised in a violent home situation. All disposable income seemed to be spent on Jake's drinking habits. There were no books in the Heke home. As Jake's wife, Beth, put it, "It occurred to Beth that her own house - no, not just her own house but every house she'd ever been in - was bookless. The thought struck her like one of Jake's punches" (p. 10).

Many children from low-SES homes come to school hungry or without any lunch (Turner, Connolly, and Devlin 1992) or else do not come to school at all. In contrast, children from middle-class homes are more likely to attend school regularly and be well fed (e.g., will bring lunch to school with them). As a result, they receive more consistent schooling and are able to give their school tasks more attention.

Parents with little money struggle to keep their children well fed, and lack financial resources needed to provide their children with school textbooks and other study materials. Orr (1995) reported the results of an interview survey of 500 Australian families who had children attending high school. All families were receiving financial assistance from the Smith Family. The findings revealed that 60% of the children in the sample of 500 had not progressed beyond a 10–year-old level. The pressures faced by these children were revealed in interviews. One comment was, "They say to me, “Your family is poor and we don't want to hang around germs." Another comment was, "They would tease me because of the clothes I was wearing so then I got a uniform ... Now they just tease me because I wasn't born in Australia" (p. 21).

Yet for all these difficulties there are many pupils from low-SES backgrounds who come from homes where they are well fed and cared for, and have supportive parents. There are many instances in the literature of children from humble backgrounds who have become successful readers and writers. Abraham Lincoln, President of the United States during the American Civil War, came from a background of rural poverty. D.H. Lawrence became a famous novelist, though his father was a coal miner. What was it that enabled these people to be successful? In this chapter it is argued that there are many people, including myself, who have come from poor backgrounds yet have succeeded in schools. It is not a sufficient explanation in itself to argue that children of the poor are doomed to failure. If some can succeed then many more can as well.

Children from low-SES backgrounds start school with significantly lower levels of phonemic awareness skills than do children from high-SES backgrounds. Wallach, Wallach, Dozier, and Kaplan (1977) found that 5-year-old children from low-income backgrounds in the United States had much more difficulty with easy phonemic awareness tasks (e.g., finding a picture which started with a particular phoneme) than did middle class children of the same age. Dickenson and Snow (1987) found social class differences among 5-year-olds on simple tasks such as deciding whether "Nat"

rhymed with "feet" or "fat" or giving the first sound of a word, such as "d" for "dog". Raz and Bryant (1990), in England, also reported social class differences, after a year in school, on tasks such as picking the odd one out of a string of spoken words (e.g., "hug", "dig", "pig", "wig", where "hug" is the odd one out). Bowey (1995), in Australia, also found social class differences when she used tasks similar to those of Wallach et al. (1977).

Juel (1988) followed a group of 129 low-SES pupils in Austin Texas, through grades 1 to 4. She found that pupils who became poor readers all entered school with low levels of phonemic awareness. These poor readers, after 4 years in school, had still not achieved reading levels attained by average and good readers after only two years in school. Juel (1994) found that getting off to a slow start in learning to read and spell will have negative Matthew effects in that poor readers and spellers fall further and further behind as they pass through each school grade.

Stanovich (1986) summarized research showing the negative effects of attending schools where most of the pupils are from low-income backgrounds. Teacher expectations will be lower, classroom discipline more of a problem, teachers are harder to recruit, and those who are recruited tend to be less experienced. There are negative effects of being in a class where most of the children are low-achievers. Pupils who need extra help with reading are less likely to get it if most of their classmates also need help with reading. Pupils make better progress academically in classrooms where the average level of achievement is high than in classrooms where academic levels are low (Rutter 1983; Nicholson and Gallienne 1995; Share, Jorm, Maclean, and Matthews 1984).

Bernstein (1974) has made the point more strongly, that for children from low-SES backgrounds, “we offer these children grossly inadequate schools with less than able teachers. No wonder they fail – for the ‘more’ tend to receive more, while the socially defined ‘less’ receive less and become less.” (p. 151). To some extent this statement is accurate. It is difficult to recruit teachers to low-SES schools. Teachers are not easily attracted to work in an area where you see graffiti everywhere, with gutted cars parked on front lawns, where there are no gardens or flowers growing because people can’t afford these luxuries, and where you are likely to have your house burgled or your belongings stolen while you are at work. On the other hand, Bernstein’s statement may be too strong. My experience with low-SES schools is that they are usually in pleasant surroundings and there is a real willingness among teaching staff to help low-SES children. However this does not seem to be sufficient to enable them to close the gap between these children and their high-SES peers.

It can be argued that children in low-SES areas have too many social problems for schools to make any difference. These children come to school with fewer literacy skills and concepts than high-SES children (Gilmore, 1998). They lack the middle class language “code” that seems to be necessary to succeed in schools (Bernstein 1974; Nash 2002). There is a view, called social reproduction theory, that low-SES children, whose parents probably struggled at school themselves, will repeat their parents’ own experiences (Bourdieu 1974). Society replicates itself so that the rich will stay rich and the poor will stay poor, and schools are a conservative force in reproducing the social structure.

Yet it does not have to be this way. A number of studies have reported that low-SES children can get off to a much better start in school with a phonological approach to reading. This approach does not assume a weight of pre-reading skills at school entry. The approach assumes that children have few of these skills and starts by teaching the alphabet and the sounds that each letter makes. In contrast, the whole language approach appears to depend for success on skills that middle-class children have and low-income children lack (Nicholson 1999).

Some researchers argue that whole language benefits middle class children rather than children from low-income backgrounds (Adams 1990; Chall, Jacobs, and Baldwin, 1990). Whole language is the mandated approach in New Zealand schools, but which part of society does it best serve? Whole language relies on children teaching themselves to read. The approach immerses children in the language of books and encourages children to learn to read by reading, using contextual guessing, picture clues and so on to acquire phonological recoding skills. Tunmer and Chapman (1999), however, have found that the contextual guessing strategy only works well for children who have good phonological recoding skills. Good readers can use their phonological recoding skills in combination with context to identify words they have not come across before. Yet poor readers have to rely on context to compensate for their lack of phonological recoding skills. Nicholson (1991) has found that while poor readers embrace contextual guessing to work out words, good readers have such high levels of phonological recoding skills that they are just as good at reading words in isolation as they are in context. The whole language approach assumes that the school is building on the literacy skills that have been acquired in the home. Yet this assumption cannot be made for many low-SES children.

Many low-SES children start school with very little knowledge of the alphabet and low levels of phonemic awareness. Yet phonological recoding skill depends on knowledge of the alphabet and phonemic awareness (Juel, Griffith, and Gough 1986). In addition, phonological recoding as well as depth of vocabulary and general knowledge helps good readers to acquire more new words and infer more meanings of words than poor readers (Nicholson and Whyte 1992). As a result low-SES children suffer a double whammy in a whole language approach compared with high-SES children. First, they are poorly equipped to infer phonological recoding rules through reading because they start school lacking in alphabet knowledge and phonemic awareness. Second, they are less able to increase their vocabulary and general knowledge compared with good readers since they have less well developed decoding skills, vocabulary and general knowledge.

A phonological approach however sidesteps this problem by teaching how to decode words without guessing, and this puts children in a strong position once a word is decoded during reading to figure out its meaning from context and to add this new word to their mental dictionaries. The phonological approach helps the child to gain an increased vocabulary whereas the guessing approach forces the child to rely always on an existing mental vocabulary.

In support of this argument, there are a number of studies that have used the phonological approach with success. Wallach and Wallach (1979) taught 98 grade 1 pupils from inner city schools on Chicago's South Side. The pupils received 10 weeks of daily, half hour instruction (25 hours) in a one-to-one situation with parent tutors. The programme included teaching of phonemic awareness and letter-sound rules. The

control group received no extra instruction. The researchers found significant gains in word recognition and reading comprehension compared with a control group from the same schools.

Williams (1980) worked with 63 learning disabled pupils from Central and North Harlem, aged 7 to 12 years. Classroom teachers taught the programme for 26 weeks, for 30 minutes each day (65 hours), in small groups of 2-5 pupils at a time. The control group was selected from similar schools, and received no extra instruction. The experimental children were taught phonemic awareness and letter-sound rules. The initial study was a trial run. A second study, using random assignment to experimental and control groups, was then carried out. The results of both studies showed that the trained pupils were significantly better than the controls in reading, as measured by real word and pseudoword reading.

Whitehurst, Epstein, Angell, Payne and Fischell (1994) worked with 94 preschool children who were enrolled in Head Start programs (eligibility is only for pupils from low-income families). The children received training in phonemic awareness as well as interactive book reading experiences at home, which involved parents reading to their children in a way that encouraged child participation. A control group of 73 preschoolers received no extra instruction. The programme ran all year, but the phonemic awareness instruction only ran for 20 weeks, carried out by the pupils' teachers three times each week (a total of 20 hours). The results of the study showed that the trained pupils were better than the untrained controls in knowledge of print concepts, writing and oral language. There was an improvement in phonemic awareness but only for recognising the first sound of words.

Blachman, Ball, Black and Tangel (1994), followed up an earlier study with a similar design (Ball and Blachman 1991), teaching phonemic awareness and letter-sound correspondence skills to 84 kindergarten (5-year-old) children from low-SES areas of upstate New York. A control group of 75 children received no extra instruction. The program ran for 11 weeks, with 15-20 minutes of instruction 4 times each week (a total of 11 hours). The children were trained in small groups. The findings of the study were that the trained children were significantly better than the control children in phonemic segmentation skills, letter name knowledge and the reading of short regular words and pseudowords. The trained children were also better than the control children in spelling. A follow-up of these children in first grade, when they received a second round of similar instruction, showed that they retained their advantage in spelling (Tangel and Blachman 1995).

Foorman, Francis, Fletcher, Schatschneider, & Mehta (1998) worked with 285 first-grade children in Houston, Texas. The children were from low-SES backgrounds. Sixty percent were African-American, 20 percent were Hispanic. They were taught in small groups, outside the classroom, across 19 different schools. Children were taught with either a direct instruction approach, which was heavily phonics based, a less direct approach, which used phonemic awareness and onset-rime phonics, or an incidental approach, which was intended to be like whole language in emphasis. The findings were that children who received the direct phonics instruction were able to read words faster than children who received the whole language, indirect approach. Only 16% of the children in the phonics group did not improve in reading compared to 44% of the onset-rime phonics group and 44% of the whole language group. Children taught with phonics scored close to the national average in terms of decoding ability. The children taught

with direct phonics had higher reading comprehension scores, though this advantage was not statistically significant. This showed that comprehension was not compromised in the phonics approach.

To summarise, there is every reason why low-SES children should be able to succeed at school even though they do not have the same levels of ”cultural capital” that high-SES children have on entry to school. A lot depends on the reading instruction provided to low-SES children. A whole language approach succeeds better with children who start school with high levels of technical knowledge (e.g., knowledge of the alphabet, phonological awareness) and with high levels of vocabulary and general knowledge. On the other hand, the whole language approach will disadvantage low-SES children because they do not have this level of “cultural capital” and it is very difficult to raise quickly levels of vocabulary and general knowledge that have been built up over several years in a middle-class home through direct instruction at school. A better approach is to give low-SES children decoding skills to enable them to teach themselves new words through reading and in this way acquire new vocabulary and general knowledge. Low-SES children are more likely to make better progress if they are given phonological decoding instruction from the outset, which enables them to work out words on their own without guessing, which in turn makes it easier for them to increase their vocabulary knowledge through reading, and in turn improve their reading comprehension.

This rest of this chapter is in three parts. First we look at longitudinal data that shows emerging literacy gaps between low- and high-SES children through the first five years of school. Second, we use the longitudinal data to explore the "Simple View" of how children learn to read and spell (Juel, Griffith and Gough 1986). Data will be presented to show that the cultural capital of a high-SES background is not the crucial factor in reading and writing success. What matters more is getting off to a good start at school with high entry levels of alphabet knowledge and phonemic awareness, and a quick learning trajectory into phonological recoding skills. Finally, we look at data on the results of an 18-month evaluation of an after-school reading tuition programme for children with reading difficulties.

A longitudinal study: How the rich get richer and the poor get poorer

This longitudinal study was originally a study of the effects of phonemic awareness instruction on a low-SES experimental group compared with a low-SES control group. At the time, the study included a high-SES group of children of the same age to act as a comparison. The results showed small but positive effects of the phonemic awareness instruction on invented spelling and pseudoword reading (Nicholson 1996, 1997). However follow up assessments of the children in years 2 and 5 showed that the initial effects of the intervention had washed away. As a result, the assessment data for the experimental and control groups were pooled together to form one low-SES group and re-analysed in order to look at the long-term progress of the low-SES children. The re-analysis also included the high-SES children who served as a comparison group in year 1 but who were also re-assessed in years 2 and 5.

Participants

We assessed children in Year 1. There were 111 children in total, 88 from six schools in low-SES areas of Auckland, and 23 from one school in a high-SES area. The participants had only been at school for a few months. Average age was 5.27 years for the low-income children and 5.26 years for the middle-income children. In the final term

of Year 1, we located 94 of the original 111 children (low-SES=71, high-SES=23). Average age was 6.9 years. In the final term of Year 2, we located 78 of the children (low-SES=57, high-SES=21). Average age was 7.0 years. In the final term of Year 5 we located 46 of the children (low-SES=33, high-SES=13). Average age was 9.9 years

The missing children in years 1 and 2 were nearly all from low-SES schools. This number of dropouts in just a few months is typical of schools in low-income areas, where families move in and out of the community (see "Hundreds of school children missing" 1996). In the high-SES school by comparison, there was no attrition rate during year 1 and a small attrition rate in year 2. There was a much bigger attrition rate in year 5 for both groups. This dropout rate was high, but it was not unusual for longitudinal studies involving children from low-SES backgrounds. Juel (1988) reported a similar high dropout rate from 129 to 54 over four years.

The low-SES children were from six different decile 1 schools in Auckland. Decile 1 is the lowest category in a scale used by the Ministry of Education to determine levels of government funding for schools. The high-SES children came from one decile 10 school. Decile 10 is the highest category on the scale (Norris, Bathgate, and Parkin 1994). We did not gather ethnicity data at the beginning of the study, only in the Year 5 follow-up where we located 46 of the original children. The children in the six low-SES schools were mostly of Pacific Island (45%) or Maori (36%) descent with a small minority of European (12%) and Asian descent (6%), whereas the children in the middle-income school were mostly of European descent (92%) with a small minority of Asian children (8%).

Measures

We used the GKR phonemic awareness test (Roper 1984, reprinted in Nicholson, 1999). The test has 42 items and assesses six phonemic awareness skills including blending, segmenting, deletion and substitution. Juel, Griffith and Gough (1986) reported that the test has good internal consistency (Cronbach alphas greater than 0.7).

Verbal ability was assessed with the Peabody Picture Vocabulary Test - Revised (PPVT-R; Form L, Dunn and Dunn 1981). Only standard scores are reported here.

Letter knowledge was assessed using the Clay (1985) alphabet knowledge measure. The total score is 52, with 26 uppercase and 26 lowercase letters.

Spelling was assessed with two measures. The first was a test of invented spelling (Tunmer and Chapman 1995). The test gives points for phonemic similarity to the test words, ranging from 1 to 4. The total score is 72 points.

The second measure of spelling ability was the Wide Range Achievement Test of Spelling (WRAT-S; Jastak, Bijou and Jastak 1993). Alpha internal consistency reliability for the test at the 5-year-old level is 0.89 according to the WRAT manual.

Reading was assessed with tests of real word reading, pseudoword reading, and text reading. The Burt Word Reading Test (Gilmore, Croft, and Reid 1981) is a test of real word reading standardised in New Zealand. The test-retest reliabilities for this test are 0.97. The text reading measure was the Neale Analysis of Reading Ability Revised (Neale 1988) that assesses reading accuracy and comprehension. The test-retest reliabilities (parallel forms) were 0.98 for accuracy and 0.94 for comprehension.

The pseudoword reading measure used in year 1 was made up of 30 single syllable nonsense words (Richardson and Di Benedetto 1985). Children received points for the number of phonemes in each pseudoword pronounced correctly. The Bryant (1975) Test of Basic Decoding Skills with 50 items, consisting of single and multiple

syllable pseudowords was administered in Year 2 and 5 and scored for number of words read correctly. These tests assess children's phonics knowledge: simple consonant-vowel-consonant correspondences, consonant and vowel blends and digraphs, and syllabication

We also used a writing task. Each pupil was given a single blank page and wrote a story about an unusual picture that depicted a car accident, with an ambulance driven by an astronaut and an alligator. The task was allocated 10 minutes. Each story was given a holistic score, using the same criteria as in Juel et al. (1986). The score depended on the extent to which the story related to the picture, and whether or not there was a plot. Two raters independently assessed all stories. Inter-rater agreement was r = .97 using the Pearson r statistic.

Results

The statistical analyses used two-tailed t-tests. Since there were a considerable number of t-tests, the conservative Bonferroni adjustment was used, with significance levels set at $p<.002$.

Beginning of Year 1. The mean age for low-SES children in the first year of school was 5.27 years (SD=.25) while the mean age for high-SES children was 5.26 years (SD= .20). There was no significant difference in the ages of the two groups, $t(109) = 0.21$, $p>.05$

There were significant language differences at school entry between children from low-SES and high-SES backgrounds. The PPVT standard score for receptive language for the low-SES group was 75.75 (SD = 19.48) and for the high-SES group was 105.30 (SD=6.87), $t(109) = 6.87$, $p<.001$.

As shown in Table 1 there were also significant differences between the two groups in alphabet knowledge, phonemic awareness, invented spelling, and pseudoword reading.

In each SES group there was a wide range of scores. Not all low-SES children did poorly. In the low-SES group, phonemic awareness ranged from zero to 19, and 20 children out of 88 (23 percent) scored at or above the high-SES average score of 9. Alphabet knowledge ranged from zero to 51 and 20 children out of 88 (23 percent) scored at or above the high-SES average of 41. PPVT standard scores ranged from very low to 118 and there were 22 children (25 percent) with a PPVT standard score of 90 or above.

In the high-SES group, there was also a range of scores. Not all high-SES children did well. Phonemic awareness ranged from zero to 21. There were 4 children out of 23 (17 percent) who scored either the same as or else below the low-SES average of 3. Alphabet knowledge ranged from13 to 51. There were 2 children (9 percent) who scored below the low-SES average of 20. PPVT scores ranged from 88 to 134. There were 22 children (96 percent) with a PPVT score of 90 or above.

Insert Table 1 About Here

End of Year 1. Assessments carried out at the beginning of the last school term of year 1 also showed significant differences between low-SES and high-SES children, as shown in Table 2. There was a PPVT standard score difference for receptive

language but the difference was not so great as at the beginning of year 1, mean standard score for low-SES (N=58) was 82.90 (SD=14.75) and for high-SES was 105.32 (SD=12.10), t(79) = 5.95, p<001.

The children in the low-SES group at the end of year 1 had attained levels of alphabet knowledge, phonemic awareness and invented spelling skills that the high-SES children had already achieved when assessed at the beginning of year 1. The low-SES raw scores for Burt word reading were below average for their age, while the high-SES children's scores were average for their age.

To find the best predictor of reading success in year 1 of school, a series of partial correlations were carried out. The school entry PPVT vocabulary measure was correlated with Burt reading after partialing out school entry alphabet and GKR phonemic awareness scores. The partial correlation of PPVT with Burt reading was not significant, r=.20, N=89, p=.06. The same partial correlation analysis was done for the GKR measure and the result was significant, r=.21, N=89, p=.04. The same pattern was followed for the alphabet measure. The correlation was significant, r=.64, N=89, p=.000. Knowledge of the alphabet had a higher correlation with Burt word reading than the other two measures.

Insert Table 2 About Here

End of Year 2. Assessments carried out at the beginning of the last school term of year 2 showed significant differences between low-SES and high-SES children. These are shown in Table 3. At this time children in the study were 7.0 years of age. Burt word reading frequencies showed that 75 percent of low-SES children were reading below the 7-year-old level, and 25 percent were reading below a 6-year-old level. In contrast, 14 percent of the high-SES children were reading below a 7-year-old level and none were reading below a 6-year-old level. The pattern of differences was similar for other reading measures. The gap between the two SES groups on the Burt word reading measure was 1.2 years.

This does not mean that all low-SES children were failing. A frequency analysis showed that the range was between 5.0 and 9.9 years. There were 14 out of 57 (25 percent) at a 7-year level or above for Neale reading accuracy. For reading comprehension the range was between 5.0 and 9.3. There were 21 out of 57 (37 percent) at a 7-year level or above. A check of beginning year 1 scores for the high achieving low-SES children showed that, on average, their scores for alphabet, phonemic awareness, and PPVT vocabulary were higher than those of their low-SES classmates, and closer to the beginning year 1 scores of high-SES children.

Likewise, not all high-SES children were succeeding. For reading accuracy the range was between 6.2 and 9.8 years. There were 5 out of 21 (24 percent) of the high-SES group who were reading below a 7-year level for accuracy. For reading comprehension the range was between 6.2 and 10.5 years, and 3 (14 percent) were reading below average for reading comprehension. A check of beginning year 1 scores for alphabet, phonemic awareness, and PPVT vocabulary showed that, on average, their scores were lower than those of their high-SES classmates.

To find out the best predictors of reading success in year 2 of school, a series of partial correlations were again carried out. The end of year 1 PPVT measure was

correlated with Burt reading at end of year 2 after adjusting for end of year 1 alphabet and GKR scores. The partial correlation with Burt reading at end of year 2 was not significant, r=.24, N=62, p=.06. The same partial correlation analysis was done for GKR and was significant, r=.63, N=62, p=.000. The same analysis was done for the alphabet measure and was significant, r=.33, N=62, p=.009. These results indicated that phonemic awareness had a higher correlation with Burt word reading than the other two measures.

Insert Table 3 About Here

End of Year 5. Assessments carried out at the beginning of the last school term of year 5 showed significant differences between low-SES and high-SES children, as shown in Table 4. At this time children in the study were 9.90 years of age. Burt word reading frequencies showed that 67 percent of low-SES children were reading below the 10-year-old level, and 52 percent were reading below the 9-year-old level. In contrast, 15 percent of the high-SES children were reading below the 10-year-old level, and 8 percent were reading below the 9-year-old level. The pattern of differences between the two SES groups was similar for other reading measures. The gap between the two SES groups had increased since the year 2 assessments. The gap on the Burt word reading measure was 2.1 years.

Not all low-SES children were failing. For Neale reading accuracy, scores ranged from 5.50 to 12.50 years. There were 10 out of 33 (30 percent) who were reading at a 10-year-old level or above. For Neale reading comprehension the range of scores was from 7.08 to 12.50 years. There were 6 out of 33 (18 percent) who were reading at or above a 10-year-old level for reading comprehension.

Not all high-SES children were succeeding. The range of scores was between 8.25 and 12.50 for Neale accuracy. Among the high-SES children there were 2 out of 13 (15 percent) who were reading below the 10-year-old level for reading accuracy. The range of scores was between 7.08 and 12.50 for reading comprehension. There were 5 out of 13 (38 percent) who were reading below the 10-year-old level.

Insert Table 4 About Here

Summary. These results showed significant differences in school entry reading and writing skills between low- and high-SES children from first months of school. The long-term effects were that the initial gaps were not closed, and, in fact, became wider. Although there were significant differences in vocabulary knowledge between these different SES groups, as indicated by PPVT vocabulary scores, the results also showed that these differences were not as important as reading related skills of alphabet knowledge, phonemic awareness and phonological recoding. Schools were unable to close the reading and writing gaps. For example, the low-SES children took most of year 1 to get to the point that high-SES children were at when they were assessed at the beginning of the year. The results showed that in relation to reading and writing the rich got richer and the poor got poorer.

The simple view of reading

In this part of the chapter we look at what variables are most important in learning to read and write, using the longitudinal data reported in the previous section. Although

many variables correlate with reading and writing, it is important to have a theory that explains why some variables are more important than others. The theory we will consider is the simple view of literacy acquisition (Juel, Griffith, and Gough 1986). This theory states that ethnicity, intelligence and oral language initially influence the development of phonemic awareness. The mediating role of personal variables, language, and home background influence initial levels of phonemic awareness skills when children start school. The combination of phonemic awareness and exposure to print through reading is necessary to acquire cipher knowledge, that is, knowledge of the letter-sound rules of English.

Exposure to print through reading is also a source of lexical knowledge, that is, knowledge of irregular spellings. With both cipher and lexical knowledge, the child will acquire skills of word recognition and spelling. Word recognition and language comprehension account for reading comprehension. Spelling ability and ideas account for writing (Juel 1994; Nicholson 1999).

Cipher knowledge

Year 1. The simple view of reading would predict that in Year 1 the development of cipher knowledge depends on phonemic awareness. In the longitudinal study reported above, the measure of cipher knowledge used was pseudoword reading. Simple correlations showed that the best predictor of pseudoword reading at the beginning of year 1 was phonemic awareness (r=.61), followed by alphabet (r=.40) and PPVT vocabulary (r=.30). A stepwise regression was carried out with beginning of year 1 pseudoword reading as the dependent measure, entering beginning of year PPVT, alphabet and GKR in that order. The results (N=110) showed that GKR had the most predictive value, r=.61, accounting for 38 percent of the variance. PPVT and alphabet did not add to the variance accounted for.

Simple correlations with end of year pseudoword reading showed r=.48 for alphabet, r=.51 for PPVT, and r=.78 for phonemic awareness. A stepwise regression was carried out with end of Year 1 pseudoword reading as the dependent measure, entering end of year PPVT, alphabet, and GKR in that order. The results N=80 showed that GKR phonemic awareness had predictive value (r=.78) over and above PPVT and alphabet, accounting for 60 percent of the variance. PPVT and the alphabet measure did not account for further variance.

Word recognition

End of Year 1. A stepwise regression was carried out using Burt word reading scores at the end of year 1 as the dependent measure, with PPVT, alphabet, GKR, and pseudoword reading variables entered in that order. The results showed that the pseudoword reading measure was the strongest predictor, r=.82, accounting for 67 percent of the variance. Alphabet and GKR increased the predictive value to r=.83 and r=.87 respectively. The three variables together accounted for 75 percent of the variance. PPVT did not add to the variance.

End of Year 2. A stepwise regression was carried out using Neale Reading Accuracy at the end of year 2 as the dependent variable (N=65). The predictors entered were end of year 1 PPVT, alphabet, year 2 GKR and year 2 Bryant pseudoword reading scores in that order.

The results showed that the best predictor was the Bryant pseudoword reading score, r=.84, accounting for 70 percent of the variance. Alphabet increased the

predictive value to r=.89. PPVT increased the correlation to r=.91. The combination of the three measures accounted for 82 percent of the variance.

End of Year 5. A stepwise regression at Year 5 with Neale reading accuracy as the dependent measure N=38, and with end of year 1 PPVT and Year 5 Bryant pseudoword reading entered in that order, showed Bryant to be the better predictor r=.85, accounting for 72 percent of the variance. PPVT increased the predictive value to r=.92 accounting for an extra 12 percent of variance. The two measures together accounted for 84 percent of the variance

Reading comprehension

End of Year 2. A stepwise regression was carried out for Neale reading comprehension, with PPVT and Burt word reading entered as predictor variables in that order. The better predictor was Burt word reading, r=.84, accounting for 70 percent of the variance. PPVT increased the predictive value to r=.85, accounting for a further 2 percent of variance.

End of Year 5. A stepwise regression (N=38) was carried out for Neale reading comprehension, with PPVT and Burt reading scores entered in that order. The better predictor was Burt word reading r=.86, accounting for 75 percent of the variance. PPVT increased the predictive value to r=.91, accounting for an additional 8 percent of the variance. The combination of the two measures accounted for 83 percent of the variance.

Invented spelling

Beginning of Year 1. Invented spelling requires the child to have awareness of the sequence of sounds in spoken words, that is, phonemic awareness, and be able to represent each phoneme with its corresponding grapheme. Thus, GKR and alphabet knowledge should account for invented spelling. A stepwise regression (N=99) with beginning of year 1 invented spelling as the dependent measure showed GKR was the strongest predictor (r=.73) of invented spelling, accounting for 54 percent of the variance. Alphabet knowledge increased the correlation to r=.79, accounting for an additional 8 percent of the variance. PPVT increased the correlation further to r=.80, accounting for a further 2 percent of the variance.

End of Year 1. A stepwise regression with end-of-year 1 invented spelling as the dependent measure (N=80), entering end of year PPVT, alphabet, and GKR scores in that order, showed that the GKR phonemic awareness test was the most powerful predictor (r=.86), accounting for 74 percent of the variance, with alphabet knowledge increasing slightly the predictive value (r=.89), contributing an additional 5 percent of the variance. PPVT did not account for any additional variance.

End of Year 2. A stepwise regression with end-of year 2 invented spelling as the dependent measure (N=65) was carried out. End of year 1 PPVT, end-of-year alphabet and year 2 GKR scores were entered in that order. The GKR measure was the strongest predictor (r=.77) of invented spelling, accounting for 60 percent of the variance. The PPVT measure increased the predictive value to r=.84, accounting for an additional 10 percent of the variance.

Traditional Spelling

End of Year 2. A measure of conventional spelling used in the longitudinal study was the WRAT spelling test. Conventional spelling relies on cipher knowledge as represented by invented spelling ability. A stepwise regression was carried out using

end of Year 2 WRAT spelling raw scores as the dependent measure. Variables entered were PPVT, alphabet, and invented spelling in that order. The results showed that invented spelling was a strong predictor of WRAT spelling (r=.70), accounting for 49 percent of variance. Alphabet knowledge increased the predictive value to r=.72, adding an extra 3 percent of variance. PPVT did not account for additional variance.

Writing

End of Year 1. The simple view predicts that writing is made up of spelling and ideas. In the longitudinal study the PPVT vocabulary measure was used as a surrogate for "ideas". For year 1 the spelling measure was invented spelling. A stepwise regression was carried out using end of year 1 story writing (N=79) as the dependent variable. End-of-year PPVT, and invented spelling were entered in that order. The better predictor variable was invented spelling, r=.86, accounting for 73 percent of the variance. PPVT did not account for further variance.

End of Year 2. A stepwise regression was carried out for story writing assessed at end of year 2. The predictor variables were WRAT spelling and PPVT. Again, the better predictor variable was WRAT spelling, r= .59, accounting for 34 percent of the variance. PPVT scores did not add additional variance.

Summary

Although there is a view that success in school depends on the language that children bring to school, the correlation and regression results from the longitudinal study did not support that view. The analyses indicated that PPVT language knowledge did contribute to reading and writing development, but in a much smaller way than did skills more directly related to reading and writing: alphabet knowledge, phonological awareness, invented spelling, and pseudoword reading.

The effects of an after-school intervention for children with reading disabilities

The University of Auckland after-school reading programme has been in operation for two years. The programme offers free tuition to children with reading disabilities. It emphasises a phonological approach to reading, which is different from the mainstream whole language approach. The focus of each lesson is on phonological recoding, both in reading and in spelling. The programme is located in one of the classrooms of an elementary school in inner city Auckland. Children attending the centre tend to come from the local area in which the school is situated which is low-SES, but some come from high-SES areas as well.

The lessons are divided into four parts: sight word reading, phonics, spelling and text reading. It teaches children more than 50 letter-sound correspondences as well as strategies for breaking down and decoding long words (e.g., syllabication, structural analysis). The programme also stresses accurate and fluent sight word reading skills. Spelling is practised and spelling strategies are taught. The reading lessons also include some reading of age-appropriate text. The tutors consist of teachers who are between jobs and teacher trainees. The tutors receive training through the centre. They follow a set lesson plan, but the content of the lesson depends on the reading level of the child. Tutors keep a logbook for each lesson. The manager of the programme monitors the logbooks.

The after-school reading programme is funded by private sponsorship and is supported with free teaching materials from commercial publishers: Smart Kids,

Sunshine Books, and Nelson-PM Library. Children attend the programme between 3.30 pm and 5.30pm. Reading lessons last for one hour. Most children attend one lesson a week, but some receive two lessons a week or more.

Parents usually enroll their children, though some schools recommend children to the programme. The tutors give the children a range of reading and spelling assessment at entry, and the same assessments at exit. The children receive one-on-one tuition, and are assessed at mid-year and end-of-year. Sometimes a probe is given in mid-term to assess progress. In each year of the programme so far, many of the children have attended a 3-week daily summer school programme run by the University, and then continued on with after-school lessons.

Phase 1 of the programme

In the first year the programme ran from March to December. There were 34 children in the programme, 23 boys and 11 girls. Two thirds of the enrollments were boys. From parent information sheets we found that 10 out of 21 (48 percent) children had been in Reading Recovery. This is a government run programme that gives one-to-one tutoring to 6-year-olds, but does not stress phonological recoding strategies. Out of 28 children, 10 (36 percent) were European, 5 (18 percent) were Maori and 13 (46 percent) were Pacific Island. Out of 25 parents, 10 (40 percent) were in professional jobs and the rest were in trades, semi-skilled jobs, or unemployed/not known.

We were able to assess 15 of the children for receptive language using the PPVT test. Standard scores ranged from 58 to 125. The average was 84.33. Age levels at entry ranged from 6.00 to 11.83 years. Average age was 8.60 years at entry and 9.17 years at exit. Children spent from 3 to 10 months in the programme, but most spent 7 months.

A number of the children, when quizzed about their attitudes to reading before starting the programme, had negative feelings about reading. For example, one child was asked, “How do you feel when it is your turn to read to the teacher?” He said: “Sad because the other kids laugh at me – shame me.” Another child said, “Sad. I’m afraid of being told off.”

The programme used the same assessment measures as were used for the longitudinal study. At entry, all children were behind their chronological age on the Burt reading test, but by the end of the year, 10 of the children (29 percent) were at or above their chronological age. On entry to the programme, Burt word reading scores ranged from 4.33 years below chronological age to 0.08 years below. On exit at the end of the first year, children ranged from 3.92 years behind chronological age to 1.83 years above their age. On entry to the programme 71 percent of the children were a year or more behind in reading. On final testing, this figure had dropped to 35 percent. On average the children were initially 1.68 years behind in reading, but by time of final testing they were 0.83 years behind.

Assessment results were analysed by using paired sample t-tests. The results showed that children made significant gains on nearly all reading and spelling measures. Burt word reading increased from 6.92 to 8.34 years, a gain of 17 months. Neale reading accuracy increased from 6.99 to 7.74 years, a gain of 9 months. Neale reading comprehension increased from 7.08 to 8.10 years, a gain of 12 months.

Insert Table 5 About Here

Phase 2 of the programme

At time of writing only the mid-year results were available. There were 31 children, 23 boys and 8 girls. Three quarters of enrollments were boys. There were 20 new enrolments, and 11 children who continued from the previous year. Parent information about the children indicated that 16 out of 23 (70 percent) had been through the Reading Recovery. Parent information also indicated that of 25 parents, 11 (44 percent) had professional jobs while the remainder were in trades, semi-skilled jobs, or were unemployed/not known. Data on 25 of the children indicated that 15 (58 percent) were European (Pakeha), 3 (12 percent) were Maori, and 7 (27 percent) were Pacific Island. We were able to assess 21 of the children for receptive language using the PPVT test. Standard scores ranged from 55 to 131. The average score was 91.24. Chronological ages at entry ranged from 6.00 to 12.58 years. Average age was 9.06 years. Average age at mid-year was 9.38 years. At mid-year, most children had spent 4 months in the programme.

The assessment measures used in the programme were the same as in the longitudinal study. The only additional measure was the Schonell spelling test (Schonell 1950). At entry on the Burt word reading test children were reading from 5.08 years behind to 0.67 years above their chronological age. At mid-year, children were from 3.58 behind their age to 2.50 years above their chronological age. At entry, 2 out of 31 (6 percent) were reading at or just above average on the Burt test though they were below average on our other reading measure, the Neale test. At mid-year, 7 out of 30 (23 percent) were reading at or above average on the Burt.

On entry to the programme 55 percent of the children were a year or more behind in reading. On final testing, this figure had dropped to 37 percent. On entry, the children were 1.46 years behind in reading, but by time of final testing the figure was 0.71 years.

Paired sample t-tests at mid-year showed that children made significant gains in reading and spelling measures. Results for Burt word reading showed improvement from 7.60 years to 8.67 years, a gain of nearly 13 months. Neale reading accuracy improved from 7.38 years to 8.16 years, a gain of 9 months. Neale reading comprehension improved from 7.47 to 8.28 years, a gain of nearly 10 months. Children's spelling ages improved from 7.17 to 7.92 on the Schonell spelling test, a gain of 9 months.

Insert Table 6 About Here

An interesting development during the second year of the programme was an offer of free visual assessments for all the children in the programme from a private optometry firm, Barry and Beale, in Auckland. Of the 16 children who took advantage of the assessments, 6 (38 percent) required spectacles. Five of the children required spectacles for reading and one for all near and distance viewing. The provision of glasses for reading may have influenced the results for some of these children. One child in particular seemed to make dramatic gains in reading, and this may have been because he simply was better able to see the print. In order to separate out this possibility, the results were re-analysed without the children who had been prescribed glasses. The pattern of results was still the same. Nevertheless, the optometry results suggest that visual examinations should be required for children who are having

difficulties with reading. Such problems can easily affect children's progress since reading requires visual acuity at a close distance.

What is it that enabled the after-school programme to work?

The results indicated that the key to the success of the after-school programme was the teaching of phonological recoding skills. This had positive effects on reading accuracy and spelling and also improved reading comprehension. Reading comprehension depends not just on decoding skills but also vocabulary and general knowledge. Although the programme did not teach these things directly, it provided decoding skills essential for their development since it enabled pupils to read text more easily, and text reading is a source of vocabulary learning and general knowledge. The improvement in decoding skills enabled these children to concentrate their minds on the meaning of what they were reading, which in turn improved their comprehension of text (Tan and Nicholson 1997; Nicholson 1998).

Discussion

The first part of the chapter presented longitudinal data showing "rich get richer" and "poor get poorer" effects between children from high- and low-SES backgrounds. The data showed that there is no level playing field when children start school. Some children are much better prepared to learn to read and spell when they walk through the school gate on their first day. They are ready to put their pre-reading skills into learning how to read and spell. The most striking differences between low-income and middle-income children from day 1 were in knowledge of the letters of the alphabet, phonemic awareness, and in vocabulary knowledge. Low-SES children were disadvantaged in pre-reading skills relative to high-SES children as soon as they started school. It took them all of year 1 of school to reach the point where middle-income children were at the start of year 1. Even worse, they fell further behind in reading and spelling as they proceeded through the school years. To give an example, results for the Burt word reading measure showed that the gap between the low- and high-SES groups at the end of year 2 was 1.2 years. By the end of year 5 the gap was 2.1 years.

The low-SES children were below average for their age in reading and spelling, but with effective instructional interventions it seems likely that they could achieve levels of reading and spelling appropriate for their age. The view that children from poverty areas are "illiterate" is not correct. By year 5, when they were nearly 10 years of age, the low-income children in this study were reading at an early 9-year level. They could read, but not to the level of the average reader of that age. Even so, to be reading below average for their age is a real disadvantage in terms of making academic progress at school.

An interesting aspect of the results was that differences in vocabulary knowledge in Year 1, as measured by PPVT, was not a major predictor of learning to read in years 1 and 2. There is a view that the language sophistication children bring to school from the home is the key to their academic success in reading and writing (e.g., Bernstein 1974 – see also an updated view by Nash 2002). There is no question that children with high levels of language are well placed to succeed in school. They understand the language of school and they have a better understanding of middle class language skills, of the tools of trade of teachers, such as children's books, alphabet blocks, pencil

and paper activities, and so on. They will have extensive experience with the formal language of books through listening to stories read to them at home.

Yet the partial correlation results of this study indicated that entry language knowledge was not the most important predictor of reading success. The best predictors of success were alphabet knowledge, GKR phonemic awareness, and pseudoword reading.

Some children at the end of Year 1 were already feeling negative towards reading. This was apparent in their answers to a questionnaire. One question was, "How often do you read at home?" A child replied, "Never. I hate reading now." This was from a 5-year-old still in the first year of school. Another question was, "How do you feel when you come to a new word while reading?" A child replied, "I cry." Another said, “Sad because if you don't know it the teacher might growl you.” Another question was, “Would you rather clean up your room or read?” One child said, “Clean up my room, ‘cause I can clean up my room, but I can’t read.” To the question, “How do you feel when it’s your turn to read to the teacher?” one child said, “Sad, because the teacher gives you a growling.”

Some of the questions probed support at home, and it was clear that there was very little in the way of literacy resources in some homes. We asked one child, “How do you feel when someone reads you a story at home?” The child said, “No one ever reads me a story at home.” Another child said, “Mum reads to me, not often, no one else does.” We asked another child, "How many children's books do you have at home?" The child said she had no books at all and commented, "I never get to get any books.” Another child said she had between five and ten books. When asked why, she said, "Because I've been good. My mum buys them, she's got the moneys [sic], she paid it." When the same child was asked whether she liked to read, she said, "No. Mum likes me to read, but I read ugly. 'Cause I don't know how to read.”

For many children, negative feelings about reading occur in the first year of school, and this is a significant concern in that negative attitudes can inhibit their self-confidence.

The second part of the chapter explored the reasons for success in reading and writing. The data analysis indicated that in the first years of school reading comprehension is determined very much by word recognition skills. These skills in turn depend on the development of phonological recoding skills (cipher knowledge). This knowledge in turn depends on alphabet knowledge and phonemic awareness. Writing depends on spelling and “ideas”. However, in the first few years of school, it seems that writing is strongly predicted by spelling. Spelling, in turn, is strongly predicted by invented spelling, which is, in turn, predicted by phonemic awareness skills.

The third part of the chapter presented data from an after-school tuition programme to show that for children who have fallen behind, tuition in phonological recoding improves their reading and spelling. The after-school tuition programme was based at a low-decile school in inner city Auckland. Many of the children had already gone through a Reading Recovery programme, yet were still behind in reading. Likewise, quite a few children had slipped through the net and not been through Reading Recovery at all. About half the children were Pakeha, and half were Maori and Pacific Island. The children were from a range of SES backgrounds. The tuition programme emphasised phonological recoding skills. The results showed that many of these

children, who came to the programme with major reading difficulties, made dramatic improvements in their reading and spelling skills.

Phonological teaching of reading could make a huge difference to children if they received this kind of instruction from their first days of school. In the last few decades there has been a reluctance to do this. Instead, to reduce the failure rate, New Zealand and other countries have introduced interventions such as Reading Recovery (Clay 1994) to provide extra tuition for children falling behind. Reading Recovery is a one-to-one tuition programme for 6-year-olds but the emphasis is not on explicit instruction in phonological recoding. In the United States, at least 1,000,000 children have been through Reading Recovery. In New Zealand, at least 100,000 children have been through the programme. Yet it would be a lot cheaper simply to change teaching practices. As DeLemos (2002) puts it, “The adoption of effective classroom practices is, in comparison with strategies such as the reduction of class size or the implementation of intervention programmes such as Reading Recovery, much more cost effective. Teachers have to be trained and employed. It costs no more to train teachers to use effective teaching practices than it costs to train them to use ineffective teaching practices.” (p. 35)

The results presented in this chapter indicate that the phonological approach is a highly effective teaching approach for children from a range of SES backgrounds who do not respond to the whole language approach. Given the importance of reading and writing, the results reported in this chapter converge on the fact that many children do not benefit from the whole language approach, that, in fact, they get further and further behind their peers as the years pass by. The data reported here also show that these children can benefit from an emphasis on phonological recoding skills. The intervention programme described in this chapter where children received after-school tuition that emphasised phonological decoding suggests that intensive teaching of a phonological approach is what is sorely needed to get at-risk children off to a better start in school.

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The chapter is a re-analysis and extension of longitudinal data previously reported at conferences and presented as technical reports –Nicholson (1997a), Nicholson, Ell, and McIntosh (1999), and Nicholson (2000). The year 1 data were originally collected for a different study and have been summarised in a book chapter (Nicholson 1997b).

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Table 1
Social class differences at school entry: Group Means and Standard Deviations

Measure	Group				Independent samples t-tests		
	Low-SES N=88		High-SES N=23		t-test (t)	df	
	M	SD	M	SD			
Alphabet	20.31	17.48	40.87	11.90	5.32*	109	.
Phonemic Awareness	3.42	3.88	8.70	5.89	5.16*	109	
Invented Spelling Points (Low-SES N=77)	2.68	7.13	22.87	12.25	9.94*	98	.
Pseudoword reading Points	1.58	6.74	8.04	9.05	3.80*	109	

Note: * p<.002

Table 2
Social class differences at end of Year 1: Group Means and Standard Deviations

Measure	Group				Independent samples t-tests	
	Low-SES N=71		High-SES N=23		t-test (t)	df
	M	SD	M	SD		
Alphabet	41.99	12.51	50.48	2.95	3.22*	92
Phonemic Awareness	12.20	9.91	23.61	6.42	5.17*	92
Invented Spelling Points	24.59	19.13	44.00	14.64	4.45*	92
Burt Words correct	8.80	7.52	18.91	8.12	5.50*	92
Story writing	2.89	1.89	4.80	1.67	4.32*	91
WRAT spelling Words Correct	1.45	1.57	2.74	1.36	3.49*	87

Note: * p<.002

Table 3
Social class differences at end of Year 2: Group Means and Standard Deviations

Measure	Group				Independent samples t-tests	
	Low-SES N=57		High-SES N=21		t-test (t)	df
	M	SD	M	SD		
Burt Reading age	6.69	.92	7.89	.98	5.01*	76
Neale Reading age	6.47	1.02	8.01	1.21	5.90*	76
Neale Comprehension Reading age	6.58	1.06	7.97	1.10	5.32*	76
WRAT spelling Words Correct	4.30	2.71	7.10	3.71	3.64*	76

Note: * p<.002

Table 4
Social class differences at end of Year 5: Group Means and Standard Deviations

Measure	Group				Independent samples t-tests	
	Low-SES N=33		High-SES N=13		t-test (t)	df
	M	SD	M	SD		
Burt Reading age	9.12	1.87	11.21	1.61	3.55*	44
Neale Reading age	9.18	1.75	11.12	1.26	3.65*	44
Neale comprehension Reading age	8.45	1.50	10.56	1.53	4.28*	44
WRAT spelling Standard score	92.45	12.16	104.54	14.81	2.87	44

Note: * p<.002

Table 5 After-School Reading Programme Year 1 - Group Means and Standard Deviations

Measure	Group				Paired samples t-tests	
	Pretest		Postest		t-test (t)	df
	M	SD	M	SD		
Burt Reading Age	6.92	1.17	8.34	1.77	8.85*	33
Neale Reading Age	6.99	0.81	7.74	1.29	5.03*	29
Neale Comprehension Reading Age	7.08	1.01	8.10	1.76	4.28*	28
WRAT Spelling Standard Score	84.73	12.02	88.80	10.35	2.37	29

* p<.002

Table 6 After-School Reading Programme Year 2 - Group Means and Standard Deviations

Measure	Group				Paired samples t-tests	
	Pretest		Postest		t-test (t)	df
	M	SD	M	SD		
Burt Reading Age	7.60	1.46	8.68	2.05	6.10*	29
Neale Reading Age	7.38	0.96	8.16	1.62	4.51*	23
Neale comprehension Reading Age	7.47	1.33	8.28	1.97	3.42*	23
Schonell Spelling Age	7.17	1.11	7.92	1.06	7.38*	23

Note: * p<.002