An Evaluation of Full-time Remedial Provision for Boys with Specific Reading Retardation

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ABSTRACT

This study examined full-time remedial provision for 9-year-old reading retarded boys. An operational definition of Specific Reading Retardation (SRR) based on chronological age, IQ and expected reading age was used, identifying groups of boys with similar degrees of reading disability. Effects of remedial provision for different IQ levels, perceptual motor maturation, motor impairment and emotional behaviour were examined. Comparisons were made between screening and retest reading scores, (taken after 4 terms) using the boys as their own controls. Remedial Class SRR boys were compared with SRR boys remaining in mainstream classes. A chronological age control group of 9-year-olds where CA=RA, and a reading age control group of 7-year-olds where CA=RA were also used.

Control SRR boys made greater gains in reading than remedial class boys. Reading age controls made greater gains than either SRR group. Adjusted gain scores indicated a mean loss for accuracy and comprehension in the remedial class and a loss for comprehension for SRR controls. Rate of reading gain (one year) was the same for all 9-year-old groups. Seven year olds advanced 15 to 18 months.

Perceptual motor skills, motor impairment, and emotional indicators were not related to reading gains. Higher Verbal IQ scores were related to gains in reading comprehension, but not in conjunction with a higher degree of emotional disturbance.

Nine year old SRR boys were developmentally similar to CA controls in perceptual motor development, and similar to RA controls in patterns of reading errors. They were behaviourally different from either CA or RA controls at the beginning of the study, but not significantly different at the end. SRR boys were significantly poorer than either CA or RA controls in control and coordination of upper limbs.

In spite of intensive remediation, SRR children remained behind in reading and may always need a special curriculum.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

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INTRODUCTION

The present study is an examination of the effectiveness of full-time remedial reading provision in a local educational authority. Provision of remedial reading instruction has come under examination at various times, often as the result of competing demands for better standards of literacy and shortage of money available for education. The latter has made local authorities examine the ways in which staff are deployed to bring problem readers up to standard. While the Education Act of 1981 has made the provision of services for children with special educational needs a statutory obligation for LEAs, evaluation of local provision has been difficult and has often concluded with negative or equivocal results (Bullock, 1975). More recently, the implications of the Warnock Report (1980) have created pressure in some areas for greater integration of children with special needs into mainstream schools instead of providing separate teaching facilities. This is being done in spite of the fact that the value of separate remedial classes, either on a full or part-time basis has not been fully investigated.

The Bullock report (1975) examined remedial provision and stated that it is difficult to evaluate programmes because of differences in provision, in approach and in the criteria used to select children in need of help. This study will look at a particular group of children who have been operationally defined

as specifically reading retarded (SRR), based on the works of Yule (1967, 1973). Children who meet the criterion of SRR are those whose achievement levels are lower than expected on the basis of their IQ and chronological age. By using a regression equation which takes into account the child's age and IQ score, an expected reading age is determined. If the child's reading age is 2 standard deviations lower than expected, the criterion for SRR is met. There have been a number of studies using similarly identified groups of SRR children, and a body of knowledge is being built up about antecedents of SRR, as well as the progress of SRR children through the educational system.

It may be that within the group of SRR children there are developmental or constitutional differences. Some children may respond more positively to remediation than others. Perceptual motor skills, motor impairment, emotional stability, verbal IQ, and performance IQ will be examined in order to ascertain whether there is a relationship between scores on these variables and increase in reading age, after a year of full-time remedial teaching. Reading progress will be measured by:

1) Comparing the observed and expected reading scores at the beginning of the study with those at the end using each boy in the remedial class as his own control and

2) Comparing the observed and expected retest reading scores of the boys in full-time remedial reading classes with those of a control group of SRR boys who have remained in mainstream education.

An unresolved issue arising out of the study of the aetiology of SRR has been whether to regard this group of retarded readers as a qualitatively different population, or as part of a continuum of poor readers. One way to examine this issue is to look at the ways in which patterns of reading acquisition differ between good and poor readers of the same chronological age, and also to compare good and poor readers of the same reading age. To this end two other groups will be used as controls:

3) A group of boys of the same chronological age as the SRR groups, but reading at their correct age level, and

2) A group of seven year old boys who are reading at their correct age level, which is also the reading age of the SRR boys.

As Bryant and Bradley (1985) point out, if there are differences between children who are reading normally for their age and poor readers reading well below their age, though they are at the same reading level, then SRR children cannot be said to be part of a reading continuum, but a separate group of children with very special handicaps and needs. The examination of similarities and differences in patterns of reading acquisition and an analysis of types of reading errors will be made to see if qualitative differences emerge. Comparisons of the perceptual motor skills and motor impairment of the groups will also be examined to see whether the nine year old group more closely resemble their CA or RA cohorts.

The present study will limit itself to observed deficiency rather than cause, although a survey of the literature will explore theoretical considerations of the bases of those deficiencies.It is hoped that in focusing on a discrete, well defined group of children with severe reading problems, this study will be able to examine the usefulness of full-time remedial provision for such a group. It may also shed some light on the similarities and differences between the specifically reading retarded and other children, and possibly differences within the group of SRR children. This would have implications for the types of teaching methods to be used with children who have severe reading difficulties.

CHAPTER ONE

READING DISABILITY

Reading retardation is defined in a variety of ways, and often many names are used for the same condition, making it difficult to form a picture of the child who is having difficulties. Terms such as dyslexia, developmental dyslexia, specific learning disorder, specific reading disability, learning disabled, have all been used. At times the same term has been used by different researchers to mean different things (e.g. backward readers used by Bryant and Bradley (1981) are the group that Rutter and Yule (1973) call specific reading retarded in order to distinguish them from their backward readers). This chapter will explore the ways in which reading retardation is defined and the relationship between the context of the definition and theories about aetiology.

Measures of retardation will also be examined. Measures may be dependent upon definition, as in the case of dyslexia, but may also form part of the definition, as in an operational definition of specific reading retardation. Theoretical considerations about the nature of retardation and its measurement will influence remediation techniques and measures of improvement which evaluate those techniques.

Definition

Definitions of reading retardation often depend upon the context in which they are defined. As a result, definitions of poor readers vary considerably. Wiener and Cromer (1967) warn that poor reading may be used as a generic term without the recognition that different investigators may be talking about very different forms of behaviour.

Pillener and Reid (1972) use educationally oriented criteria and make a distinction between backwardness as being intellectually dull and not able to attain the same standards as the majority of one's peers, and retardation, which is relative to mental age and not chronological age. A retarded child falls below the level of his capacity. Some children are both retarded and backward.

Vellutino (1978) uses a more specific definition based not on supposed physical defects, but on the child's performance and achievement. He is dealing with a circumscribed group and identifies a probable dyslexic as a child:

> 1) who has extreme difficulty in identifying single words and consequently difficulty with all other aspects of reading;
>
> 2) who not only cannot recognise printed words on sight, but finds it equally difficult to analyse their component sounds;
>
> 3) who has severe decoding problems.

In comparison with operational definitions based on the use of regression equations, this definition of a population appears crude, although Vellutino seems to be working with the same sort of group.

Yule (1973) for example, comments that underachievers are called retarded readers but the only statistically satisfactory way to define underachievement is through the use of regression techniques. He states that specific reading retardation is sufficiently different from general reading backwardness in terms of sex distribution, neurological correlates, and its association with speech and language disorders to make it a useful educational concept.

Horn and O'Donnell (1984) use the term 'learning disabled', and state that it is, by definition, achievement lower than expected on the basis of potential. They point out that research using uncorrected achievement scores or teacher ratings predicts the criterion of low achievement and not the criterion of learning disability.

Jorm (1983) points out that there is no criterion commonly agreed upon for defining reading difficulties and no consensus as to terminology used to describe them. He found that although the use of multiple regression in defining specific reading retardation had undoubted advantages over other alternatives, it was used in only two of the studies of memory deficit which he reviewed in his article.

Zigmond (1978) points out in her definition that dyslexia should be a term reserved for those who will always remain illiterate and will need a special 'no books' curriculum. All others can be taught, even if at a one to one level.

Eisenberg (1978) admits that there are social dangers and logical circularities in existing definitions of dyslexia, possibly in response to Rutter's criticism of the term. He adopts the term SRR and its operational definition, though also calling it specific reading disability or developmental dyslexia.

It would appear that Yule's regression formula is the most useful for classification and criteria for placement. It also isolates a group of children who appear to have other similarities (sex, early language difficulties, family history of language problems, resistance to remediation, and history of behaviour problems), which may be useful in determining aetiology.

Aetiology

There appear to be two main views amongst theoreticians with respect to the aetiology of reading retardation. Rutter (1978) outlined these views as follows: 1) Within a broader group of reading disabled children, there are disorders due to inherent biological deficits which are constitutional and probably genetic. These may constitute a unitary condition or a single disorder. 2) There are many causes of reading difficulty which encompass a variety of syndromes.

I-The Single Cause Theory

The single cause theory includes speculation about minimal brain dysfunction (Koppitz 1976), parietal lobe dysfunction (Rabinovitch and Ingram 1968, Ingram 1970), developmental delay (Satz and Sparrow 1970, 1974), and genetic factors (Gibson and Levin 1975). Researchers who follow this line of thinking often refer to children with reading problems as dyslexic, having developmental dyslexia or specific developmental dyslexia.

Satz and Sparrow (1970) admit that the nature of the disorder they term "specific developmental dyslexia" is unclear and that its incidence is unknown, although it is suggested that it occurs in four to eight percent of the school population. As an operational definition based on negatives is the only one extant, it is surprising that children can be so accurately identified. They say that the aetiology is also unverified although genetic factors have been postulated, (possibly because of familial incidence). Rourke (1978) states that data would support a neuropsychological interpretation of reading retardation, but one has to temper that conclusion by considering sampling practices, composition of control groups, cross validation and reliability of measuring techniques.

Satz and his colleagues put forward a maturational lag theory, suggesting that the brains of some children are poorly differentiated. The lack of differentiation affects acquisition of skills needed in concepts of left-right discrimination, form perception and other perceptual skills necessary for beginning to

read. Satz's theory is an inviting one, as it draws away from the brain defect model to one of developmental continuity. However, there is little evidence to suggest that children do not demonstrate parallel language difficulties at an early age and, in fact, evidence (Rutter, et al. 1975, Bryant ad Bradley, 1985) suggests that early language problems have a strong association with later reading difficulties. Vellutino (1977) states that perceptual deficit theories are highly questionable. Poor readers lack the implicit language cues that alert them to critical differences in letters and words. Poor readers may differ from average readers on word encoding, visual-verbal association learning and word-retrieval and may have difficulty in linguistic coding of incoming information and remembering linguistic referents associated with given stimuli.

Satz does not entertain the idea that even at the earliest stages of learning, a framework based upon the child's inner language is being built, and that to extract any meaning from the signs, which may or may not be perceived by the child, some conceptualisation based on language development must be present.

Gibson and Levin (1975) tend to give rather more credence to a genetic theory of reading disability. There is an incidence of language related disorders in families including spelling errors and speech disorders. Gough and Tunmer (1986) state that there may be several causes of dyslexia or specific reading disability, but the common denominator, the proximal cause is an inability to decode, probably because of lack of phoneme awareness. The authors feel that this may be due to biological deficits, as there are genetic links and some evidence of abnormal cerebral

anatomy. But, they state, that this is in the realm of the unknown. Torgesen and Houck (1980) are more definite in stating that certain children have structural limitations in the ability to process highly familiar verbal material, and that reading problems of dyslexic children are most closely associated with structural-like deficiencies.

However, there is a gap between stating that language disorders run in families and giving all the credit for this to genetic make-up. Environmental factors including lack of family interest in reading are not mentioned. Bradley and Caldwell (1984), for example, found that provision of appropriate play materials correlated with achievement of 6 year olds, and even with IQ controlled, had a significant correlation with reading achievement. Rutter and Yule (1985) state that although there seems to be a family link there is no single mode of genetic transmission. The most severe cases of reading retardation are compatible with a recessive gene theory, but mild cases appear to be caused by a number of factors. They suggest that both the severity of reading retardation and its nature have to be included in attempts to discover links with genetic inheritance.

Although less potentially damning than the brain damage theory, developmental or maturational lag is only slightly less fatalistic in its implications that if certain skills are missing at the right age because of slow brain or neural development, reading will not occur. Some children do develop more slowly than others and many, if not all children develop at an uneven pace in the many areas which are essential for learning. It may be just as valid to state that in the early stages children who

are slow in some areas compensate by using other areas to learn as it is to state that slow development in some areas will prevent learning. This is especially true in the areas of perceptual motor and conceptual language development and their relationship to the reading process. It may also be true that some children are not ready to learn to read when presented with this task in the formal learning situation, ie. in infant classes. This may or may not have a genetic basis and, in any event, the identification of the difficulty as genetic seems to have little practical value in remediating either the cause or the effect.

II-The Multiple Cause Theory

Rutter and Yule (1985) state that a separate subgroup with specific developmental anomalies has not been demonstrated. They state that there is evidence that specific reading retardation has multiple causes. Environmental influences interact with biological factors which give rise to SRR. There is no single pattern which occurs in all dyslexic children. They feel that the concept of dyslexia is mistaken in supposing that it is a distinct unitary condition and that the presence of a biological condition means that environmental influences are unimportant. Jorm (1983) feels that individual differences in reading achievement probably arise as a result of a large number of interacting variables related to differences in home environment, instruction, and cognitive ability, and that it is not possible to attribute an individual case of reading retardation to a deficiency in one particular area. He feels that it is more

profitable to talk of sources of variation in reading achievement for a population as a whole. Generalisations drawn from a study of a particular ability of children who are at the lowest extreme of reading achievement can only be regarded as one source of individual differences and not the whole account of specific reading retardation. Jorm also feels that there is no evidence that there is a qualitative difference in deficits between reading retarded children and those that are mildly retarded in reading. He states that it is reasonable to regard the specifically reading retarded as the lower end of a continuum of ability.

Many investigators (Collins (1961), Wepman (1962), Senz (1968), believe that looking for single isolated causes is not very productive. Failing pupils differ from the majority in many factors. Auditory and visual memory spans, cerebral dominance, right and left handedness and eyedness and poor motor control are symptoms in a group of symptoms and are linked with nutrition, health, integration of the nervous system, the effects of intelligence, genetics and experience with symbols. This also affects personality growth and makes children less effective learners. (Clark, 1970).

Backman, et al. (1984) criticise traditional research paradigms on the basis that they ascribe to a single syndrome model of reading disability. Deficits which are observed in reading disabled children relative to chronological age controls are inferred to be causally related to reading failure, despite the fact that the deficits discovered may not be typical of the entire reading disabled sample. The authors state that reading

disability would appear to be a heterogeneous disorder with subgroups of children showing different patterns of impairment on both reading and non-reading measures.

Rutter and Yule (1985) suggest that there may be three types of reading disability : 1) mainly a verbal deficit or language disorder, similar to adults with left temporal lobe disorders; 2) a large group with less marked language disorders, poor performance on arithmetic as well and marked sequencing problems similar to adults with tempero-parieto-occipital region of the left hemisphere problems; 3) a group with articulation difficulty and graphomotor discoordination associated with right as well as left hemisphere functioning.

Identification of single aetiological factors such as parietal lobe damage, developmental delay, maturational lags in perception, motor skills and genetic defect have not been helpful in isolating those children who are in need of remedial work. Because diagnosis is so difficult, individual programmes for remediation cannot be developed and may not be effective if based upon aetiology rather than upon current need. It may be that there is no single factor, but that specific reading retardation is an end product of the interaction of a number of weakly related factors as Doehring (1978) suggests. However, by isolating a group of children who can be operationally defined as SRR by meeting rigid criteria, one can then examine their patterns of learning and acquisition of perceptual, motor and language skills and compare them with other developmental groups. As Ellis and Large (1987) point out, "A group has to be homogeneous for the relevant characteristics, or the individual

pattern will be obscured in group averages. The average response will not represent the performance of any individual in the group and one cannot generalise from the group to any particular individual."

Measurement of Retardation

A wide range of methods is used to measure retardation. Variations in age and IQ of subjects, in size of group, origin (clinic or school population) and in measures used to make decisions about children's suitability for remedial education make comparisons between studies impossible and often prevent the reader from making meaningful interpretations of the data (See Appendix II). Some studies use IQ and RA cut-off points, sometimes irrespective of the child's CA or MA or confuse the two. Others make an attempt at formulating ratios or Quotients based on age, grade, IQ and a variety of other scores. Years of school attendance and progress in school are sometimes assumed to be directly related to IQ, ignoring both school and environmental factors. In some studies a variety of IQ or reading measures are used with the same sample of children and it is not surprising that there is lack of correlation between the variables measured.

Vernon (1960) points out that comparisons with CA, MA, or grade level have all been used to identify reading retardation, but mental age may vary with the type of test used, individual or group, verbal or non-verbal. Huelsman (1970) also points out that many studies demonstrate poor experimental design including mixing boys and girls who may have different disabilities, an imbalance of boys to girls with no separate analysis of the

results by sex, and comparison of reading with CA rather than MA.

Jorm (1983) states that there are difficulties in the way in which reading achievement is measured, the degree of underachievement regarded as retardation and matching for general ability. The use of different types of tests could produce different types of children designated as retarded readers. He feels that this is not so crucial however, as retarded readers can be regarded as the lower end of a continuum of ability.

Spreen (1978) points to other problems in defining or assessing the severity of reading problems. He states that there are different populations in clinic studies and classroom studies, possibly because the clinic population has a large number of brain damaged 'dyslexics' as well as some reading problems which are the result of behaviour and emotional problems, a point also made by Rutter and Yule (1973). They point out that some investigations in the past have examined highly selected groups of children based on the biases of their clinic referrals. They also state that the same degree of backwardness, for example, 1 1/2 to 2 years, means different things at different ages. Units of reading attainment are not equal at different points on the chronological scale.

Yule et al. (1974) state that selection procedures based on achievement ratios, learning quotients and reading indices all have a statistical drawback, in that there is a regression effect. Whenever a correlation between measures (such as MA and

RA) is less than perfect, children who are well above average on one will be less superior on the other and those who are well below on the first will be less inferior on the second, so the mean reading age of 10 year olds with average MA of 13 years will not be 13 but more likely 12. Only in the middle of the distribution will the two be the same. Achievement ratio is a misleading statistic which will overestimate the number of under-achievers in children of high IQ and underestimate the same in children of low IQ. Horn and O'Donnell (1984) state that misidentifying the learning disabled and low achievers leads to inappropriate intervention. They state that the results of past research on early identification of learning problems, because they have not used regression equations and discrepancy scores are specific to the identification of low achievers and should not be generalised to programmes interested in early identification of the learning disabled.

It would appear that the use of a regression formula would avoid the objections stated by Pillener and Reid (1975) that some studies assume that intellectual ability correlated perfectly with reading, or fail to recognise that there are variations from one chronological age to another in predicting reading retardation. If one knows the correlation between predictor variables (CA and IQ) and the criterion variable (reading attainment), it is possible to calculate the expected reading attainment for any predictor value. It would also take into account Bruininks et al. (1973) point that studies do not recognise that the same degree of reading retardation doesn't have the same significance in terms of classwork to a younger child as it does to an older one. It would also take into

consideration Rutter and Yule's (1973) point that reading attainment cannot be assumed to progress at a uniform rate throughout a child's school career. A regression formula taking into account the relationship between IQ, CA and RA increases the accuracy of prediction and the computation of a statistically accurate level of probability of deviation from an expected reading age.

A decided advantage in using an agreed-upon operational definition would be direct comparability between studies. Children could be selected for study and evaluated without reverting to more ephemeral definitions based upon possible neurological deficits or developmental lag. This definition could apply equally to school or clinic populations and over a wide range of age groups. Hayes (1975), for example, comments that comparisons between his study and other studies pose problems as very few studies use regression equations either in defining the extent of the difficulty or in controlling for the child's reported reading gain. Jorm (1983) states that although a multiple regression approach to defining SRR has undoubted advantages over other alternatives, it was only used in two of the studies of memory deficit he reviewed.

Measurement of Improvement

Global measures which compare RA before and after treatment have used a number of instruments and criteria of progress (See Appendix). In general the findings have been that except for an initial rise, there is no long-lasting difference between the

treated and untreated groups. Spache (1976a) points out that number of hours spent in remediation is not positively related to gain. A more meaningful measure would seem to be to look at the expected and observed accuracy and comprehension reading ages at the beginning and end of the study, as Hayes (1975) did using each child as his own control.

Other measures may be as important in analysing the reading gains of this particular group of children. Yule and Rigley also (1967-8) analysed accuracy and comprehension errors separately, and found that children who were behind and had some remedial teaching gained more in comprehension than in accuracy and that children with higher VIQs made greater gains. SRR children, who had higher IQs than controls continued to be far behind them in accuracy, but did catch up in comprehension due to higher VIQs.

In a later study Yule (1979) looked at accuracy and comprehension scores of both backward and specifically reading retarded children. He points out that the backward did better on all three measures of reading (accuracy, comprehension and rate) than the brighter SRR group. Children who were poor on accuracy alone did much better than those who were poor on comprehension alone. If a child was originally poor on both, he did least well. Comprehension difficulties appeared to be more serious than those of mechanical reading. The SRR group also had higher IQs than the controls, and while their accuracy reading scores continued to be very much below the controls, they caught up in comprehension due to higher verbal intelligence.

Spache (1976) states that no-one has yet answered the question of what is 'normal' gain for a retarded reader under treatment for a given period of time. As a result, almost any degree of gain in a post training reading test is considered to be indicative of a successful treatment programme. Spache asks, "Do we know whether the average child grows a full year in test scores in a school year, or whether his progress from year to year is characterised by continuous growth?" Levin et al (1985) found that growth was not continuous or evenly paced. In a follow-up study of learning disabled adolescents they found that half of the achievement growth had taken place in the first year of a four year programme and the other half over the next three years. Progress tapers off. Spache (1976) states that there are periods of rapid gain and plateaus of growth. Levin et al.(1985) ask whether a plateau is reached in the achievement capabilities of adolescents or is the measurement of a baseline spuriously low because of lack of motivation, prior discouragement and limited effort. Over time, the children not only learn new things but apply what they already know but had not been using. In the first year new learning is augmented by quick recoupment of older, currently unused learning. They justify the continued efforts and expense of remedial programmes in later high school years of learning disabled students who were identified late. Andrews and Shaw (1986) comment that there was an initial learning spurt in both their backward and specifically reading retarded groups in the first 10 months of a two year remedial programme. They attribute this to the 'Hawthorn' effect and state that previously the children had repeated failure and now were placed in a sympathetic environment. In contrast to Levin et al, they suggest that increased time in treatment doesn't necessarily lead to

further gains.

Other workers have used more fine-grained analyses than increase in reading age to measure reading gains. Early studies by Ilg and Ames (1950) identified developmental trends in reading behaviour. Applying a developmental schemata to measures of reading progress in remedial children, it appears that a more detailed analysis of their progress can be made by looking at the kinds of errors a child makes. Biemiller (1970) and Weber (1968,1970) looked at graphic and grammatical substitutions. Biemiller stated that beginning readers would be constrained by context and use contextual clues, then move to graphic substitutions (usually substituting another word with the same first letter regardless of context or syntax), and then later return to contextual substitutions. The earlier a child moved, the better his reading would be at the end of the year. Biemiller observed that the majority of errors made by poor readers were constrained by context, while most errors made by good readers were non-responses or refusals. Very few errors made by poor readers used graphic information. He postulated that poor readers might be trying to gain information aurally (from reading aloud), rather than graphically. Better readers attended enough to graphic information to say that they didn't recognise a word. In higher grades, it is the retarded readers who make errors indicative of over-use or misuse of graphic information. Some readers are stuck on contextual information for longer than necessary. Later, they may be trying to master graphic skills within a framework of failure and dissatisfaction with reading in general.

Bryant and Bradley (1985) make the same point when they say that 6, 7 and 8 year olds read phonologically and can't 'see' that a sentence is wrong if a key word is spelt wrong but sounds right. Backward readers cannot make use of letter-sound correspondences and do better at reading irregular words because they don't rely on phonemic knowledge. They also state that backward readers depend upon context to decipher meanings of words and phrases but cannot use context as effectively as good readers, even though they depend upon it. Bryant and Bradley also reiterate Biemiller's point that poor readers continue to use different strategies for reading and spelling for a longer period than other children. They could not capitalise on skills they already had to transfer them to a new task because they rigidly used other strategies. As a result, they used phonological skills for spelling and 'chunking' skills for reading.

Weber (1968,1970) also looked at the use of grammatical context in reading. She examined two sets of first graders and found no differences between good and poor readers with respect to grammatical errors. About 90% of the errors did not violate grammatical constraints. The high proportion of grammatically correct errors reflect a strong expectation by first graders that written sentences will conform to the restrictions that the grammar of their language imposes, and was similar to Biemiller's findings that poor readers' errors were still contextually constrained. This does not support the characterisation of a low achiever as a word-by-word reader. Poorer readers did not differ from better readers in the use of grammatical constraints for the identification of words in a string, but having made errors, only the better readers consistently corrected themselves, possibly as

a result of having more self confidence in their ability to word find.

By measuring changes in strategies of reading, it is possible to see progress from a developmental viewpoint. If the children in remedial classes are able to use new strategies, thereby demonstrating growth in reading skills, this seems to be a valid measure of achievement. If greater shifts in strategy took place in remedial class than non-remedial class SRR children it would suggest the advantages of remedial programmes for these children.

Other effects of remedial programmes are related not to reading gain itself, but to emotional stability. Children with reading problems have often been characterised as having emotional problems. (Yule, 1979, Rutter,et al. 1972, 1975, McMichael, 1979, Sturge, 1982, Jorm, 1986). Morris (1960) found that improvement in reading was related to a lessening of depression and feelings of being unsettled. Spache (1976) states that remediation will affect emotional well being, motivation and attention span and has a positive effect on self concept. Attitudes create poor self-concept in the child and low reading achievement. He feels that progress in reading is more influenced by the instructional method and degree of personalised attention given pupils than by their actual mental age. Williams (1970) comments that many of the most essential early learnings are motivational, such as focusing attention, delay of gratification, task persistence, achievement motivation, and development of scholarly activities. Therefore, more attention should be paid to motivational variables including teachers and kinds of books, and Keir (1977) states that techniques for teaching must be adapted to cognitive

and other processes, and provide the child with an opportunity to participate in learning because he/she wants to learn. However, Share, et al (1984) found that out of school factors have a greater impact on differences in achievement than in-school factors such as teachers and schools.

Evaluations of remedial reading provision have depended upon the context of the original definition of the group (dyslexic, SRR, neurologically impaired, developmentally delayed, etc.), instruments used to measure improvement, the dimensions upon which the success of the remedial programme is measured (gross gains, adjusted gains based on expected and observed scores, accuracy and comprehension gains, changes in strategies for learning to read, emotional and motivational factors), and upon whether there is an assumption of an even gradient of reading growth throughout the child's school years. This has made comparisons between research findings difficult. The one consistent finding with respect to reading gain is that there is a very slow rate of improvement within a certain group of children and that these children continue to fall behind in some aspects of reading, particularly in reading accuracy and the ability to make use of phonological information.

CHAPTER TWO

CORRELATES OF READING DISABILITY

A number of variables have, over the years, been associated with reading disability, either as antecedents or as the result of an inability to learn to read. This chapter will briefly outline the more widely accepted correlates of reading disability, and will cite studies in these areas.

Perceptual Motor Skills

There has been a large body of research relating perceptual-motor deficits to reading disability. Bender, in 1949, suggested that retarded readers suffer from a lag in perceptual development, and Benton (1962) stated that by using the Bender-Gestalt test, differences were seen between younger dyslexic children, ages 7 to 10, and normal readers, but that older children, 11 and 12 years old, showed no differences between the groups.

De Hirsch et al. (1966) state that the Bender-Gestalt test ranked near the top amongst tests that correlate significantly with

eight year old achievement. Silver (1968), using the Bender-Gestalt test, found that 92% of children in his sample who had reading disability showed some visual motor defect which reached statistical significance in difficulties with angles, tendencies to verticalize diagonals on card 2, use of primitive responses such as loops for dots and use of margins of paper as guidelines. Silver interprets these defects as problems in spatial organisation. Hunter and Johnson (1971) compared 20 non-reading boys with 20 controls aged 7 years 11 months to 11 years 4 months and found that controls were significantly better on the Bender-Gestalt test. Unfortunately, the authors did not give the range of scores at different ages. With such a small sample covering such a wide age range, one or two very deviant results could account for the significant scores. It must be kept in mind that some investigators have pointed out that perceptual differences between good and poor readers disappear after the age of nine or ten, due to a lessening of the developmental gap and an emphasis on verbal mediation skills rather than purely perceptual skills.

At the lower end of the age group, Connor (1966) found that poor readers at age 7 make significantly more distortion errors on the Bender-Gestalt. Horn and O'Donnell (1984) in their predictive study using first graders found that the Bender-Gestalt, letter and number recognition and visual matching are associated with both low achievement and specific learning difficulty. Gredler (1972), however, points out that when significant differences are found between groups on any test, such differences will not necessarily mean that the test can be used to predict the performance of specific individuals, and Koppitz (1975) in her book on research and application of the Bender-Gestalt test for

young children, states that an immature or poor Bender-Gestalt at age 5 or 6 doesn't necessarily mean that the child will fail in reading at a later stage.

Although earlier studies found correlations between perceptual motor skills and reading achievement, even at a late age, there was little or no control for IQ, and no multiple regression formula to control for age as well as IQ. As a result, it is not known whether children with SRR perform more poorly than their chronological age peers on tests of perceptual motor skills, or whether, within the SRR group there are differences which influence responses to remedial teaching.

Perceptual Skills

Wedell (1977) studied perceptual deficiency in specific reading retardation and the relevance of visual and auditory perception to reading achievement. He found a positive but not close association between the two. Poorer readers have poorer perception skills, but there is a substantial overlap between the two groups. Predictive studies show that those with good perceptual skills are likely to make good readers, but those with poor skills may or may not make poor readers, although deficiencies in auditory or visual perception may handicap a child, if he has insufficient compensatory skills, ability or motivation, points also stressed by Koppitz (1975) in relation to perceptual motor skills. As Cashden (1972) points out, although audio-visual tasks are not performed as well by retarded readers, the difference lies more in a willingness to attend and plan and

label spontaneously than in a major failure in integrational ability which may be resistant to remediation.

Veit et al. (1986) found that the learning disabled students they examined (12 to 14 year olds) did not have perceptual deficits or visual-auditory integration problems. They suggest instead that they have strategy deficits and need careful training in task appropriate learning strategies.

Motor and Neurological Correlates

Johnson and Mykelbust (1967) state that learning disabled children have minor motor incoordination affecting acquisition of hopping, skipping, bike riding, buttoning and tying shoes. Sitting and walking may be delayed. No cut-off point can be determined as there is no definitive test. They recognise that motoric and learning problems are also associated with other perceptual and emotional factors, though they identify the cause as a dysfunction of the brain.

Yule (1979) examined motor and neurological correlates in the Isle of Wight study. The results indicated that retarded readers were clumsier than the controls but this did not reach significant levels. They were, however significantly poorer than normals in motor impersistence, ($p < .05$) as well as in right-left discrimination ($p < .001$). Yule points out that by limiting the age range to 9 to 11 year olds, only certain developmental phenomena were studied. The fact that differences were not found on certain tasks does not mean they didn't exist at other ages.

There may be a connection between motor incoordination at ages 9 to 11 and defects in shape perception and visual spatial tasks in younger poor readers.

Horn and O'Donnell (1984), however, found that 6 1/2 year old low achievers had finger agnosia and motor incoordination, but the learning disabled (Yule's SRR) did not. They state that finger localisation was associated with low achievement in reading and not reading disability, even at age 6. They did find visual spatial tasks associated with both low achievers and learning disabled. The only variable which was significantly correlated to learning disability and not low achievement was lateral dominance, which predicted learning difficulty in maths only.

Jorm et al. (1986) found that the SRR group of 6 year olds they studied were poorer than normal readers on some visual discrimination tasks and on finger localisation. However, Share et al (1984) point out that although finger localisation was highly predictive of SRR, it could be considered a verbal rather than a motor skill, as it may very likely be a result of difficulty in learning and recalling verbal labels for the fingers.

Perceptual motor deficits, particularly in the earlier years have been identified with reading disability, though evidence with older children tends to suggest that differences between good and poor readers disappear as poor readers gain proficiency. This would, in turn, suggest a developmental lag, rather than some sort of brain damage, however minimal. Perceptual deficits seem to correlate weakly with reading disability and may be linked to

attentional and motivational factors, which are also dependent upon maturation. Motor problems, on the other hand were identified in retarded readers of 9 to 10 years of age in the form of incoordination and impersistence, and may constitute a deficit which is less dependent on maturation and therefore of a more long-standing nature.

Spatial and Auditory Deficits

Some investigators have attempted to separate dyslexia into spatial and auditory subgroups of deficit. Mykelbust (1965) and Kinsbourne and Warrington (1966) have identified deficits based on difficulties in either the language sphere or sequential ordering. Jorm, (1983) however, points out that it isn't possible to attribute an individual case of reading retardation to a deficiency in one particular area. It seems more profitable to talk of sources of variation in reading achievement for a population as a whole. Boder (1973) used an analysis of reading and spelling as interdependent functions. She identified three groups, a dysphonic group composed of children whose reading-spelling pattern reflects primary deficit in symbol-sound integration, resulting in the inability to develop phonetic word analysis-synthesis skills, a dyseidetic group whose reading-spelling pattern reflect primary difficulty in perceiving letters and whole words as configurations, and a third group of mixed dysphonic-dyseidetic or alexic children whose reading-spelling pattern reflects deficits in both phonetic synthesis skills and the ability to perceive letters and words as visual gestalts.

Jorm (1983) though, points out that no short term memory visual spatial deficit has been found in retarded readers. They fail instead on verbal coding, rehearsal and organisation. Ellis and Large (1987) also found that there were no differences in visual processing, or ordering or visual digit span between good and poor readers, but that differences in phonological discrimination and auditory short term memory did exist and play an important and perhaps causal role in SRR.

Other recent studies have also found a strong correlation between phonological awareness and reading acquisition. Bryant and Bradley (1981) state that despite overall intellectual superiority, backward readers (SRR) were far worse at categorising sounds than younger children. They could not tell which words had elements in common and which did not and could not produce rhyming words. Jorm (1983) states that SRR children have problems in storing phonological coding information in long term memory which gives rise to slowness of retrieval once learning has taken place. They are poor at recoding unfamiliar printed words into a phonological representation. Seymour and Porpodas (1981) also noted that dyslexic children had a sight vocabulary but it was impaired with regard to the time required for translation, as well as the range of vocabulary covered by visual word recognition.

Short term memory is also an important adjunct in developing reading skills. Smith et al. (1986) found that poor readers do not have a specific syntactic deficit, but their verbal short term memory is poor so the amount of information held while processing items puts a strain on poor readers. Jorm et al.

(1986) found that SRR children are poor at short term memory tasks involving phonological coding and have poor knowledge of syllabic and phonemic segments of speech. In the first three years at school they perform below the level of normal readers in letter names, name writing, recognition and discrimination of letters and numbers, memory for non-confusable sentences, reaction times and errors for naming pictures and colours, phoneme segmentation and finger localisation. These results could be grouped into early literacy skills and phonological processing. Ellis and Large (1987) also found that SRR children differed from good readers in segmenting auditorily presented words, rhyming and other primarily phonological tasks.

Share et al. (1984) found that phonemic segmentation was highly predictive of later reading success or difficulty. They state that individual differences in reading achievement appear to arise from phonological processing skills and interdigital dexterity. (They feel that this is a more specific paradigm than oral language and general maturational lag.) These two variables accounted for 76% of the variance when compared to later ability. Mann and Liberman (1984) screened kindergarten children and then tested them in first grade and found that phonological awareness and verbal short-term memory in kindergarten may presage future reading ability in first grade.. The ability to count syllables was also a predictor of reading success. Future poor readers were tolerant of phonetic confusability, but future good readers relied on phonetic representations. Poor readers problems seemed due to poor language processing. The authors felt that deficits in language may be of a permanent nature.

Speech and Language

Many studies have noted the relationship between early speech and language problems and later reading difficulties. Rutter et al. (1976) state that some cases of dyslexia represent a basic disturbance of language development. Children who first present with early language difficulties may grow up to be backward readers. They found in the Isle of Wight study that speech difficulties were highly correlated with reading retardation. Mason (1967-8) did a follow-up study of the educational attainment of children with retarded speech development and found that children with normal speech development who acted as controls were overwhelmingly superior to the speech retarded in reading. Mason summarises by stating that a speech retarded child has a good chance of being reading retarded in the early stages of reading irrespective of IQ level.

Ingram (1967-8) points out that many dyslexic children have a history of slow speech development and in an examination of 200 children with reading problems found that 73 had been referred to speech clinics between the ages of 2 1/2 and 4 1/2 because of retarded speech development. In Owen's (1978) study of educationally handicapped children and their siblings and families 45% of the boys had speech problems as did 35% of the siblings. They were unable to reproduce patterns of auditory stimuli and could not sequence sounds within words. The mothers also had language disability and were significantly poorer readers as adults.

Rutter and Yule (1973) point out that speech and language delays are strongly associated with specific reading retardation so that impairment in one form of language is likely to be associated with impairment in other forms. Yule (1979) also found a strong association between speech and language delay and reading difficulties. Poor readers are 5 to 6 times more likely to have had severe delays in language. They then develop difficulties in articulation and language complexity. Children with specific reading retardation had more general language problems which were not accounted for by lower intelligence and therefore were more striking.

Seymour and Porpodas (1981) however, state that speech based defects could account for certain aspects of reading and spelling difficulties, but it would not be sufficient to explain the full range of reported results. They put forward a structural coding deficit as one cause of reading retardation, which seems to follow on from Vernon (1960) when she wrote that,

> "there must exist some failure in reasoning related to the use of language which precludes these children (non-readers) from analysing the printed words systematically, associating sound to the constituent letters and synthesising these to form the total word sounds."

Collins (1961) found in looking at children receiving remedial instruction, that the errors they made suggested that the children were unacquainted with the vocabulary and lacked the level of thinking necessary to appreciate the logical development of the story. He stated that there were conceptual rather than perceptual difficulties. Saunders (1962) states that retarded readers, though they have read the words accurately, do not comprehend the meaning of what they have just read, although Rutter and Yule (1973) report a higher comprehension than accuracy score on the Neale amongst retarded readers, but not backward readers. De Hirsch and Jansky (1966) report that an overwhelming majority of children suffering from spoken language disorders often present difficulties with decoding and encoding-reading, writing and spelling. The authors found that on testing, the poor readers had limited recognition vocabulary, or the ability to grasp essential parts of a story and put them in proper relation to the whole. Their stories lacked cohesiveness and were poorly integrated. They had severe word finding difficulties. The older age group had persisting deficits in oral language, found word finding difficult and couldn't tell a coherent story. But, as Bryant and Bradley (1985) point out it is just as likely that children who cannot read and write properly will begin to fall further and further behind in all phases of language usage.

Fry et al. (1970) investigated oral language production in relation to reading achievement and also found that average or above average readers have larger speaking vocabularies and are more verbally fluent than below average readers who tended to enumerate picture content rather than explain or connect. Fry

feels that below average readers' language structure is more immature. As reading entails word recognition and comprehension of the meaning of the word in the context in which it is used, better readers with a larger vocabulary have a greater variety of verbal mediators at their disposal. Poor readers may continue to use different strategies for reading and spelling and depend upon context to decipher meanings of words and phrases, but they may not use context as effectively, as Bryant and Bradley note. Zigmond (1978) points out that a reading disabled child is poorer in many more aspects of oral language than a normal reader. In both receptive and expressive speech they are less fluent, know fewer words and give less mature definitions.

Jorm (1983) suggests that phonological recoding helps comprehension, and that this may be truer at the beginning stages than with older readers. Retarded readers are poorer at remembering the wording of clauses they've just read and poorer at remembering aurally presented sentences. Jorm contends that retarded readers have reading comprehension deficits independent of their problems with word identification. Older retarded readers comprehend less than younger normal readers who are matched to them in the ability to read single words. Gough and Tunmer (1986) agree that the proximal cause of specific reading disability is an inability to decode, probably because of lack of phoneme awareness but say that SRR children cannot decode, but are relatively good comprehenders. Horn and O'Donnell (1984) observe that language variables were amongst the most significant predictors of learning disability and state that learning disability is an attenuated form of a more pervasive developmental language disability.

Word recognition also involves forming associations between the printed symbols and oral responses. In order to form this association, the correct oral response must be in the reader's repertoire. In comprehension, a child brings to the task all the words he uses in oral language. These words have a background of experience and meaning which results in a better understanding of the passages read. It may be that children with better vocabulary scores, which suggest better word finding skills and a greater range of experiences, can make better sense of a passage and can therefore learn to decipher a larger number of words. Children who are older may also find it easier to comprehend reading selections than those children who are younger but have the same word reading skills, as older children have a wider range of experiences and greater maturity.

Emotional Stability

Investigations into the emotional components of reading disorders, using various techniques have arrived at similar pictures of the reading retarded child. Investigators agree that children with reading problems also have emotional problems to a much greater degree than children not experiencing reading difficulties. These problems have been variously described as hostile, aggressive, anti-social, bullying, negative and disobedient by some investigators (Spache, 1976, Lytton, 1972, Clark, 1971, Berger et al. 1975, Yule, 1979). Others find them overactive, squirmy, unable to settle down, less persistent and less stable (Gregory 1965, Gamsky et al. 1971, Rutter, 1976,

Lewis, 1973). They seem defensive, have poor achievement motivation and no long term goals (Zimmerman and Allebrand, 1965). At the other end of the scale they have been found to be nervous, withdrawn, solitary, discouraged, inadequate, depressed and oversensitive (Frost, 1965, Morris, 1966). They are unable to make contact, are less self-reliant, easily led, worried, fearful, with irrational fears and neuroses (Collins, 1961).

There has been some discussion in the literature as to what the antecedents are to these emotional difficulties and, indeed, whether the emotional difficulties precede or are caused by reading difficulty. Some investigators favour early psychosocial experiences which inhibit learning by disturbing exploratory functions, (Silverman, et al., 1959) or promote guilt associated with poor self image, or avoidance of anxiety provoking situations (Sylvester and Kunst, 1968, Goldman and Barclay, 1974). These studies often rely on clinic populations and it is difficult to make generalisations to the unreferred school population of poor readers. It seems just as likely that reading disability is the cause rather than the effect of anxiety and that curiosity is dampened by inability to find out, as Merritt (1972) suggests. He discusses what he terms "reading neurosis" and describes initial learning which breaks down when discrimination becomes too difficult or confusing. Anxiety in the situation occurs. There is a strong tendency to avoid the situation, make excuses and be uncooperative or distracting. There is a tendency to regress in behaviour and eventually a breakdown of earlier learning so that the child who has mastered a concept, forgets it. Merritt seems to describe very well the mechanisms these children use to avoid learning in a threatening

situation.

Others pin-point maturational lag, leading to lack of communication skills which hampers impulse control and the ability to postpone gratification. De Hirsch, Jansky and Langford (1966) attempted to explain the aetiology of the child's psychological problems in terms of language development. His problems may result from difficulties with comprehension and use of verbal symbols. A child who cannot verbalise anger resorts to more primitive means. Lack of communication skills hampers ego functions of impulse control and the ability to postpone gratification. This paradigm combines the child's difficulty with the symbolic use of language, especially in terms of higher order functions to understand his environment and development of ego strength, and would also explain the child's restlessness, inability to concentrate and to find meaningful the tasks he is set. Reading failure then results in a poor self image. This is secondary to failure and not the cause of the failure.

Gamsky, Neal and Lloyd (1971) in a study examining the relationship of classroom behaviour to visual perceptual difficulties found that Kindergarten children with visual perceptual difficulties are rated by their teachers as maladjusted in the classroom. They find academic work difficult and the ability to adjust to social and emotional demands of classroom procedures is sometimes impaired. Children with disability in visual perception may experience school as frustrating and may compensate for lack of academic success with negative behaviour. Gamsky, et al. are referring to children between the ages of five and six. These children, who have not

yet begun a formal reading programme, have already been identified as maladjusted to the school situation. It is even more relevant because children with visual perception problems are those who later will become children with reading problems.

There are also inborn temperamental attributes such as impulsiveness, and poor attention span which a child brings with him to the learning situation. Gregory (1965) found significant differences in an older group of children (8 to 10+) between retarded and normal readers with regard to anxiety for approval and acceptance by other children, and for restlessness. For younger children (6 to 7-10) the poor readers differed from others only in restlessness. Gregory concludes that reading failure did not cause restlessness as the older children did not show an increase in this. He defines restlessness as inability to persevere, concentrate or reflect and a liking for easy, moment-to-moment satisfaction, and seems to be saying that these are givens in the child's psychological or physical make-up when he enters school, which prevent successful learning experiences, but that anxiety is a product of reading failure, as this was found in older but not in younger poor readers. Aside from some arguable definitions of poor readers, Gregory's work seems to verify a developmental theory of readiness to read, emotional, physical and psychological. A child who is not able to sit still for long periods, needs immediate gratification and finds reflection difficult is an immature child for whom formal aspects of learning have little relevance. The above list suggests that emotional difficulties experienced by the child when faced with having to learn to read are those with which he comes to school. There is some evidence, according to Yule (1979) that reading

difficulties precede psychiatric problems. Failure leads to frustration and thence to antisocial behaviour. There is even more frustration amongst brighter underachievers than backward children. However, poor concentration may be a contributing factor to reading difficulty as it is present in five year olds. McMichael (1979) found that children entering school with antisocial problems at age 5 will be more likely to have reading problems later in primary school. McMichael felt that emotional disorders are clearly related to poor performance on reading readiness tests. At school entry antisocial disorders are already associated with low competence in skills which contribute to later success in reading. Children with problems in reading and antisocial behaviour had significantly poorer self concepts but this was also related to poor performance on other tests such as reading readiness, so reading failure hadn't contributed to initial low self esteem, but contributed to further loss of confidence. Antisocial behaviour had accompanied low self esteem into school as a result of other factors such as delayed linguistic perceptual and cognitive development. McMichael concluded that there is a group of children who bring to school behavioural and cognitive disadvantages which affect self-perception, perception of them by others and reading development.

However, Jorm et al. (1986) found that possibly, the way in which scoring of the CBQ was done made classification into the antisocial category spuriously high in McMichael's and in the Isle of Wight studies. Since there are more antisocial than neurotic items, children with high total scores due to problems on other items will often inappropriately be classified as antisocial. They state that there is no evidence that children

in the first three years of school develop antisocial behaviour problems as a result of reading problems. They also found that in comparing the kindergarten CBQ scores with later reading achievement, there were no differences between normal readers and retarded readers on entry to school, but that backward readers did have problems when they entered school. These were not just the result of reading difficulties. They had primary attention difficulties and hyperactivity. They were squirmy, restless and had poor concentration. However, by the end of grade 2, although they were behind in reading, there were no differences between the backward and other children on the CBQ.

It is suggested by some researchers, however, that anti-social behaviour, poor self-image, depression, neuroticism and anxiety for approval are an outgrowth of failure to learn to read. Rutter et al. (1966) in an article examining the relationship between severe reading retardation and maladjustment found a very high rate of reading retardation among those children with antisocial behaviours. The authors concluded that reading difficulties are probably not due to maladjustment in a simple causal sequence. It is more likely that antisocial difficulties develop as a reaction to reading backwardness or that both are due to other factors in the child and his family. As Rutter was studying children aged nine or older, this agrees with Gregory's (1965) findings that older children will develop disorders as a result of reading difficulties.

Sturge (1982) also suggests a more complex relationship between antisocial behaviour and reading retardation. Sturge states that the antisocial component is secondary and does not lead to

reading retardation. Nor is there clear evidence that reading retardation leads to antisocial behaviour. The association between antisocial behaviour and reading retardation may be because of associated background factors such as socio-economic class and family problems. The group of children who have both reading retardation and antisocial behaviour could be composed of some children who are antisocial because of reading retardation and some who are both because of background problems.

It is not known whether those boys with SRR who remain in mainstream education exhibit different behaviour after one year than those SRR boys who experience a year of full-time remedial education, although Morris's work (1966) suggests that those children who had made some improvements in reading were less depressed. Nor is it known whether there is a relationship between severity of emotional disturbance as measured by behaviour rating scales, and degree of gain in reading proficiency among boys with SRR.

Intelligence

Research has shown that there is an imperfect relationship between IQ and reading and that it is not possible to predict if young children with higher IQs will become better readers. This may be due in part to greater reliance on non-verbal items at an earlier age in IQ tests. Spache (1976) states that the statistical relationship between reading and mental age is moderate at the primary level and only later increases with chronological age to a marked degree. Yule (1979) found the same

low correlation between IQ and reading . It was exceptionally low in the younger age group (.36) compared with .55 in the older group. Koppitz (1975), in investigating the relationship between the Bender, IQ and reading achievement also found that both reading and the Bender are greatly influenced by a child's age as well as IQ.

All investigators show that reading retarded children have higher performance than verbal IQs. In a study comparing retarded and good readers, Hunter and Lewis (1973) found no significant difference in full scale IQ or in performance IQ, but a difference in Verbal IQ significant at the 0.001 level, with reading disabled children's VIQ lower than their PIQ by 12 points. Those with the highest full scale IQs did not necessarily make the largest gains over time. Yule (1979) comments that most published studies are methodologically poor. There is a lack of adequate definition of poor reader, inadequate sampling, no firm evidence for saying that poor readers have a particular WISC pattern, findings similar to the studies of Huelsman (1970) and Rugel (1974). At some point, the lack of reading skill has an adverse effect on the Verbal IQ and older non-readers have a lower Verbal IQ whilst maintaining an average Performance IQ.

Bishop and Butterworth (1980) also point out that the significant correlation between full scale IQ and reading ability is almost wholly due to the strong relationship between verbal IQ and reading. This means that the characteristics of retarded readers will vary according the IQ scale used in defining the group. A child who is poor in reading is likely to have a low verbal IQ

regardless of his performance IQ level. They ask "Does poor reading result in low verbal ability so that ability should be assessed with non-verbal tests or, since PIQ is not significantly correlated with reading ability, are non-verbal skills irrelevant in learning to read well and verbal ability the major determinant of reading proficiency?"

Lower verbal IQs may be a result of poor reading skill and may be due to difficulties in integrating new knowledge in school-based situations or those requiring reading and writing, (Bryant and Bradley, 1985), and to motivational problems within the classroom, where a child sees himself as a failure. McLeod (1965) concluded that age, mental age, socio-economic level, educational experience and emotional adjustment must be considered to draw valid conclusions as disability in reading and emotional disability exert similar influences on WISC subtest patterns.

At the same time factors preceding the child's entry into school may play a part in lowered verbal IQ scores. Difficulty with processing verbal information may have begun at a very early age, and may be related to delays in concept formation (Maxwell, 1972), and with restlessness and poor attention span, behaviours which have been noticed by reception class teachers when looking at children with learning difficulties (McMichael, 1979). Bishop and Butterworth (1980) found evidence of poor language skills before reading begins. They were also interested in the question of whether a low VIQ is a cause or consequence of reading retardation. Their study showed that lowered verbal skills may be a consequence of reading disability. PIQ correlated more highly than VIQ in WPPSI scores of 4 1/2 year olds and their

subsequent reading age. The correlation between reading age and change in verbal IQ was higher than reading age and change in performance IQ over a period of 4 years.

The authors suggest that one can only be confident that a child is specifically reading retarded if the reading age is disproportionately poor relative to his VIQ. If one defines it in terms of PIQ then the reading age is going to be consistent with the VIQ.

Some research suggests that children with higher IQs will make more gains in reading than those with lower IQs. Yule (1979) examined the hypothesis that intelligence bears a relationship to the amount of progress a child with specific reading retardation will make. There were three possibilities:

> 1) Because they are so much more intelligent, they will not need extra help, but will catch up themselves;
>
> 2) Because they are so much brighter, failure to learn to read suggests a specific handicap and without help they should do less well;
>
> 3) There will be no difference between backward and specific reading retarded on follow-up.

He found that backward readers, in spite of lower intelligence did better on all three measures of reading than the brighter

specific reading retarded group. It appears that those children with SRR make less progress than those who are backward, in spite of higher IQs. Rutter (1978) points out that because reading retarded children make less progress than others they tend to fall further behind with the result that the prevalence rises somewhat in older children.

Within the group of SRR children, however, it is not known whether IQ is related to reading gain, or whether children with higher IQs will make more progress in a remedial situation, and if this is related to verbal or performance IQ.

Sex of Subject

In all studies it appears that there is a higher prevalence of boys in reading retarded groups, anywhere from 2 to twenty times the number of girls. Ilg and Ames (1950), in studying developmental trends in reading behaviour found a marked difference in reading ability between boys and girls. Silverman, Fite and Mosher's (1959) profile of a typical reading disabled child specifies male, nine years old, of at least average intelligence. Rabinovitch (1959) puts the proportion of boys to girls at 10 to 1 and suggests that there may be hereditary factors, although there was no mention of sex linkage.

Gibson and Levin (1975) cite international studies which report that in America girls are better readers than boys. In Japan, France and the U.S. more boys are found in remedial classes, but in Germany, Nigeria and India girls are more illiterate. Gibson

and Levin state that in Great Britain there are no consistent differences. However, most studies have shown that even in Great Britain, boys outnumber girls by anywhere from two to one to ten to one. For example, Berger et al. (1975) found that both in the Isle of Wight and an Inner London Borough, boys outnumbered girls by three to one, and Ingram (1967-68) found the ratio in early studies was five to one in favour of boys.

Various avenues have been explored to try to explain the unequal numbers of boys and girls amongst poor readers. Some researchers suggest personality factors and of those, there are suggestions of both constitutional and environmental indicators. (Money, 1962). Other investigators favour a maturational theory, with boys maturing more slowly generally, leading to too high expectations at age six, when they are not ready to learn. Senz (1968) states that not all children are ready to learn school subjects by six, seven or eight, and this developmental lag then becomes a serious problem because of parental and school attitudes toward the child. Bentzen (1963) carries this argument further and states that the vulnerability of the male organism to stress and trauma and slower maturation rate of males makes for an uneven distribution of the sexes in reading retarded groups. Bentzen feels that society doesn't fully recognise the relationship between biologically determined developmental differences and the predominance of males in learning and behaviour disorder groups. Because of this society itself may precipitate stress and trauma and initiate deviant behaviour responses which it then sees as 'normal' for boys. Boys tire easily, lack motivation, are unable to concentrate. They have a short attention span, infantile speech and language development,

are unable to follow directions, recognise words and letter sounds and colour within lines. Bentzen states that by the age of six, girls are about 12 months ahead of boys in developmental age. By the time they are nine, this differential increases to 18 months. Bentzen states,

> "In our school system, which claims to be dedicated to the concept of the whole child and the importance of individual differences, there is little or no recognition of this developmental age difference between the sexes or planning for the variation in the biosocial readiness of children to learn how to learn and how to behave."

Morris (1966) says that there was no evidence that slower development of reading ability among boys in general could be attributed to sex differences in intelligence as measured by non-verbal tests. But it might be due to sex differences in adjustment to the school situation as boys were less well adjusted than girls between ages 8 and 10. Boys were impetuous, careless and paid less attention to detail. In this respect Morris agrees with Bentzen in stating that boys don't appear to be ready for the learning experience.

There may also be a developmental lag in early brain differentiation, as Taylor's (1962) and Taylor and Ounsted's (1972) studies indicate. They found that the pace of development seems to be connected to the sex of the child. Girls' brains appear to differentiate earlier, especially in the area of language skills. This would put them at an advantage in learning

to read earlier. Bakker (1970) found that normal boys show an initial lag in development with regard to the retention of temporal order as compared with normal girls. Girls seem better equipped when they start primary school, but in normal readers the lag isn't evident after age nine. Fairweather (1976), however, states that there have been failures in attempts to find sex differences in maturation rate or in cerebral lateralization. Fairweather says that the premise that there are sex differences requires considerable qualification and concludes that "studies with the normal population predicated on the assumption that discriminations are useful can only be regarded as tempting sexism."

Either maturational lag or slow brain differentiation may lead to non-conforming behaviour which makes the boys more vulnerable and raises the referral rate. Still others feel that the fault lies with the learning environment provided for the boys who can't identify with the material they read or with the person who teaches them or the task itself. (Blom, 1970, Kagan, 1965, Gibson and Levin, 1975). There are also strains on boys which may not be as apparent in girls in that parents may have higher hopes for boys academically and become more alarmed at their lack of progress. Owen (1978), for example, believes that the larger number of boys was due to the fact that nonreading boys create more trouble than nonreading girls and get referred more frequently. Also, parents are more alarmed by the boys' inability to succeed academically. Spache (1976) is also in favour of a sociocultural explanation for the higher rate of specific reading retardation in boys. He feels that as a group, boys receive more negative remarks, are given fewer opportunities

to participate in the reading lesson, and receive lower grades than girls in keeping with their tendency to disappoint the teacher's expectations in reading achievement and classroom behaviour.

There have been suggestions that, because it is so unusual for girls to have SRR, there may be qualitative as well as quantitative differences in reading acquisition. Rutter (1978) points out that amongst the generally backward, the ratio is approximately equal, but amongst children with specific reading retardation the ratio is four to one in favour of boys, the same ratio as Satz et al. (1976) found in the U.S., and although the percentage of children with specific reading retardation was higher in the Inner London borough study than the Isle of Wight, the ratio of boys to girls remained the same. Morris (1966) in a survey of 60 Kent primary schools found that significantly more boys were poor readers at eight years seven months ($p=.001$). A year later, this was still significantly different ($p=.01$) and two years later it was further reduced to $p=.05$, but still significant. As children get older, the percentage of boys in the group of non-readers becomes greater. Clark (1971) found that in her population of 791 boys and 753 girls, 138 boys and 92 girls had poor reading. Of those children with a WISC IQ of 90 and no reading skills, boys outnumbered girls by about two to one. A further group of children who continued to have prolonged reading difficulty at age nine were studied. Of 165 children, 19 were two or more years behind. All but 4 were boys.

More recent studies have also found a much higher ratio of boys to girls in the SRR than in the backward group. Jorm (1986)

found that in a sample of 453 children followed for the first 3 years of schooling, there were 10 boys who were backward readers and 4 girls, but 21 boys and only 4 girls were retarded readers, a ratio of 5 to 1. Mann and Liberman (1984) also found sex differences in this age group. Studying kindergarten and first grade children, they found that good readers were 64% girls, but poor readers were only 35% girls. They did not find that girls and boys were qualitatively different, however. Andrews and Shaw (1986) found 20 boys who were backward readers and 8 girls, but in the retarded group there were 55 boys and 3 girls, a ratio of almost 20 to 1. Veit et al. (1986) using an older group of 12 to 14 year olds still found that there were 45 boys to 19 girls in their learning disabled group, a ratio of almost 3 to 1. An even older group of 14 to 15 year olds was studied by Levin et al (1985). Of their group of severely reading retarded, 46 were boys and 6 girls, a ratio of more than 7 to 1. Share et al (1984) suggest that sex functions as a moderator variable, indicating differential predictability of boys and girls. As a result of the large differences in sex ratio, especially within the SRR group, some researchers have eliminated girls from studies because of the increase in variability of the results when girls were included.

The preceding chapter has explored some of the correlates of reading retardation which have been mentioned over the past 20 years or so of research into reading difficulties. It is interesting to note that earlier studies seem to have placed greater emphasis on perceptual motor, perceptual and audio-visual correlates, especially in relation to early deficits in visual motor skills. More recently, there has been an emphasis on

language skills, with a particular focus on phonological processing and short and long term storage and retrieval of phonological information.

The relationship between intelligence and reading acquisition has also been explored and has particular relevance to that group of children who have been defined as specifically reading retarded, as these children are performing below the level of their intellectual potential. Other questions arise with respect to this particular group of reading disabled children. When compared with a group of backward readers, for example, there appears to be a much greater percentage of boys than girls in the SRR group. These issues raise the question of whether we are looking at the lower end of a continuum of poor readers, or whether we are examining a discrete population of children with specific needs who need very specific remedial attention.

Finally, there is the question of emotional stability. How much of the child's difficulties can be attributed to his lack of success in reading and how much to what he brings with him into the school situation? Will some children respond better to remedial teaching than others, and what sort of environment should we provide for those children?

The following chapter looks at remedial programmes on the basis of type and quality, particularly with relation to the abovementioned correlates of reading disability.

CHAPTER THREE

REMEDIATION

Remedial programmes in schools have tended in the past to be an amalgam of language enrichment, the provision of a sympathetic environment, more one-to-one or small group learning situations, and some commercial packages based on task analysis with learning broken down into small units leading to short-term as well as long-term goals and immediate rewards. There has been little in the way of investigating the responses of different children to different forms of remedial instruction, although Rutter, et al. (1966) suggested this course of action as a result of the Isle of Wight study.

Ingram (1971) goes even further and states that before remedial measures are employed, it is very important that the precise causes of the difficulty in learning to read be explored in depth. Gibson and Levin (1975) agree and state that all aspects of the child's condition, both cause and deficiencies of performance have to be taken into consideration when planning remedial help.

Yule (1976) feels that there is little place for eclecticism in remedial reading programmes. It is important to gather evidence about different well conceived methods and approaches and these should have a clear theoretical basis, and a written description of the order in which different components are presented, how the

teacher presents the material and how she corrects the child. The group of children who take part should be well selected and described.

Instructional methods should follow some generally accepted rules such as those outlined by Rutter and Yule (1985). These include appropriate reinforcement which is given immediately and is contingent upon the child's response, feedback of results so that the child knows his/her progress, and the use of rewards.

More recently there have been suggestions that, based on research findings, remedial teaching should be more specific and include systematic phonic teaching. Williams (1984), for example states that instructional programmes incorporating phonemic training have been effective in teaching reading. These use both phonemic analysis and phoneme blending. Williams goes on to say that blending and segmentation are the basic phonemic tasks and these are the tasks that belong in an instructional programme. She states that research has indicated the importance of phonemic analysis in beginning reading and the value of providing effective instruction to children who have difficulty in this area.

Other researchers have come to similar conclusions. Mann and Liberman (1984) suggest that to prevent reading problems phonological awareness should be improved by teaching nursery rhymes, encouraging rhyming games that include nonsense words, promoting the use of pig-latin, etc. There should also be more formal teaching of word awareness leading to syllable awareness and phoneme awareness, as well as explicit training in syllable

counting tasks. They also advocate training short term memory by repeating again and again rhymes, poetry, and sentences. Perfetti (1986) states that children should learn about decoding, e.g. alphabetic principle, specific orthographic patterns of the writing system and specific mappings of print and speech. They should learn enough about decoding and word identification so that words can be identified without effort. He states that it is important to teach grapheme-phoneme correspondences and that there is an advantage of code-emphasis programmes over meaning-emphasis programmes.

Juel et al. (1986) state that in order to learn to read you need knowledge of the cipher or spelling-sound correspondence rules and lexical knowledge. Knowledge of the cipher can be traced to phonemic awareness and experience of print, but until there is some phonemic awareness, exposure to print will not increase knowledge of the cipher. Jorm et al. (1986) also stress the need for training in letter sound correspondences which should be carried out on reading related items. They also feel that there should be training in fast retrieval of letter sounds and word names.

In an earlier article Williams (1979) traces the history of teaching reading skills, and points out that the whole word or look and say method was developed as a reaction to phonics approaches which were drill-heavy and tedious. The look and say method placed its emphasis on reading as a meaningful and satisfying experience. However, researchers found that all children tended to do better with an approach which taught the alphabetic code early, but children of low intelligence or of low

socio-economic level were especially likely to achieve more with a code approach. This seems to imply that children who would have difficulty learning to read, possibly the specifically reading retarded, would do better with an approach of this sort. However, it has been pointed out that proponents of decoding approaches also tend to recommend direct instruction. When more instruction time is spent on reading in the classroom the teacher is doing direct teaching, and direct teaching is of decoding. It then becomes impossible to tell whether the effects are due to teaching decoding or to more direct teaching time. Williams concludes that the evidence suggests that a good decoding programme will teach basic skills more effectively. There is no evidence that instruction in decoding helps comprehension, but it doesn't hurt.

In an interesting cross-cultural study, Raynor (1986) looked at the development of programmes for children with specific reading disabilities in the German Democratic Republic. There, SRD is considered a disturbance in language development. Children have problems in learning to read, spell and write. In spite of remedial assistance, these children cannot meet the demands of normal instruction. They constitute 1% of the school population. Children are diagnosed in the middle of second grade (7 1/2 years) and at 8 years enter a special full time class for 2 years with a structured remedial programme. They are taught as a group except for three hours each week during which they receive language arts instruction in smaller groups. Specific disabilities are isolated and exercises provided for remediation. Multisensory techniques are employed for teaching and mastery of material. There is special emphasis placed on clear speech and

correct pronunciation of words. Instruction in reading concentrates on an analysis-synthesis method. Words and word groups are analysed according to single sounds, single sounds into whole words. Phonics and structural analysis are the bases of instruction.

In spite of the foregoing, there are still a number of people who believe that teaching meaning should take precedence over decoding. Bristow (1985-6) found that poor readers make fewer spontaneous corrections, use context less often and correct mis-cues that change meaning less often. He feels that poor readers are given the message that reading is not a search for meaning, but a decoding exercise. Teachers reinforce this by the amount of time given to decoding activities with poor readers. He feels that to correct this the focus should be on sense-making, stressing comprehension as the foremost goal in reading. This should be done by developing background experience and directly teaching comprehension strategies which involve active reading. One of these methods is progressive cloze. As described by Riley (1986) the system deletes whole or parts of words in a systematic manner in a passage. It causes the students to focus on semantic, syntactic and graphophonemic features. Questions are asked about the passage, encouraging the students to construct a meaningful passage using prior knowledge. Remedial students are then guided in rereading the passage periodically as it evolves, verifying the appropriateness of their responses as they relate to overall meaning. This shows the student that comprehension is the act of constructing meaning from print. The author points out that progressive cloze is designed as a ongoing supplement to a remedial reading programme.

Others state that instead of stressing the differences between remedial children and others by providing different methods and different materials, one should concentrate on more and better instruction. Allington and Shake (1986) state that the remedial teacher should use the reading programme already extant in the child's classroom in two ways: 1) by working on improving the child's performance in a lesson that will follow a remedial session through intensive work on aspects of the upcoming lesson and, 2) by having remedial instruction after the classroom instruction to review the work. Gentile et al. (1985) state that some children who are reading retarded may be neurologically impaired and that no specific remedial strategy has proved to be effective. They feel that to focus on skill weaknesses may be inappropriate for the neurologically impaired child who may have a dysfunction, damage or lack of specialisation in the left hemisphere. Traditional remedial teaching techniques are based on diagnosis of skill deficits followed by instruction and drill for isolated weaknesses. These, the authors say, are aimed directly at left hemisphere functioning, but overstimulation of a defective brain system may disrupt functioning of the normal brain areas. This can diminish strength areas and lead to depression and hyperactivity. Instead, say the authors, one should approach reading as a non-linguistic task and focus on comprehension rather than decoding, using a language experience approach. They feel that a remedial programme should give encouragement in language skills that the students have, that it should ensure success, be interesting and of the appropriate difficulty level. They stress that one should not place emphasis on the child's difficulties.

Hinson and Kelly (1986), on the other hand, do believe in planning an individual learning programme, matching the appropriate strategies, methods and materials to the individual's learning requirements. They do not see any purpose in putting children with specific learning difficulties into a discrete category and avoid the use of the term dyslexia. They do feel that any approaches aimed at resolving a child's learning difficulties are unlikely to be effective unless all aspects of his or her personal development are taken into consideration. Intellectual, social and emotional factors are involved and must be given sympathetic consideration when catering for the child's needs. This type of approach appears to combine specific diagnostic techniques and a tailor-made remedial programme based on the results of an assessment, with a more broad-based philosophy which provides a sympathetic climate in which the child feels safe enough to learn.

Wolf, et al (1985) point out that the first two reading strategies are substitution strategies in which the readers first use semantic clues, then graphemic clues to guess at unknown words. They feel that word meaning may be easier for beginning readers to grasp than sound structure which is why substitution strategies proliferate at early ages. The second strategy is phonemic decoding. The authors point out that both of these strategies are useless with multisyllabic words which are not based on letters and sounds. Good readers develop analogy strategies like vowel shift rules (prime-primitive) or comparing the unknown word to a known word with the same phoneme. They state that analogy strategies are not intuitively learned by

learning disabled readers who tend to perform as younger readers. They advocate the use of direct instruction in analogy strategy which speeds up reading development. This method appears to use both knowledge of phonemic structure and meaning to further develop reading skill.

From the preceding it can be seen that, along with most of the terminology in the field of reading retardation, there are no agreed definitions of remediation, nor methods which have been shown to be specific for particular children. In fact, remedial studies produce inconsistent results, irrespective of the method used.

CHAPTER FOUR

THEORETICAL RATIONALE

This study will be an examination of the effectiveness of full-time remedial reading classes for retarded readers. As with many innovative ideas in education, the remedial classes had been in existence for many years without an evaluation of their usefulness, apart from teachers' tests of reading age at the beginning and end of the school year. There had been no examination of criteria for entry, nor was there consistency in measures used to identify children in need of help. It was not known, therefore, whether the children placed in the special classes constituted a fairly homogeneous group, or whether some children, because of a variety of differences, were deriving more benefit from placement than others. Also, the assumption that rise in reading age was the only criterion for measuring the success of the programme had never been questioned. In other words, a controlled study of the effectiveness of the remedial classes had never been done.

In the first instance, the study will attempt to identify a discrete population of boys within the remedial classes who meet the operational definition of Specific Reading Retarded (SRR) as used by Yule (1967, 1973) and to compare them with a similarly identified group of SRR boys who did not receive remedial class help. As Ellis and Large (1987) point out, there are two approaches to the study of reading retardation. Studies of

generalised reading disability yield too many discriminators because of the heterogeneity of the group, while studies of specific reading disability yield too few. They point out that if investigators are interested in limiting ability factors which underlie specific reading disability, then comparisons between specific disability vs. ability is the appropriate model, matching for intelligence and even reading ability. This study will limit itself to children who meet the SRR criteria using a regression formula which takes into account the relationship between IQ, CA and RA. This increases the accuracy of prediction by computing statistically accurate levels of probability of deviation from an expected reading age. There would also be direct comparability between the present study and previous studies (Berger, et al. 1975, Hayes, 1975, Rutter, et al. 1966, 1970, 1972, 1973, 1975, 1976, Yule et al. 1967-8, Yule, 1973, Yule et al. 1974, 1976, Yule, 1979, Jorm et al. 1984, 1984a).

The study will examine the patterns of reading acquisition of SRR boys as well as looking at other dimensions of their development which might contribute to their reading difficulties, e.g. perceptual motor skills, motor impairment, and emotional stability.

Perceptual motor deficits have been identified with reading disability especially in the early years (Satz et al. 1970), and some research has suggested that some older children continue to suffer from this in terms of inability to decode symbols (Boder, 1973). The present study will compare 9 year old SRR boys with 9 year old good readers and 7 year old good readers who are reading at the same level as the SRR group in order to see whether boys

with reading retardation more closely resemble their CA cohorts or their RA cohorts in perceptual motor development. Within the SRR remedial class group, perceptual motor skills will be examined in order to see whether there is a relationship between perceptual motor development and progress in reading.

Emotional difficulty has been associated with reading problems by a number of investigators (Spache, 1976, Rutter, 1976, 1978, Stott, 1974, McMichael, 1979). Some research suggests that a child who is having reading problems enters the formal learning situation with a set of characteristics which preclude effective acquisition of basic skills, although other researchers have not found the same relationship between reading difficulties and early behavioural problems (Jorm et al. 1984a). Little is known about the effects of full time remediation on the emotional well-being of SRR boys, or whether those boys who experience this form of education would show less disturbance that SRR boys who had remained in mainstream education. This study will compare the 2 groups of SRR boys by examining behaviour rating scales both at the beginning and end of the study. Reading gains will also be compared with behaviour ratings in order to see whether children who demonstrate less disturbed behaviour made better progress in reading.

Although the relationship between mental age and reading is not perfect, there is some evidence to suggest that children with higher IQs will make greater gains in reading. This type of evidence has been used in justifying the selection of brighter children for remedial classes. Yule and Rigley (1967-8) in looking at a population of poor readers found that children who

were behind and had some remedial teaching gained in comprehension and that children with higher Verbal IQs made greater gains. SRR children, however, although they had higher IQs than backward children, did not make as much progress in reading accuracy. The present study will investigate the group of SRR children to see whether, within this group, IQ is related to reading gains and whether children with higher IQs will make more progress in the remedial situation. The relationship between reading gain and verbal IQ and reading gain and performance IQ will also be examined.

It may be that children with better verbal IQs have better word finding skills and a greater range of experiences and can then make sense of a passage. This would result in a higher comprehension score. The present study will examine the relationship between VIQ and gains in reading comprehension, and will also compare the comprehension scores of 9 year old and 7 year old children who are reading at the 7 year level in accuracy, to see whether older children, because they have had a greater range of experiences and are more mature, can make better sense of the passages they read.

It has been noted by many investigators that learning disabled children have minor motor incoordination problems (Johnson and Myklebust, 1967), are clumsy, have motor impersistence and are poor in right-left discrimination (Yule, 1979). It has also been suggested (Rourke, 1976) that retarded readers do not catch up with their age group and that this might suggest a deficit rather than a delay in development. This study will attempt to measure motor impairment in SRR boys and compare this group to normally

reading boys of the same age as well as to normally reading boys of age 7. It will also examine the relationship between motor impairment and the acquisition of reading skill in order to determine if those children with greater impairment make less progress, and examine the types of motor impairment to which SRR children may be prone.

Central to studies of the effects of remedial provision for children with reading disabilities has been the issue of evaluation. The success or failure of a particular programme has been judged by global reading gains over a period of time, regardless of the age and IQ of the child. It has been expected in the past that a year of remedial work should yield a year's worth of improvement. The present study, because it is based on an operational definition of SRR using a regression formula taking into account the age, IQ and expected reading age of the child, will use an adjusted gain score, as outlined by Hayes in his study of SRR children (Hayes, 1975). Gain will be measured by examining the difference between observed and expected reading age at the beginning of the study, comparing this with the difference between observed and expected reading age at the end of the study. (O-E (retest) - O-E (screening)). Separate measures will be taken for reading accuracy and reading comprehension.

The time at which the measures have been taken is another crucial factor, as children will improve at the end of the year only to fall back once they are returned to their regular classrooms (Collins, 1961, Spache, 1976a). In order to determine whether the remedial class was truly effective, there should be some

carry-over to a new learning situation. Retests therefore will be given four terms after the beginning of the study, in order to allow the subjects to settle back into the mainstream classes to which they have been returned after the remedial experience.

Other measures than gain in reading age can be used to evaluate the success of a remedial reading programme. An analysis of reading errors would place the child on a developmental continuum with reference to the kinds of strategies he uses in deciphering a passage. Biemiller (1970) suggests that children move from contextual clues to non-responses to graphic substitutions and then return to contextual substitutions. The earlier the child moved, the better his reading would be. Retarded readers over-use graphic information because they become stuck on contextual information for longer than necessary and they later are trying to master graphic skills and are unable to move on. This study will examine the errors that children make in order to determine whether the SRR boys resemble nine year old good readers or seven year old good readers in the types of reading errors they make or whether they constitute a group which resembles neither, suggesting that their pattern of development is different from normal readers. It will also examine whether at the end of a period of intensive remedial work, the SRR boys in the Opportunity class will be able to make use of new strategies to help them to read.

In the preceding paragraphs it was suggested that an appropriate control group for the SRR boys would be a group of younger boys who were reading at the same level as the SRR boys. Various investigators have pointed out the theoretical advantages of such

a design. Backman, et al. (1984) argue for the validity of such a control group which would match reading-disabled children with younger, normal children at the same level of reading achievement. One would then compare levels and patterns of performance on various neuropsychological, psycholinguistic and reading tasks. They state that if you match age and IQ with normal readers, differences could be found in phonemic segmentation, or syntactic or morphophonemic knowledge, but these would be a consequence of reduced experience with written language rather than a cause of poor reading.

Including groups matched on reading level would allow testing the hypothesis that reading disabled children perform on these other tasks at a level lower than, or a manner different from that predicted by their reading level. If no differences are found, then the reading disabled are not qualitatively different from the younger normal readers, but delayed in acquisition of reading and related skills. But if they have lower levels of performance on non-reading measures, or a different pattern of reading or spelling errors, then disabled readers are qualitatively different from the younger readers in sequence and rate of development. This would be compatible with a deficit rather than a lag interpretation of reading disability. The addition of a third group, chronological age controls, allows examination of differing performance levels across two chronological age levels in normal children as well as relative performance within chronological and reading age level matched groups. The authors state that the unique contribution of the reading level design lies in its ability to delineate those variables most closely related to the reading task itself, so that meaningful subgroups

can be identified.

Seymour and Porpodas (1981) state, "Only if the dyslexic performance can be shown to differ either quantitatively or qualitatively from both reading and chronological age controls will we conclude that the experiment is tapping an area of dysfunction which possibly makes a causal contribution to the disorder". They found that dyslexics differed from CA controls in all areas, but from RA controls in sensitivity to orthographic regularity, slowness and errors in grapheme-phoneme translations. They conclude that SRR or dyslexic children have structural coding deficits. Bryant and Bradley (1981) also used a design which included an RA control group. They examined a group of 10 year olds with a reading age of 7-7 and compared them with a group of 7 year olds with a reading age of 7-6. The 10 year olds, despite overall intellectual superiority were far worse at categorising sounds than the younger children. The could not tell which words had elements in common, and could not produce rhyming words.

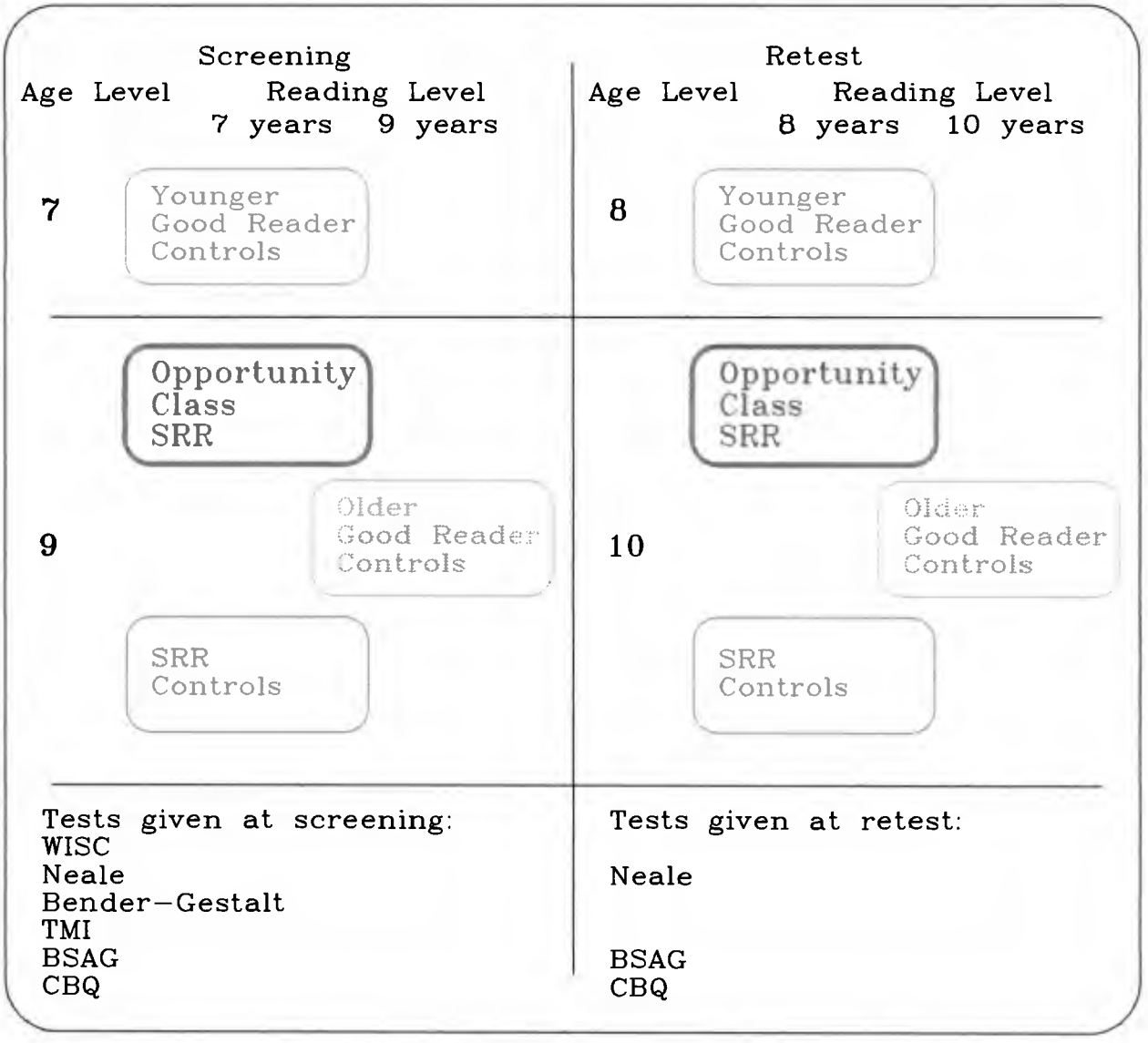
Nelson (1981), in an examination of spelling errors stated that if good and poor spellers (or readers) attempt the same words, the quality of good spellers' errors will be judged on relatively few errors and on words almost all within their capabilities. Poor spellers' errors will be judged on many errors and on words far beyond their capabilities and for which they offer random guesses, making grossly misspelled errors. Inappropriate norms may also be used. If a child's errors are compared with errors made by children of the same age, the relevant factor in determining the normal pattern of errors is CA rather than level

of spelling achievement. It is more appropriate to compare poor spellers with younger children of the same spelling (or reading, if measuring reading) ability, to see if there is an abnormal pattern of errors. She found that dyslexics did not produce more extreme patterns of spelling errors than controls. The quality of dyslexic children's spelling is essentially normal.

The following design will be used in this study:

Figure 1

A Chronological and Reading Age Level Design



In this design the Opportunity Class will be matched with three control groups, a group of SRR boys who remained in mainstream classes, a group of CA cohorts who are reading at their proper age level, and a group of RA cohorts, who are younger normal readers, reading at the level of the SRR. In this way, the acquisition of reading skills, motor development, perceptual motor skills and emotional difficulties can be examined across age and reading dimensions. At the beginning of the study, in the autumn term, each group will be given a short form of the WISC, a Neale Analysis of Reading Abilities test (accuracy and comprehension), a Bender-Gestalt test, and a Stott-Moyes-Henderson Test of Motor Impairment. Their teachers will be asked to complete Bristol Social Adjustment Guides (BSAG) and Rutter Childrens' Behaviour Questionnaires (CBQ) for each child.

A second set of data will be gathered a year later, also in the autumn term. At this time, the Neale will be administered and BSAG and CBQ scales will be completed by the teachers. (See Figure 1, p. 81).

CHAPTER FIVE

HYPOTHESES

The aim of this study will be to examine in detail the children who are placed in full time remedial education and to measure the effects of this educational provision on the acquisition of reading skills. We have very little knowledge of the effects of this sort of provision for children with specific reading retardation (SRR) as previous studies have used a variety of criteria for defining reading retardation and for evaluating progress. We have even less knowledge of the differential effects of full time remedial provision for different IQ levels, levels of perceptual motor maturation, motor impairment and emotional behaviour for this group of operationally defined poor readers.

In order to measure the progress of the SRR boys in full time remedial education (the Opportunity Class), a number of comparisons will be made. These include:

a) Comparisons between screening and retest reading scores of the Opportunity Class, using the boys as their own controls;

b) Comparisons between screening and retest reading scores of Opportunity Class boys and a control group of SRR boys who remained within mainstream education;

c) Comparisons between screening and retest reading scores of nine year old SRR boys reading at the seven year level, and a group of seven year olds also reading at the seven year level;

d) Comparisons between screening and retest reading scores of SRR boys and a group of nine year old boys reading at the nine year level.

Hypotheses relating to Reading Improvement

1) There will be no improvement in reading age accuracy or comprehension within the Opportunity Class group when measured by the Neale Analysis of Reading Ability, using comparisons of differences between observed and expected reading ages at the beginning and end of the study.

2) There will be no differences in reading improvement between boys in the Opportunity Class and control group SRR boys when means of retest scores for the Neale Analysis of Reading Ability accuracy and comprehension are compared.

3) There will be no differences between patterns of acquisition of reading skills as exhibited by SRR boys and good readers when measured by comparisons of differences between observed and expected reading ages within each group at the beginning and end of the study.

4) There will be no differences between the two groups of SRR boys with relation to changes from graphic to contextual clues when analysing accuracy errors on the Neale Analysis of Reading Ability.

Hypotheses relating to differences in IQ level, perceptual motor skill, motor impairment, and emotional stability and their relationship to reading improvement in boys with Specific Reading Retardation in remedial education.

5) There will be no relationship between high scores on the Verbal IQ scale of the WISC (short form) and amount of gain in reading accuracy and comprehension scores as measured by the Neale Analysis of Reading Ability in the group of SRR boys in the Opportunity Class.

6) There will be no relationship between scores on the Bender Gestalt test and amount of gain in reading accuracy and comprehension scores as measured by the Neale Analysis of Reading Ability in the group of SRR boys in the Opportunity Class.

7) There will be no relationship between scores on the Stott-Moyes-Henderson Test of Motor Impairment and amount of gain in reading accuracy and comprehension scores as measured by the Neale Analysis of Reading Ability in the group of SRR boys in the Opportunity Class.

8) There will be no relationship between scores on the Bristol Social Adjustment Guides or the Rutter Children's Behaviour Questionnaire and amount of gain in reading accuracy and comprehension scores as measured by the Neale Analysis of Reading Ability in the group of SRR boys in the Opportunity Class.

An examination of the various dimensions on which boys with specific reading retardation differed from boys who were average to good readers was also carried out. The purpose of this was twofold:

a) To see whether boys with SRR more closely resembled their chronological age cohorts or their reading age cohorts in those skills which are usually associated with acquisition of reading, ie. perceptual motor development and reading strategies.

b) To examine in detail the differences between SRR boys and those experiencing no difficulty in reading on measures usually associated with reading difficulty, ie. motor impairment and emotional instability.

Hypotheses related to comparisons between SRR boys and CA and RA controls.

9) Nine year old boys with Specific Reading Retardation will not be significantly poorer in tests of perceptual motor integration than nine year old boys who are reading at the nine year level. The scores of Bender Gestalt tests of nine year old SRR boys will more closely resemble other nine year olds than those of seven year olds when measured by a one-way analysis of variance.

10) Nine year old boys with Specific Reading Retardation will not be significantly different from nine year old good readers in the types of reading errors they commit. Scores for SRR boys on the Neale Analysis of Reading Ability for graphic and grammatical substitutions will not differ significantly from those of nine year old good readers and will more closely resemble the nine year olds than the seven year old good readers.

11) There will be no significant differences between boys with Specific Reading Retardation and RA or CA controls in motor impairment as measured by the Stott-Moyes-Henderson Test of Motor Impairment.

12) There will be no significant differences between boys with Specific Reading Retardation and RA or CA controls in emotional stability as measured by the Bristol Social Adjustment Guides or the Rutter Children's Behaviour Questionnaire.

CHAPTER SIX

RESEARCH DESIGN AND METHODOLOGY

In this chapter the process of selection of the four groups of children used in the study will be described, as well as the measuring instruments used to select the groups and measure their progress, and the methods used to collect and treat the data. The sample was selected from a group of children placed in the Opportunity Class, a full-time remedial class for children with reading difficulties. Three control groups were used, a group of children with the same degree of reading deficit who had remained in mainstream classes, a group of children of the same chronological age (9-11), but with RA=CA, and a group of children of the same reading age as the sample (7 years) but with RA=CA.

6a Sample

A group of 30 children in two special classes for children with reading difficulties were assessed to see if they met the criteria for SRR. The classes themselves comprised 15 children each, and were chosen out of a group of children referred to the School Psychological Service for reading difficulties. They came

from many different primary and junior schools throughout an area comprising a small town (20,000 population) and its surrounding rural area. Boys outnumbered girls by a factor of 8 to one. The children were placed in the special classes by various methods, depending upon the screening method used by the particular psychologist who tested them, the demands for this type of special education, and the willingness of parents to allow their children to attend a full-time special unit in a school other than their own for a year. Along with these restrictions were constraints placed upon the selection by the teachers of the units to exclude children with attendance problems (as they would not attend a special unit and 'waste' the place), and to exclude severe behaviour problems which would disrupt the other children. It was felt that children with severe behaviour problems could be better placed in another unit for that purpose.

Psychologists in the area varied in their selection procedure, some using the Burt Word Reading Test to determine reading age, some using the Neale, and some the Holborn or Schonell. A WISC or short form of the WISC was usually given, but some psychologists used the Stanford-Binet and at times children were placed in the special unit on teachers' evaluation of their potential. Criteria for placement also varied, although a gap of one and a half to two years or more between reading age and chronological age was usually accepted as a minimum requirement for entry. As the reading tests varied, this criterion lent itself to different interpretations. It became apparent that a child with a reading age of five years on the Burt would often score higher on the Neale, due to the nature of the test. Therefore, loose criteria were accepted. There was also lack of

agreement with respect to which children would benefit most from a resource of this sort, some psychologists arguing that children with IQs of 80-85 would be good candidates and also needed to be taught to read to the best of their ability, whilst other psychologists argued that any child with an IQ in the range of 85-90 upward should be selected. The final selection therefore was a compromise solution.

As a result, at the beginning of the study, in order to ascertain which children were Specifically Reading Retarded (SRR), a short form of the WISC and a Neale Analysis of Reading Ability (Accuracy and Comprehension) were administered to all boys within the age range covered by Yule's tables (Yule, 1967), that is, between 9-0 and 12-5. The study was limited to boys because of reasons outlined in Chapter 3. As Koppitz (1975) points out in Volume II of the Bender-Gestalt Test for Young Children, girls are less often referred for learning difficulties than boys as they seem to adjust better to their difficulties within a school situation. As a result, those girls who are referred tend to be a different population and have more severe problems. Other investigators have pointed out the greater variability amongst girls and the greater difficulty of predicting outcomes.

Twelve boys in the two Opportunity Classes were found to meet the criteria for SRR as outlined by Yule (1967). At the time of testing, they ranged in age from 8-11 to 10-11 with a median age of 10-5. Reading ages ranged from 6-11 to 8-5 for accuracy with a median age of 7-5,and for comprehension a reading age of 6-6 to 8-11 with a median of 7-10. Discrepancies between chronological age and reading age ranged from 18 to 45 months for accuracy with

a median of 33.5 and 7 to 47 months for comprehension with a median of 28.5. IQs (WISC short form) ranged from 98 to 118 Full Scale (Mean of 105.7), 88 to 122 Verbal (mean of 105.5) and 89 to 125 Performance (Mean of 108.2). (See Table 1, p.97)

Remedial Provision in the Opportunity Classes

The three Opportunity classes catered for 3 separate age groups, the first for top infants and first year juniors, the second for second and young third year juniors and the third for older third year and fourth year juniors. The classes were sited within two of the junior schools, and children were bussed from their homes to school each day for a full academic year, from September to July. As they came from a variety of schools, most of them did not know each other at the beginning of the school year. The classes were quite separate from the rest of the school, in one case held in a demountable classroom or hut in the grounds of the school, and in the other case, in a fairly remote classroom on an upper floor of the school. The Opportunity class children did not engage in activities with the rest of the school and were not usually included in sports teams, plays or concerts, although technically they were on the roll of the school where the special classes were sited. This presented problems when there were shared activities such as dinner and playtime. In later years an effort was made to integrate the children and to include more shared activities, and also to integrate the teachers of the units, who were given an opportunity to participate in non-Opportunity class teaching when the occasion arose.

Within their own classrooms, the Opportunity classes were fairly self-sufficient. There was a class library with books clearly marked for reading level, so that children could choose books with a fair degree of confidence in their ability to read them. There was water so that they could engage in crafts and in some cases there was an oven so that they could cook some food. There also was ample space for circulating, for study and for arts and crafts.

The teachers of the classes had all had some training in teaching children with reading difficulties. They were all experienced teachers who were chosen not only for their expertise in teaching language skills, but for their sympathetic attitude toward children who often exhibited shyness, inability to articulate their needs and a poor self image. Teachers were supportive while continuing to provide a good teaching model and structure for growth.

Teaching tended to be fairly traditional with a great deal of emphasis on development of language skills through the child's own experiences. Therefore, opportunities were provided for children to discuss, plan, and take trips to various places and then to write about what they did. There were also a number of reading schemes which the children worked through as well as sentence building devices. There was little or no reliance on computers or on other mechanical devices, the teachers preferring to talk and read to the children and elicit language from them. A great deal of creative play was used, with puppets or games, and arts and crafts sessions were also used to discuss projects in small groups.

Although mis-cue analysis was used, there was little effort made to design specific programmes for individual children. Detailed information on the childrens' strengths and weaknesses was not generally provided before or during placement, and no intensive screening was made before the children entered the Opportunity Class. There was no use of criterion referenced testing, nor of programmes which make use of task analysis and direct teaching of decoding. Instead, the emphasis has been on a language approach which, as Williams (1979) points out, has come to be used for meaning emphasis and which has more to do with issues of comprehension.

The teachers continuously evaluated the children through their work and by the use of various word reading tests and kept records of their progress. Because they measured the progress the children made by comparing their reading ages at the beginning and end of the year in the class, it often looked as though the intensive remedial year had been a success. There was little or no opportunity for the teachers to follow up their pupils once they had left the Opportunity class. Also, because the approach itself was so general, and because there was no information about the specific needs of the children in the class, this sort of evaluation would be meaningless in terms of trying to establish the benefits of this sort of remedial provision for children with particular problems. It certainly did not meet Yule's (1976) criteria of well conceived methods with a theoretical basis and a well selected and described group of remedial readers. In fact, it probably subscribed to the same eclecticism which Yule condemns as useless in the circumstances.

Although it does seem to stress those activities which would foster comprehension more than accuracy in reading, it did provide an environment which was supportive, non-stressful and which capitalised on the childrens' strengths rather than highlight weaknesses, as Gentile et al. (1985) suggest a remedial programme should do.

6b Control Groups

The control groups were all chosen from primary and JMI schools in the same town, and often from schools which had sent children to the Opportunity Classes. The schools were organised in many different ways. Some were fairly traditional, with vertical grouping. Others were in open-plan schools, and had team teaching as an integral part of the curriculum, allowing for more flexibility, and use of quiet rooms for small group work. One of the infant schools had family grouping in all infant classes. Classes had between 25-30 children in mixed ability groups.

In some schools there was limited provision for remedial work, with a peripatetic remedial teacher, once or twice a week, for two hours. In others, the headteacher would hear children read, and spend more time with those needing extra work. All schools had libraries, with a selection of books at various reading levels in the classrooms.

I- Poor Readers

A control group of twelve boys who were poor readers but not in the special unit was selected from a number of schools in the area. Head teachers of junior or primary schools were asked to recommend boys between 9-0 and 11-11 years of age who were doing very poorly in reading and who appeared to be of average or better intelligence. Forty boys were referred and out of these, twelve who were found to meet the criteria for SRR as measured by the WISC (short form) and the Neale were randomly selected. At the time of testing, they ranged in age from 9-0 to 11-0 with a median age of 10-4. Reading ages ranged from 6-6 to 8-2 for accuracy with a median age of 7-7, and 6-3 to 8-11 for comprehension with a median age of 8-7. Discrepancies between CA and RA ranged from 12 to 41 months for accuracy with a median of 33.5 months and from 5 to 42 months for comprehension with a median of 25.5 months. IQs ranged from 89 to 119 Full Scale (Mean of 103), 85 to 114 Verbal (Mean of 95.5) and 89 to 157 Performance (Mean of 112). (See Table 1, p.97)

Two other control groups were selected, a group of nine year olds whose reading age matched their chronological age, (that is, they had no reading problems), and who were the same chronological age as the SRR groups, and a group of seven year olds whose reading age also matched their chronological age, but who were of the same reading age as the SRR groups. These two groups were selected in order to examine the reading progress of normal seven and nine year olds in order to ascertain whether the poor readers more closely approximated the progress of their CA cohorts or their RA cohorts.

TABLE 1

Chronological Ages, Reading Ages and IQ Scores of the Four Groups of Boys in the Study

	Opportunity Class SRR N=12	Control Group SRR N=12	Control Group 9 year old good readers N=12	Control Group 7 year old good readers N=12
CA				
range	8-11 to 10-11	9-0 to 11-0	9-4 to 10-8	6-11 to 7-5
Median	10-5	10-4	9-10	7-3
RA Acc				
range	6-11 to 8-5	6-6 to 8-2	8-10 to 10-10	6-2 to 8-11
Median	7-5	7-7	9-5	7-5
RA Com				
range	6-6 to 8-11	6-3 to 8-11	8-8 to 12-7	6-3 to 8-10
Median	7-10	8-7	10-5	7-5
IQ FS				
range	98 to 118	89 to 119	95 to 118	93 to 121
Mean	105.7	103	105.8	105.2
VIQ				
range	88 to 122	85 to 114	94 to 119	88 to 121
Mean	105.5	95.5	109.9	102.7
PIQ				
range	89 to 125	89 to 157	80 to 125	91 to 140
Mean	108.2	112	102.7	109.1

II- Nine to eleven year old good readers

A group of twelve boys was selected from a variety of junior and primary schools after screening, using the WISC (short form) and the Neale. At the time of testing, their ages ranged from 9-4 to 10-8 with a median age of 9-10. Their reading ages ranged from 8-10 to 10-10 for accuracy with a median of 9-5, and from 8-8 to 12-7 for comprehension with a median of 10-5. Their IQs ranged from 95 to 118 Full Scale (mean of 105.8), 94 to 119 Verbal (mean of 109.9), and 80 to 125 Performance (mean of 102.7). (See Table 1, p. 97).

III- Seven year old good readers.

A group of twelve boys was selected from a variety of infant and primary schools, after screening with the WISC (short form) and the Neale. They ranged in age from 6-11 to 7-5 with a median age of 7-3. Their reading ages ranged from 6-2 to 8-11 for accuracy with a median of 7-5, and 6-3 to 8-10 for comprehension with a median of 7-5. Their IQs ranged from 93 to 121 Full Scale (mean of 105.2), 88 to 121 Verbal (mean of 102.7), and 91 to 140 Performance (mean of 109.1). (See Table 1, p. 97).

6c Measuring Instruments

Two sets of measures were used. The first set served as a screening device in order to pick out those children who met the criteria for SRR in the Opportunity Class and in mainstream

classes. The screening measures were also used to identify two other groups of children, seven and nine year olds, who had comparable IQ scores to the SRR group but whose RA=CA. In order to test hypotheses relating perceptual motor problems, motor impairment and emotional problems to reading retardation, tests measuring these variables were also used in screening the 4 groups of children. In all, six tests were used in screening, the Wechsler Intelligence Test for Children (short form), giving verbal, performance and full scale IQ scores, the Neale Analysis of Reading Ability (Accuracy and Comprehension), analysis of errors, Bender-Gestalt test of Perceptual Motor Skills, Stott-Moyes-Henderson Test of Motor Impairment, Bristol Social Adjustment Guides (BSAG) and Rutter Childrens' Behaviour Questionnaire (CBQ), the last two as measures of emotional adjustment.

The second set of tests was used to measure change over a period of 12 months, and consisted of retest measures of reading using the Neale (Accuracy and Comprehension) and error analysis, and a second set of BSAG and CBQ scores to measure changes in emotional adjustment.

I- Wechsler Intelligence Test for Children (Short Form)

This intelligence test was chosen in order to be able to use Yule's criteria for determining children with SRR. It was developed in the United States by David Wechsler in 1949, was a downward extension of the WAIS, and was standardised on a sample of 100 boys and 100 girls at each age from 5 through 15, making a

total of 2200 cases. Reliability coefficients using the split half technique were .88 to .96 for VIQ (older age groups having greater reliability) .86 to .90 for PIQ and .92 to .95 for FSIQ. In a review of the WISC-R in the Eighth Mental Measurements Year-book (1978), Freides comments that his original criticism of the WISC is still applicable to the new test; that is, that the theoretical approach to the concept of intelligence falls between Spearman's g and Thurstone's s with specific scales measuring specific aspects of intelligence, but a general score at the end which is supposed to represent the overall capacity of the individual to understand and cope with the world around him. Freides feels that this is not a drawback of this particular test, but a confusion within the field of measurement of intelligence itself. Wechsler comments that intelligence should not, however, be equated with intellectual ability.

Although the WISC-R had been published very recently when the study was undertaken, the WISC was used in order to be able to make use of Yule's previous research with children with SRR and to make use of the tables of expected reading ages derived from the short form of the WISC. Over the years, various short forms have been devised, using correlational data between each subtest and all other subtests and between subtests and the verbal, performance and full scale IQ scores (Clements, 1965, Silverstein, 1967,1970). Correlations for the best tetrads range between .93 and .89. Yule (1967) used a short form based on Maxwell's (1959) factor analysis of Wechsler's original data. In addition, short forms of the WISC-R had not yet been tried either clinically or in research studies, so that it was not possible to equate scores on the new test with those on the old. Sattler

(1982) comments that the two best scales for use as short forms of the test are Vocabulary and Block Design as they have a high correlation with FSQI, have consistent reliability and are a good measure of g. He felt that a short form was adequate for screening or research purposes but should not be used for classification or detailed assessment.

Research in reading retardation and remediation has supported the view that retarded readers had lower verbal than performance IQ (McLeod,1965, Hunter and Johnson, 1971, Yule, 1979) As the WISC measures verbal and performance factors separately, it appeared to be a good instrument for examining the relationship between the acquisition of reading and verbal and non-verbal skills.

II- The Neale Analysis of Reading Ability (Accuracy and Comprehension)

This reading test was chosen in order to be able to use Yule's criteria for determining children with SRR. It was also felt that a reading test which measured both accuracy and comprehension would yield more information on the nature of the reading process and on the actual growth in reading skills of the children than a word reading test. It provided a realistic situation in which reading normally takes place. Context is an important adjunct in the reading process and as many researchers (for example, Vellutino, 1977, Smith, 1977) have pointed out, cannot be separated from the process of decoding graphemes or phonemes in the acquisition of reading skills.

Although at the upper levels of reading some of the nine and ten year old good readers began to reach the ceiling of the Neale, none of the sample obtained a perfect score. Yule (1973) in fact, continued to use the Neale with a group of older children (aged 13 to 15) in a follow-up study of a group of backward and retarded readers originally tested at ages 9 to 11. He felt justified in using the Neale on the grounds that they were most interested in the tail of the distribution which contained the poorest readers.

Brimer (1965) was highly critical of the Neale in a review in the Mental Measurements Year-book. Brimer stated that there was no account given of the criteria or methods adopted for statistical analysis in test construction, and no rationale for including three different measures from a single reading performance. The test allows rate, accuracy and comprehension to vary together in an uncontrolled way. Inaccuracy reduces reading rate and successful attempts are limited in the interest of rate. Comprehension is measured through recall and may depend on rate. Reliability for accuracy with parallel forms is good (.96), whilst reliability for comprehension is lower but good. Validity was established by factor analytic studies of the performances of nine and 11 year old children, but details of methods and results are not give. The standardisation sample was over 2000 children, but there is no information on size of schools, area, social background, ages and sex, other than to say that they were controlled. The standardisation sample turns out to be small because it was distributed over three forms and seven year groupings, which gives 200 for each year for form A and less than

100 for forms B and C. Norms are given in the form of reading age only and no account is given of the method used to derive the norms. Although reading ages ascend reasonably smoothly with scores, there would be some difficulty because of the use of discrete ceiling levels which would tend to produce uneven trends in the increase of score with age. Brimer concludes that there are failings in construction, standardisation and test reporting.

Vernon (1965), in a slightly more positive vein, states that the test is satisfactorily constructed except that the sixth passage in each form is too difficult even for older children to understand. There were no children over the age of eleven tested in the standardisation sample so that reading age is based on extrapolation above 11-10 for rate and comprehension and 11-11 for accuracy. Vernon points out that validity was assessed by pooling the scores for rate, accuracy and comprehension and comparing these pooled scores with the Ballard One Minute Reading Test and other tests to obtain a correlation of .95. No reason was given for not computing separate correlations. Validity for comprehension is not satisfactory according to Vernon, and she concludes that the test is not clearly superior to any of the existing tests and not adequate for diagnostic purposes.

A third review (1958) in the British Journal of Educational Psychology states that the Neale provides better individual assessment of reading comprehension for reading ages 6 1/2 to 13 than any other presently available. It covers word pronunciation from 6 to 12 1/2 as reliably as any graded word vocabulary test. The tests have been carefully standardised and shown to have good reliability, but it should have had percentile or deviation norms

for each age group instead of scoring purely on reading age.

Andrews and Elkins (1971) in studying the Neale with lower grade primary school children in Queensland had these comments to make. They felt that there were discrepancies between accuracy and comprehension scores using the published norms and accuracy and comprehension scores on other tests of oral reading. They state that these inconsistencies can partly be explained by the nature of the scoring procedure where testing is discontinued after a certain number of errors are committed, whereas if the test was allowed to continue, the child might have gotten some clues to comprehension questions based on what he could read. The authors point out the need for regular revision of test scores and the need to check the suitability of norms for each educational setting.

III-The Bender Gestalt Test

This test was used in order to measure visual motor development. The Koppitz scoring of the Bender was used with norms established in 1975 based on a sample of 975 children aged 5 through 11-11. Test retest reliability ranged from r=0.50 to r=0.90 with a median r of 0.77. Interscorer reliability ranged from 0.79 to 0.99 with a median of 0.91. Validity varied and Sattler (1982) commented that for children over 8 years, the Koppitz scoring system only distinguished those with below average perceptual-motor development, as near perfect performance falls within the normal range at this age. Concurrent validity varies. With the Frostig Test it ranges from 0.39 to 0.56 with a median of 0.47.

With the Beery it is 0.82 and with tests of intelligence it varies from -0.19 to -0.66 with median of -0.48. Again the Bender varies in terms of predicting reading achievement. Correlations range from -0.17 to -0.57 with a median of -0.29. Concurrent validity with reading measures ranges from r= -0.14 to -0.58 with a median of -0.32. The Bender should not be used as a screening instrument for reading proficiency.

Silver (1968) stated that 92% of children he investigated who had reading disability showed some visual motor defects as measured by the Bender. This reached statistical significance in difficulty with angles, especially in cards A and 4, a tendency to verticalize diagonals in card 2, primitive responses, that is, loops for dots on cards 1, 3 or 5 and the use of cues such as using the margin of the paper or the edge of a previously drawn figure. Silver says that the general performance is at a more immature level than that expected from the intelligence and age of the child. Keogh and Smith (1967) examining the relationship between visual-motor ability and school achievement over a seven year elementary school period found the Kindergarten Bender a useful predictor of educational achievement in grade 6 (r=-.51), but found it did not correlate as well when third grade Benders were compared with sixth grade achievement. They felt that the limited range of Bender performance at age eight makes it a less discriminating test at third grade level. This is substantiated by Koppitz (1975) who states, "In retrospect I seem to have overestimated in earlier studies the significance of visual-motor perception for school achievement...One cannot neglect other equally important factors especially language development, oral-visual integration, sequencing, recall of symbols and information

and concept formation." Koppitz states that a good Bender at the time of school entry tends to be a good predictor of later school success, but it is also associated with good intersensory integration and good mental ability. A poor Bender may be associated with good, average or poor achievement. Both reading and Bender test performance are greatly influenced by a child's age and mental ability. Once the subjects in an investigation are matched for age and IQ score, the relationship between reading and the Bender disappears. However, Koppitz also states that normal pupils tend to show a marked spurt in learning and achievement at age eight when the Bender score is three or four. Learning difficulty pupils (not necessarily reading retarded), of average or above average verbal ability do not show real progress until age nine, and also show a marked improvement in the Bender at that age. Children with learning difficulties who have low average IQs don't show an improvement in the Bender or in achievement until 10 1/2 to 11 years.

IV-Bristol Social Adjustment Guides

This was one of two measures of school behaviour used, both of which were scales to be filled in by teachers. It has been recognised by most researchers in the field of reading retardation, that there is a relationship between reading problems and emotional and behavioural difficulties. Children with reading problems have been described as hostile and aggressive (Spache, 1976), lacking in concentration and self-confidence (Collins, 1961), anxious and maladjusted in school (Bullock, 1975), and antisocial (Yule, 1979), as well as

generally emotionally unstable (Guthrie 1976). A measure of emotional stability, in school, as reported by teachers' rating scales would provide information on (a) the types of emotional problems experienced by children with SRR and by normally reading children and (b) whether there were differential gains dependent upon types of emotional difficulties.

Definitions of Relevant Subscales of the BSAG

Under-reaction

UA and UB Unforthcomingness
WA and WB Withdrawal
DA and DB Depression
RA and RB Non-Syndromic Under-reaction

Over-reaction

Inconsequence

QA Distractible and Impulsive
QB Hyperactive and Showing Off
QC Attention-seeking

Hostility

HA Moody, sullen
HB Provocative
HC Aggressive

Peer Maladaptiveness

PA Aggressive and Domineering
PB Lack of Control and Unpopular

Non-Syndromic Over-reaction

VA (Delinquency and Peer group deviance)
VB (Defiance of Social Norms

In the manual of the 5th edition of the Bristol Social Adjustment Guides entitled The Social Adjustment of Children (1974), Stott includes test-retest and internal consistency reliability coefficients. These are as follows:

Scale	Test-retest	Internal consistency
Underreactive	.74	.83
Overreactive	.77	.91
Unforthcoming	.67	.74
Withdrawn	.47	.59
Depressed	.54	.65
Inconsequential	.71	.83
Hostile	.67	.80
Peer maladaptive	.61	.76
Non-syndromic OR	.72	.67
Non-syndromic UR	.61	.57

Total test-retest reliability coefficient was .80. Stott states that scales measuring degree of over-reactiveness correlate -.34 with reading attainment, which is significant at the .05 level.

Morris (1966) reported a general tendency toward consistency of ratings in a two year study of standards and progress in reading. Morris states, "The results are interesting because as Stott points out, one serious objection often raised against the use of these instruments is that they may reflect the attitude of the teacher to the child as much as the child to the teacher." Morris drew up a composite score to distinguish between groups of good and poor readers which included a minimum combined score on the BSAG of ten for unsettled and maladjusted, a minimum of four for any syndromes indicating unforthcomingness, depression, anxiety for adult attention, hostility to adults, indifference to adult figures, restlessness and withdrawal. The author found

that there were highly significant differences between the two groups. On average, children in the poor group had eight attributes and children in the good group had three. The BSAG was felt to be a good instrument for examining the emotional differences between good and poor readers.

However, Yule (1976) states that the BSAG is a scale with little demonstrated validity, as there is no evidence as to how it relates to other indices of maladjustment. He feels that the BSAG groups syndromes of under and over-reactivity in an idiosyncratic way so that it is difficult to see if the scales are categorising the children or their behaviour. He points out that the conclusions are based on too many methodological and computational errors. Factor analysis was not used to construct the scales and items were shifted from one subscale to another in the revision.

V-Children's Behaviour Questionnaire

Rutter (1967) developed a Behaviour Questionnaire with 26 statements to which the teacher could answer 'certainly applies', 'applies somewhat', or 'doesn't apply'. These were given weighted scores of 2,1 or 0 to produce a total score ranging from 0 to 52. Two subscores could be extracted, a neurotic subscore containing items 7, 10, 17 and 23, and an anti-social subscore containing items 4, 5, 19, 20 and 26. Children with a total score of 9 or more are designated as showing some disorder. Test retest reliability was .89, interrater reliability was .72 and validity between .8 and .9.

Booth and Taylor (1973) did a follow-up of children with high or fluctuating scores on the CBQ and found that significantly more of the high scoring group of children were felt to be underachieving in classwork. Only two in the variable group were underfunctioning. Behar and Stringfield (1974) extended the Rutter scale for use with the pre-school child by adding 10 items. Thirty of their original 36 items differentiated significantly between normal and deviant children. The authors state that the scale offered interesting possibilities as a research tool to measure such variables as change as a result of intervention or similarities or differences in subject groups.

Rutter, et al (1975) used the CBQ to compare two samples with regard to prevalence of psychiatric disorders. They compared children on the Isle of Wight with children in an Inner London Borough and found that using the cut-off point of 9 as signifying deviance, the Inner London Borough sample was significantly more

deviant that the Isle of Wight sample ($p < .001$). In a follow-up study one year later in order to establish the validity of the questionnaire, it was found that 60% of the children who were originally classified as deviant were rated as being disturbed by their new teachers.

In a report on the Isle of Wight studies in 1976, Rutter et al. reported that the teacher's scale is a reliable and valid instrument useful for either screening purposes or group comparisons. It produces a worthwhile differentiation between varieties of deviant behaviour. They found high scores on the Rutter more common in boys and in young children and felt that the latter was due to the fact that secondary school teachers don't know children very well. The London study also indicated that SRR showed a strong association with disorders of conduct.

VI-The Stott-Moyes Henderson Test of Motor Impairment

This test was used to measure motor proficiency. Investigators have found that some reading retarded children have minor motor incoordination (Johnson et al. 1967), orientation problems (Silver, 1968) minimal brain dysfunction (Sapir and Wilson, 1972), or impairment of neurodevelopmental functions (Rutter and Yule, 1973). In the Isle of Wight study (Rutter et al. 1967) a modified Oseretzsky test was used to measure motor impairment.

Stott (1966) tried to validate the Oseretzsky in order to pick up cases of subclinical spasticity. He found that much of Oseretzsky's test was unsuitable, though it sampled a wide range

of motor functions. Stott felt that a study of motor impairment was valuable in estimating the part that neurological dysfunction plays in other conditions such as dyslexia and behaviour disturbance. In this he assumes that motor impairment is wholly or to a great extent due to neurological dysfunction. He states that a test of motor co-ordination, because it requires exact time sequencing, reactions to exteroceptive cues and accurate muscle control would show whether there were neural disturbances and may be the best means by which neurological factors in behaviour disturbance may be demonstrated.

The prime criterion for item choice in the TMI is that motor impairment should be attributable to neural impairment as it is the most difficult to diagnose. Stott prefers the term neural impairment to minimal brain damage as there is often no direct evidence of brain damage while neural impairment may be due to immaturity, toxicity, hormonal disturbance, malfunction or hypoxia as well as tissue damage. His definition of neural impairment is "a failure to control or co-ordinate simple actions, without discernible physical disability." Stott tried to find items which would be non-discriminating in other areas such as perceptual, intellectual, motivational or muscular, so tolerance levels of spatial judgement, muscular strength and intelligence would have to be just above that of obvious incompetence. He needed also to find a realistic cut-off point which would be established by some independent criterion and tried to do this by observing populations of children who might be clumsy, write poorly, etc. Norms would be established separately by sex as "boys are more prone to everything from feeblemindedness...to asthma." He made the test identical for

both sexes avoiding any activity which would give a cultural or physical advantage to one sex or the other such as the use of scissors or throwing a ball from above the shoulder. There was also a need to reduce cultural factors such as unfamiliarity with apparatus or task and tasks were varied qualitatively from one age level to another.

The Oseretzsky test proved to be much too long, but it had sufficient validity to justify its use as a starting point for the construction of a new test of motor impairment. Stott felt that each item would have to be evaluated and validated on its own. There were 19 new tasks substituted, 6 of the original tasks were modified or the criterion for pass/fail made more precise, 14 tests were transferred to other categories or age groups, and 11 of the original Oseretzsky items were left unchanged so that less that 40% of the original has survived.

Pander (1978) reviewed the Stott-Moyes-Henderson Test of Motor Impairment in the 8th Mental Measurements Year-book. He felt it was a carefully and well constructed test. There are in the finished product 45 items with norms based on 854 children between ages 6 and 15 attending 31 schools in Ontario. It is not clear how many of these there are in each age group or of each sex. There are five items at each of 9 age levels,(age 4 and lower, ages 5 through 10 at yearly intervals, a combined ages 11 and 12 and a thirteen plus level). At each level one item is devoted to each of five categories of motor function: (a) control and balance while the body is immobile; (b) control and co-ordination of the upper limbs; (c) control and co-ordination of the whole body while in motion; (d) manual dexterity with

emphasis on speed; (e) simultaneous movement and precision. Instead of having items with successive difficulty for successive years, the task within each category of motor functioning changes from age to age so that culturally determined difficulties or other experientially related problems with one specific action will not unduly penalise a child across several year levels. The manual is clear.

Test-retest reliability is difficult to determine, as there is no complete table of scores for the entire test. A test-retest of scales one and three on the third revision using 24 children yielded correlations of 0.89 to 0.99. Another test-retest was done with 15 children referred to a Learning disabilities Centre and yielded percentage scores of 91.4 for scale one, 96 for scale two, 84.4 for scale three, 78.3 for scale four and 100 for scale 5. A test- retest on 20 of the tasks (not specific for scale) was done on the second revision using 6-8 year olds and this yielded an overall correlation of 0.71. There is a close correlation between the TMI and teachers' ratings of motor ability (0.85 to 0.93) and a significant correlation between motor impairment and several categories of the BSAG. This is important for Stott's argument that at least some aspects of maladjustment are related to subtle neurological impairment and the TMI serves as an independent measure of this. It has considerable face and content validity.

Lovell and Gorton (1968) used the TMI as part of a battery of tests studying some differences between backward and normal readers of average intelligence. They state that there are differences between backward and normal readers of average

intelligence on visuo-spatial and neuro-psychological tests indicating a greater degree of neurological impairment in backward readers. In their study there were significant differences in favour of good readers in tests of motor impairment. Lovell and Gorton then factor analysed the two groups of results and this indicated that 46% of the poor readers' variance could be accounted for by the factor 'neurological integrity' which includes motor performance They are careful to point out that this doesn't prove that reading failure is caused by some specific neurological impairment, but in many backward children, such impairment and reading skill are linked. They feel that their analysis of the data demonstrates why the literature tends to be confused when single tests are given to normal and backward readers and only the differences between the means of the groups is considered.

Whiting, Clarke and Morris (1969) did a clinical validation of the TMI. They used two settings. The first was a clinical setting in which 106 children referred to a pediatric clinic for a variety of reasons were tested. Some were referred because they were suffering from some form of motor impairment and others were not. Testers were not told of the paediatrician's diagnosis until after the testing. There was a significant difference between the paediatrician's diagnosis of motor impairment and the results on the TMI ($p < .02$). Four patients were diagnosed as impaired by both, one diagnosed as impaired by the TMI and not by the paediatrician, three diagnosed as impaired by the paediatrician and not by the TMI. The remainder were not impaired. The second setting was a Child Guidance Clinic and 10 children attending for remedial teaching and noted by the

parents, teachers or psychologists as being clumsy or having some form of motor disorganisation were tested,. Again, the tester did not know which of the children were the identified ones as they were included in a group being tested at schools with three or four other children in their classes. Again, the difference between the subjective evaluation and the Stott was significant ($p < .02$) Six children were found to be not impaired by the TMI and four agreed with the subjective evaluation. Of the four 'positives' picked up by the TMI, no significant abnormalities had been recorded by the paediatrician on examination. There was some overlap between the paediatrician and the TMI., but the test failed to define the particular area of impairment that was expected. This may reflect a failure of the diagnosis, poor test validity or both. The factor structure of the test might be in error as balance, for example, includes static balance, dynamic balance, and balance of an object which are independent of one another. The authors also found that giving three items of the test was as effective as giving all five. The TMI did identify a 15 year old as impaired and pin-pointed the areas of impairment when they had not been suspected. The follow-up examination supported Stott's findings. The test failed to screen out 6 of the 10 children designated clumsy by their parents or teachers and this was an area in which Stott had felt the test would prove particularly useful.

6d Collection of the Data

All four groups of boys were given the WISC (short form) during the latter part of the autumn term or the beginning of the spring term (except for one child in the Opportunity Class and three in the poor reader control group who had been tested at the very end of the previous summer term). At the same time, they were given the Neale Analysis of Reading Ability (Accuracy and Comprehension) forms A, B, or C.

The groups were tested with the Bender Gestalt test and the Stott-Moyes-Henderson Test of Motor Impairment during the spring term. These were grouped to give comparable results for visual-motor integration and Motor impairment, which are both said to be indicators of minimal brain dysfunction or neurological impairment.

The teachers were asked to fill in a Childrens' Behaviour Questionnaire (Rutter, 1967) and a BSAG (Stott, 1966), toward the end of the autumn term when they had begun to get a clear picture of the children; however, some teachers either forgot or lost the forms and so for some children this information was not gathered until April or May of the following term.

The four groups of boys were re-tested, using the Neale in order to measure reading gains after four terms. Some members of the older groups had moved on to comprehensive school and it was felt that an extra term was needed to allow them to settle into a new environment, thus records were not taken in the autumn term. At the same time, teachers were asked to fill in a CBQ and a BSAG.

Returns on these again fluctuated and were received between February and July. Two children had moved away from the area, one from the Opportunity Class group and one from the seven year old control group, and forms were sent to psychologists in their areas. Both of these colleagues tested the children with the Neale and had the teachers fill in the CBQ and the BSAG. One boy in the control poor readers had moved into a boarding school for maladjusted children and was tested with the Neale during his time home during half-term. His teacher at the boarding school filled in the behaviour ratings.

6e Treatment of the Data

I-Screening Data

In order to determine if there were significant differences between the four groups at the outset of the investigation, an analysis of variance was performed on the short form WISC scores, the BSAG under and over-reactive subscores, the CBQ neuroticism and antisocial subscores as well as the total CBQ scores, the TMI total scores, the Bender Gestalt raw scores, and the Neale reading ages for accuracy, comprehension and silent comprehension scores. Comparisons of means of those analyses of variance which proved significant was performed using the Newman-Keuls method.*

*B. J. Winer, Statistical Principles in Experimental Design (New York: McGraw-Hill Book Company, Inc., 1962), pp. 80-85.

An examination of errors in the Neale Accuracy test was also made between the three groups of boys reading at the 7 year level, using Neale's categories of mispronunciation, substitution, refusal, additions and reversals, as well as two extra categories, graphic and grammatical substitutions. Chi square tests were done in order to determine whether patterns of reading errors for the three groups were significantly different from one another.

An item analysis of the CBQ was done, comparing the means of each of the four groups on each item of the CBQ with a t-test. The groups were also combined, and the mean of the combined SRR groups was compared with the mean of the combined good reader groups. In order to determine if there were significant differences between the groups, a t-test was done. Individual scales within the broader categories of the BSAG were also examined using chi square tests to determine whether there were significant differences between the groups on any of these subscales.

A comparison of the four groups of readers on each of the TMI scales was made, using the chi square test in order to see if they differed significantly from one another on any individual scale.

An item analysis of the Bender-Gestalt test was done, in order to see whether there were differences in the types of errors committed by each of the groups.

II-Retest Data

In order to determine whether there were differences in reading age for accuracy and comprehension between the four groups at the end of the study, an analysis of variance was done on the reading ages for accuracy and comprehension on the Neale scores which were gathered 4 terms after the first set of data. Comparisons of means of those analyses of variance which proved significant was performed, using the Newman-Keuls method.

In order to examine the relationship of IQ to gains in reading age in the SRR groups, an analysis of the results of the Neale comparing the screening test with the retest scores of the SRR groups was also done, looking at the mean gains for comprehension and accuracy of those children with Verbal IQs above and below 100. A t-test was done in order to determine whether there were significant differences between the means.

An analysis of the reading errors of the four groups was also done, using the same categories as were used with the screening data. Chi square tests were done in order to determine whether patterns of reading errors for the four groups were significantly different from one another. The screening and retest scores were also examined in order to determine whether there were shifts in the patterns of reading errors in each of the groups.

Analyses of variance were also performed on the BSAG under and over-reactive subscores, and on the CBQ neuroticism, antisocial and total scores in order to determine whether there were any differences between the groups in terms of how they were rated on

their behaviour by teachers at this stage in their school careers. The means of those analyses which proved significant were examined using the Newman-Keuls method. Individual scales within the broader categories of the BSAG were also examined, using chi square tests to determine whether there were significant differences between the groups on any of these subscales. An item analysis of the CBQ was made, comparing the mean of the combined groups of SRR boys with the combined mean of the good readers on each of the items in which any group scored, using a t-test to determine if there were significant differences between the two groups in any of the items. A comparison of screening and retest scores on the individual subscales of both the under and over-reactive scales of the BSAG as well as the total under-reactive and over-reactive scores was made, and on the CBQ antisocial, neurotic, and total scores, as well as individual items in order to determine whether there were shifts in the behaviour ratings of the children in each of the groups.

A detailed examination of those children in the SRR group who demonstrated gains in reading in comparison with those who showed no gains was done, using the formula O-E, where O is the observed reading age predicted by Yule's regression formula and E is the expected reading age. Difference scores for each child were computed for both the screening and retest scores for accuracy and comprehension and the difference between screening and retest differences computed for each child in order to arrive at an adjusted gain score. These were then examined across screening scores on the behaviour rating scales in order to determine whether those who made progress had been rated differently from those that did not make progress or made a loss when they were

rated at the beginning of the study. Means of the two groups (gain and no gain) were compared for BSAG under and over-reactive scales and for CBQ antisocial, neurotic and total scores using t-tests. Similar comparisons were made with retest scores on the BSAG and CBQ to determine whether there were differences in the behaviour of those boys who made progress as compared with those who did not, as judged by their teachers at the end of the study.

The adjusted gains scores were then examined separately for each group of SRR boys, the Opportunity Class and the controls, each divided into those who had made gains in accuracy and comprehension and those who had not, across the means of the BSAG under and over-reactive scales and the CBQ antisocial, neurotic and total scores for both screening and retest scores, in order to determine whether there were differences in behaviour within each group in terms of those children who made gains and those who did not. Again, t-tests were used to determine if there were significant differences between the means of the groups.

CHAPTER SEVEN

RESULTS

Before describing the results of the study, the following issues will be addressed:

1) Observer bias-examiner and teacher,
2) Chance significance of data,
3) Interaction of examiner with children.

Observer Bias

It must be emphasised at the outset that the examiner was aware of the identity of the children in the groups. However, decisions to place the children in the Opportunity Class or in mainstream classes was not taken by the examiner, but exploited for the purposes of the study. Teachers were aware that certain children in their classes were taking part in a study. The Opportunity Class teachers were accustomed to the examiner assessing the childrens' reading at various times and welcomed the additional information on other correlates which were tested. They were unaware of comparisons being made between the children in their classes and mainstream Specific Reading Retardation (SRR) children. Mainstream teachers were informed that a study of reading acquisition was being done with good and poor readers as subjects, but again, no mention was made of comparisons between Opportunity Class and mainstream SRR children.

Chance Significance of Data

In a study of this type where many measures are repeated over time with many scores, some will reach statistical significance by chance alone. In order to protect against this, conservative measures were used and most analyses were based on prior hypotheses.

Interaction of Examiner with Children

All of the boys in the study were cooperative throughout. The examiner was a familiar sight to the Opportunity Class children as she visited the class often. Children in mainstream schools were less accustomed to seeing the examiner, but were not upset at being seen individually. In fact, they appeared to welcome the individual attention. The good readers enjoyed the opportunity to demonstrate their skills, and the poor ones seemed quite used to having other people listen to them read. As good readers were chosen from a variety of mainstream schools, they were unlikely to be able to prime each other on the questions from the WISC. This would have been more likely with those Opportunity Class children who had to be seen at the beginning of September, once they were in the Opportunity Class. Most, however, were seen at the end of the previous summer term, when they were still in their original schools. Again, it would have been unlikely at the end of the study, as all Opportunity Class children had returned to their various mainstream schools. All of the boys very much enjoyed the less cognitive aspects of the assessment, ie., the Bender-Gestalt test and the TMI.

Examination of the Results

This chapter will be divided into the following sections. Screening results will describe the groups at the beginning of the study, in order to examine how the Opportunity Class boys both differed from and were similar to their chronological and reading age cohorts and SRR controls. Retest results will be a description of the groups at the end of the study. Comparisons both within and between groups will be made, looking particularly at those factors which remained stable and those which changed.

The study also set out to explore the relationship between reading improvement and differences in intelligence, in perceptual motor ability, in motor impairment and in emotional stability within the group of SRR children both in and out of the Opportunity Class in an effort to find out which children might benefit from this sort of provision. The remaining sections of the chapter will describe the results of this area of study.

SCREENING RESULTS

Screening tests included a short-form IQ test, a reading test for accuracy and comprehension, a test of perceptual motor ability, a motor impairment test and two behaviour rating scales, as well as an analysis of reading errors. For each aforementioned variable, screening test comparisons between the four groups, between SRR groups and CA cohorts, and SRR groups and RA cohorts will be described. Results of the behaviour rating scales

comparing SRR groups with combined normally reading groups will also be described.

I-INTELLIGENCE

The one-way analysis of variance for the WISC (short form) scores of the four groups indicated that there were no significant differences between groups for short form IQ scores. (Table 2, p. 127 and Figures 2, 3 and 4, p. 128).

There were also no significant differences between the Verbal IQs ($t=1.94$, $p > .05$ 2-tailed) or the Performance IQs ($t=0.95$, $p > .05$ 2-tailed) between the combined group of SRR readers and the combined group of good readers. However, looking at the difference between VIQ and PIQ within each group and comparing these across groups, it was found that SRR boys had a greater preponderance of higher performance than verbal IQs, whilst good readers had an almost equal number of children with higher verbal and higher performance IQs. (Table 3, p. 127).

A closer look at the results revealed that the major contributors to the higher performance IQ in the SRR group were the Control SRR boys.

TABLE 2

Means of groups and standard deviations

for WISC (short form) Raw Scores

	Mean	S. D.
Opportunity Class SRR	44.91	5.61
Control SRR	43.08	7.65
7 Yr. old good readers	44.16	6.39
9 Yr. old good readers	44.58	5.12

TABLE 3

A Comparison of Differences Between Verbal and Performance IQs

for SRR Boys and Good Readers

	SRR	Good Readers
Higher Verbal IQ	7	12
Higher Performance IQ	15	10
Equal VIQ and PIQ	2	2

TABLE 4

A Comparison of Differences Between Verbal and Performance IQs

of the Opportunity Class, Control SRR, 7 Year Old

and Nine Year Old Good Readers

Class	Opportunity SRR	Control Yr. Olds	Seven Yr. Olds	Nine
Higher Verbal IQ	5	2	5	7
Higher Performance IQ	5	10	6	4
Equal VIQ and PIQ	2	0	1	1

OPPORTUNITY CLASS
CONTROL SRR
SEVEN YEAR OLDS
NINE YEAR OLDS
FIGURE 2
No. Ss
5
4
3
2
1
0
31–35
36–40
41–45
46–50
51–55
56–60
IQ DISTRIBUTIONS–SHORT FORM RAW SCORE TOTALS
FIGURE 3
No. Ss
80–84
85–89
90–94
95–99
100–104
105–109
110–114
115–119
120–124
125–129
130–134
135+
DISTRIBUTION OF VERBAL IQ SCORES
FIGURE 4
DISTRIBUTION OF PERFORMANCE IQ SCORES

II-PERCEPTUAL MOTOR SKILLS

An analysis of variance indicated that there were significant differences among the four groups on the raw scores of the Bender-Gestalt test. ($F(3, 44) = 4.01$, $p = .01$). (Tables 5 and 6 p. 130, and Figure 5, p. 131).

All the nine-year-old groups had similar scores, whilst the mean of the seven-year-old group differed significantly from each of the other three. ($p < .05$, Scheffe Test)* Item analysis of the Bender designs revealed that whereas the seven-year-olds had difficulty with angles, the poor readers tended to turn the dots of designs into circles. In terms of level of functioning by age, all of the nine-year-old groups were functioning at the nine-year-old level, whilst the seven-year-olds were functioning at the seven-year-old level.

*Winer, pp. 88-89.

TABLE 5

Means of groups and Standard Deviations of Raw Scores on the Bender Visual Motor Gestalt Test

	Mean	S. D.
Opportunity Class SRR	2.41	1.56
Control SRR	2.25	1.96
7 Yr. old good readers	5.08*	2.53
9 Yr. old good readers	2.75	2.56

*p <.05

TABLE 6

Means of Groups and Standard Deviations of Bender Scores in Terms of Level of Functioning in Months

	Mean	S. D.
Opportunity Class SRR	109.83	18.94
Control SRR	107.67	17.29
7 Yr. old good readers	87.50*	12.46
9 Yr. old good readers	110.08	24.67

*p <.05

BENDER-GESTALT DISTRIBUTION BY AGE OF SUBJECTS
FIGURE 5
No. Ss
6
5
4
3
2
1
0
5-6
6-7
7-8
8-9
9-10
10+
OPPORTUNITY CLASS
CONTROL SRR
SEVEN YEAR OLDS
NINE YEAR OLDS

Figure 5

III-MOTOR IMPAIRMENT

The analysis of variance for the Stott-Moyes-Henderson Test of Motor Impairment yielded non-significant differences between the groups. ($F(3,44)=.10$, $p > .05$) (Table 7, p.134 and Figure 6, p.136).

However, when the individual scales were examined, there were significant differences between the poor readers and good readers in scale two, which involves control and coordination of upper limbs. ($q(1,44)=14.01$, $p < .01$, Scheffe). Higher scores on the TMI are indicative of a greater degree of motor impairment, as the child scores a point for each item failed. (Table 8, p.134).

Even when the scores are calculated for the year level only, thus eliminating aberrant scores of those few children who had difficulties with one particular task at many age levels, the difference is still significant, with SRR boys having significantly higher scores. ($q\ (1,44)=10.33$, $p < .01$ using a Scheffe test). (Table 9, p.135).

There were also significant differences between the groups on scale four, although all groups found this difficult to pass. Scale four measures manual dexterity with emphasis on speed. Of the four groups, when looked at across the entire test, the Opportunity class boys appeared to have the least difficulty, making fewer errors than any other group. This seemed due to the high scores of one or two of the boys in the other groups on this scale at all age levels. However, the differences between the groups was not significant. When scores for year level alone

were considered, the seven- year- olds had more difficulty in passing the items in scale 4 at the 7 year level than the other three groups did at the 9 year level. The scores for the 7-year-olds differed significantly from each of the others. (Scheffe, $p < .05$). (Table 8, p.134 and Table 9, p.135).

TABLE 7

Means of groups and standard deviations at year level for the Stott-Moyes Henderson Test of Motor Impairment

	Mean	S. D.
Opportunity Class SRR	1.83	1.64
Control SRR	1.58	4.54
7 Yr. old good readers	2.08	2.66
9 Yr. old good readers	1.25	7.43

TABLE 8

Analysis of Individual Scale Scores of the Stott-Moyes Henderson Test of Motor Impairment

	SCALE					TOTAL
	1	2	3	4	5	SCORE
Opportunity Class SRR	5	9**	2	5	4	25
Control SRR	4	7**	0	15	4	30
7 Yr. old good readers	9	3	0	28	0	40
9 Yr. old good readers	12	1	3	19	3	24

**p <.01

TABLE 9

Analysis of Individual Scale Scores of the Stott-Moyes Henderson Test of Motor Impairment at Year Level Only

	SCALE					TOTAL
	1	2	3	4	5	SCORE
Opportunity Class SRR	3	9**	2	5	3	22
Control SRR	2	6**	0	7	4	19
7 Yr. old good readers	5	3	0	17*	0	25
9 Yr. old good readers	5	1	3	4	2	15

*p <.05

**p <.01

Figure 6

OPPORTUNITY CLASS
CONTROL SRR
SEVEN YEAR OLDS
No. Ss
8
7
6
5
4
3
2
1
0
0
1
2
3
4
5
6
8
16
26
FIGURE 6
DISTRIBUTION OF STOTT-MOYES-HENDERSON TMI SCORES (TOTALS)

IV-EMOTIONAL INDICATORS

The Bristol Social Adjustment Guides

The analysis of variance for the Bristol Social Adjustment Guides under-reactive scale indicated that there were no significant differences between the four groups. ($F(3,44)=1.53$, $p > .05$) (Table 10, p. 138 and Figure 7, p. 160). Comparing the combined means of the poor readers with those of the good readers on the BSAG under-reactive scale, a Scheffe test indicated that the differences between the means were significant at the .05 level, the poor readers exhibiting higher scores on this scale.

Opportunity class boys scored higher than the other three groups on 22 separate items, while the other three groups scored higher on 9. Opportunity class children seemed to be unforthcoming, shy, timid, needing encouragement, withdrawn and unsociable, with problems in making social relationships with peers or teacher, lethargic, and having lack of confidence. Children in the other three groups were variously categorised as sitting quietly, liking sympathy, unmotivated and having his own solitary activities to which he wanders off alone. (Table 24, p. 154).

There were significant differences in the analysis of variance between groups on the BSAG over-reactive scale. ($F(3,44)=2.93$, $p < .04$). (Table 11, p. 138). Comparing the combined means of the poor readers with those of good readers on the BSAG over-reactive scale, a Scheffe test indicated that the difference between the means was significant at the .05 level, the poor readers exhibiting higher scores on the over-reactive scale.

TABLE 10

Means of groups and standard deviations for scores on the Bristol Social Adjustment Guides Under-reactive Scale

	Mean	S. D.
Opportunity Class SRR	5.08*	5.76
Control SRR	4.00*	8.60
7 Yr. old good readers	1.67	2.53
9 Yr. old good readers	1.00	1.41

TABLE 11

Means of groups and standard deviations for scores on the BSAG Over-reactive scale

	Mean	S. D.
Opportunity Class SRR	9.33*	10.42
Control SRR	6.00*	6.12
7 Yr. old good readers	2.5	3.72
9 Yr. old good readers	2.67	3.39

*p <.05

The Rutter Childrens' Behaviour Questionnaire

Treated as a continuous measure, and comparing the means of each group with the others on a one-way analysis of variance, there were no significant differences on either the neuroticism or the antisocial scales of the Rutter Childrens' Behaviour Questionnaire nor on the total score. (Table 12, p. 141 and Figure 9, p. 160). Although poor readers obtained higher scores on both of these scales, when the combined means of the poor readers were compared with those of good readers, the differences between means was not significant, using the Scheffe test. (Tables 13 and 14, p. 141).

The scale, however, was designed to be used as a discontinuous measure, and only those children whose total scores were above 9 designated as behaviourally disturbed. When examined by this method, it can be seen that three of the boys in each of the SRR groups had scores above 9. One of the 7 year old and two of the 9 year old good readers were in this category. None of the three children in the good readers groups with total scores above 9 was in the Antisocial category, while 4 of the 6 SRR boys were scored as primarily Antisocial. (Table 15, p. 142 and Figure 9, p. 160).

An item analysis of those items of the Rutter scale in which any group scored was done. Comparing the scores of the combined group of poor readers with those of the combined group of good readers, the analysis indicated that there was a significant difference between the means of the two groups on the item 'poor concentration.' Sixty-two per cent of poor readers were felt to

have poor concentration, while only 25 per cent of good readers scored on this item. (chi square = 6.86, $p < .01$). None of the other items reached significance. (Table 16, p. 143).

TABLE 12

Means of the groups and standard deviations for scores on the Neuroticism Scale of the Rutter CBQ

	Mean	S. D.
Opportunity Class SRR	1.08	1.31
Control SRR	1.00	1.04
7 Yr. old good readers	.75	1.05
9 Yr. old good readers	.50	.67

TABLE 13

Means of the groups and standard deviations for scores on the Antisocial Scale of the Rutter CBQ

	Mean	S. D.
Opportunity Class SRR	.75	1.28
Control SRR	1.42	1.97
7 Yr. old good readers	.50	.90
9 Yr. old good readers	.50	1.00

TABLE 14

Means of the groups and standard deviations for Total Scores on the Rutter CBQ

	Mean	S. D.
Opportunity Class SRR	5.83	5.79
Control SRR	7.16	6.64
7 Yr. old good readers	3.58	3.65
9 Yr. old good readers	3.16	4.22

TABLE 15

Number of Children in Each Group with Total Rutter CBQ Scores Over 9, Indicating Primarily Neurotic or AntiSocial Behaviour

Group	Number	Neurotic	AntiSocial
Opportunity Class	3	1	2
Control SRR	3	1	2
7 Yr. old good readers	1	1	0
9 Yr. old good readers	2	2	0

TABLE 16

Item Analysis of the Rutter CBQ

	Question Number	Poor Readers N	Poor Readers %	Good Readers N	Good Readers %
Overactive	1	8	33.3	5	20.8
Fidgety	3	7	29.1	7	29.1
Twitches	11	1	4.1	2	8.3
Poor concentration**	16	15	62.5	6	25.0
Stammers	24	3	12.5	1	4.1
Other Speech Defects	25	2	8.3	2	8.3
Destructive	4	4	16.6	0	0.0
Fights	5	7	29.1	5	20.8
Disobedient	15	8	33.3	4	16.6
Lies	19	6	25.0	3	12.5
Steals	20	3	12.5	2	8.3
Bullies	26	5	20.8	2	8.3
Irritable	9	7	29.1	5	20.8
Not Liked	6	6	25.0	2	8.3
Solitary	8	9	37.5	7	29.1
Worried	7	10	41.6	9	37.5
Miserable	10	4	16.6	3	12.5
Fearful	17	6	25.0	2	8.3
Fussy	18	3	12.5	2	8.3

** p <.01

V-READING

There were differences between the groups in both accuracy and comprehension reading ages. ($F(3,44) = 30.56$, $p < .001$). (Table 17, p. 145 and Figures 11 and 13, p. 163). The Scheffe test indicated that the group of nine year old good readers was significantly different ($p < .01$) from the other three groups in RA accuracy, but that there were no significant differences between the other three groups.

Reading age comprehension yielded similar results. The analysis of variance indicated a significant difference between groups. ($F(3,44) = 30.5$, $p < .001$). (Table 18, p. 145). This was found to be largely the result of the nine year old good readers' comprehension scores which differed significantly from the other three, (Scheffe test, $p < .01$), but some of the variance was accounted for by the seven year olds' very low comprehension scores. However, this was not significant.

TABLE 17

Means of groups and standard deviations

for reading age accuracy in months

	Mean	S. D.
Opportunity Class SRR	87.58	5.61
Control SRR	90.41	5.07
7 Yr. old good readers	88.16	6.37
9 Yr. old good readers	114.25***	7.21

*** p <.001

TABLE 18

Means of groups and standard deviations

for reading age comprehension in months

	Mean	S. D.
Opportunity Class SRR	95.91	9.38
Control SRR	98.66	10.20
7 Yr. old good readers	89.25	8.85
9 Yr. old good readers	126.83***	12.74

*** p <.001

VI-ANALYSIS OF READING ERRORS

An analysis of reading errors on the Neale demonstrated differences between the Opportunity class SRR boys and the other two groups of readers at the seven year level, the control group of SRR and the seven year old good readers. The Opportunity class children made more mispronunciations and fewer substitutions. However, their substitutions were largely of the graphic variety (92.5%). Seven year olds made more grammatical substitutions and fewer graphic ones than the Opportunity class boys, but the SRR control group made the highest number of grammatical substitutions (31%) and only 69% graphic substitutions. This group also had the lowest refusal rate of the three groups (31%), while the seven year olds had the highest (44%), and the Opportunity class 38%. (Table 19, p. 147). A chi square test indicated that there were significant differences in types of errors committed between the three groups (chi square = 14.67, $p < .01$). A chi square test indicated that there were also significant differences between the three groups with respect to the frequency of grammatical or graphic errors committed (chi square = 17.99, $p < .001$). (Table 20, p. 1147.

TABLE 19

Analysis of Reading Errors of the Three Groups of Boys Reading at the Seven Year Level (in percentages) on screening tests

	Mispron.	Substit.	Refusals
Op Class SRR	38	21	38
Control SRR	27	38	31
7 Yr. olds	17	37	44

TABLE 20

Analysis of Grammatical and Graphic Substitutions (in percentages) on screening tests

	Grammatical	Graphic
Op Class SRR	7.5	92.5
Control SRR	31.0	69.0
7 Yr. olds	18.4	81.6

To summarise the screening results:

1) There was no significant difference in intelligence between the four groups, but the control group SRR had a higher number of boys with PIQ > VIQ.

2) There were significant differences in perceptual motor skills between 7 and 9-year-olds, but not between 9-year-old good and poor readers, (ANOVA $F=4.01$, $p < .01$).

3) There were no significant differences between total scores on motor impairment tests between groups, but on individual scales SRR boys did significantly more poorly on control and coordination of upper limbs (Scheffe, $p < .01$), and 7 year olds significantly more poorly on manual dexterity with emphasis on speed, (Scheffe, $p < .05$).

4) Although Opportunity Class boys were not significantly more underreactive than the other three groups, they scored higher on more items on this scale than any of the other groups. The combined groups of SRR boys were significantly higher on the both the overreactive scale (Scheffe, $p < .01$) and the underreactive scale (Scheffe, $p < .01$) than good readers. The poor readers also scored higher on neuroticism, anti-social behaviour and on total Rutter CBQ scores, but these did not reach significance. Poor readers did show significantly higher scores in poor concentration on item analysis (chi square=6.86, $p < .01$).

5) There were significant differences between the four groups in reading accuracy (ANOVA F=30.56, p <.001, and comprehension, (ANOVA F=30.5, p <.001), with nine-year-old good readers scoring significantly higher than the other three groups in each of these. There were no differences between seven-year-olds and SRR boys.

6) There were significant differences in types of reading errors committed between the three groups reading at the same age level (chi square=14.67, p <.01). There were also highly significant differences in the types of substitutions used, graphic or grammatical (chi square=17.99, p <.001). (See Table 21, p. 150).

TABLE 21

Summary of Screening Data for Opportunity Class and Controls

	Opp Class	Control	7 Yr. old	9 Yr. old
	SRR	SRR	good readers	good readers
Median Age	10-5	10-4	7-3	9-10
Median RA Ac	7-5	7-7	7-5	9-5 ***
Median RA Com	8-0	8-7	7-5	10-5 ***
Mean VIQ	105.5	95.5	102.7	109.9
Mean PIQ	108.2	112.4	109.1	102.7
Mean FSIQ	105.7	103.0	105.2	105.8
PIQ > VIQ		&		
Median B-G	9.0	9.0	7.5 **	9.0
Median TMI	2	1	3	0
TMI Scale 2	9 *	6 *	2	1
TMI Scale 4	5	9	17 **	4
Mean BSAG UR	6.1 ***	4	1.7	1
Mean BSAG OR	9.1 **	6 **	2.5	4.2
Mean CBQ N	1.25 **	1 **	.75	.50
Mean CBQ AS	.83 **	1.42 **	.42	.50
Mean CBQ T	5.7 **	7.4 **	3.6	3.2
Reading Errors *				
Mispronun.	38	27	17	
Substitut.	21	38	37	
Refusals	38	31	44	
Substitutions ***				
Grammatical	7.4	31	18	
Graphic	92.5	69	81.6	

* p=.05, ** p=.01, *** p=.001, &=non-significant trend

RETEST SCORES

Measures on retest after fifteen months, included a reading test for accuracy and comprehension and two behaviour rating scales, as well as an analysis of reading errors. Retest comparisons between the 4 groups on each of these measures were made, as well as comparisons between Opportunity Class and Control SRR children and between SRR groups and CA and RA cohorts. Again, results of behaviour rating scales comparing SRR groups and combined normally reading groups were made. Screening scores for reading accuracy and comprehension, reading errors and behaviour on rating scales were compared with retest scores for each group.

I-EMOTIONAL INDICATORS

The same two teacher rating scales were used as measures of the boys' classroom behaviour in the retest as at the time of screening. These were the Bristol Social Adjustment Guides and the Rutter Childrens' Behaviour Questionnaire for teachers.

The Bristol Social Adjustment Guides

The analysis of variance of the retest scores of the BSAG under-reactive scale indicated that there were no significant differences between the four groups. ($F= 1.83$, $p > .05$) (Table 22, p. 154 and Figure 8, p. 160). A comparison of the combined means of the SRR group with the combined means of the good readers was also non-significant. ($t=.14$ $p > .05$. The BSAG over-reactive scale also did not yield significant differences between the four groups. ($F=.61$, $p > .05$) (Table 23, p. 154). Nor did a comparison

of the combined means of the SRR group with the combined means of the good readers. (t=.02, p >.05).

Looking at individual subscales, it is seen that in the depression subscale (DB) of the under-reactive scale, the opportunity class group scored significantly higher, (F=3.45, p <.05), and that these scores related to lack of energy in bothering to ask the teacher questions and in not caring whether the teacher saw their work. They also had higher scores in the Inconsequence (QB) subscale of the over-reactive scale in those items pertaining to hyperactivity and showing off, where the major contributing items are those measuring responding only momentarily to correction, misbehaving when the teacher is engaged with others and inventing silly ways of doing things in free activity or manual tasks, although these differences did not reach significance (F=.95, p >.05). However, they were no more restless than the other three groups of readers. (Table 24, p. 154).

The control group SRR had higher scores than the other three groups on the subscale dealing with peer maladaptiveness (PA) of the over-reactive scale, which consists of items relating to never getting down to a job, or switching to something else in manual play or free activity, trying to dominate and non-cooperation when they can't get their own way in informal play, misusing companionship to show off or dominate, and snatching things from others. These did not reach significance, however (F=.72, p >.05).

Differences between screening test and retest scores for the under-reactive scale indicated a mean drop of 12 for the Opportunity Class boys, a mean rise of one for the control SRR group, a mean rise of 15 for the nine year old good readers and a mean drop of 9 for the seven year olds. Differences in the over-reactive scores indicated a mean drop of 33 for the Opportunity Class, a mean drop of 40 for the controls, a mean rise of 32 for the nine year olds and a mean rise of 11 for the seven year olds. (Table 25, p. 155).

TABLE 22

Means of groups and standard deviations

on the BSAG under-reactive scale retest scores

	Mean	S. D.
Opportunity Class SRR	4.00	5.43
Control Group SRR	1.75	2.30
7 Yr. old good readers	.92	1.24
9 Yr. old good readers	1.92	2.93

TABLE 23

Means of groups and standard deviations

on the BSAG over-reactive scale retest scores

	Mean	S. D.
Opportunity Class SRR	6.50	7.38
Control Group SRR	5.08	5.05
7 Yr. old good readers	3.42	6.05
9 Yr. old good readers	6.83	8.45

TABLE 24

Retest Scores of the four groups on the Depression,

Inconsequence, and Peer Maladaptiveness subscales of the BSAG

	DB	QB	PA
Opportunity Class SRR	8	22	4
Control Group SRR	1	11	12
7 Yr. old good readers	0	9	3
9 Yr. old good readers	1	12	6

TABLE 25

A comparison of BSAG screening and retest scores on subscales and total under-reactive and over-reactive scales

Screening Scores on the Under-Reactive Scale

	UA	UB	WA	WB	DA	DB	RA	RB	T
Opp Class SRR	10	13	9	4	8	8	12	8	72
Control SRR	5	7	0	0	0	2	2	4	20
7 Yr. olds	6	2	2	1	3	3	0	5	22
9 Yr. olds	0	5	1	0	1	1	2	2	12

Retest Scores on the Under-Reactive Scale

	UA	UB	WA	WB	DA	DB	RA	RB	T
Opp Class SRR	6	7	4	5	5	8	7	8	50
Control SRR	5	8	2	0	3	1	1	1	21
7 Yr. olds	6	3	0	1	0	0	2	1	13
9 Yr. olds	6	6	1	1	5	1	4	3	27

Screening Scores on the Over-reactive Scale

	QA	QB	QC	HA	HB	HC	PA	PB	VA	VB	T
Opp Class SRR	15	19	12	9	5	10	11	8	8	12	109
Control SRR	15	19	10	14	2	7	10	3	12	10	102
7 Yr. olds	3	12	1	4	2	1	4	1	0	2	30
9 Yr. olds	9	11	4	2	2	4	7	0	5	6	50

Retest Scores on the Over-reactive Scale

	QA	QB	QC	HA	HB	HC	PA	PB	VA	VB	T
Opp Class SRR	10	22	6	5	5	3	4	5	6	10	76
Control SRR	3	11	11	10	1	4	12	2	3	5	62
7 Yr. olds	6	9	4	5	1	2	3	1	2	8	41
9 Yr. olds	14	12	8	9	5	6	6	4	7	11	82

(See Chapter 6 p. 96 for Definitions of Scales)

The Rutter Childrens' Behaviour Questionnaire

There were no significant differences between groups on the Rutter CBQ Antisocial scale ($F=.93$, $p > .05$) nor on the total score ($F=.93$, $p > .05$). However, on the Neuroticism scale there was a significant difference between groups ($F=5.69$, $p < .002$). A Newman-Keuls test, however, did not reach significance. (Tables 26, 27 and 28, p. 157 and Figure 10, p. 160).

Item analysis of the Rutter scale indicated that the combined groups of poor readers were significantly more miserable (chi square= 14.22, $p < .001$) than the two groups of good readers, but that there were no other significant differences. (Table 30, p. 159).

Again, using the Rutter CBQ as a discontinuous measure, with a cutoff point of above 9 as an indicator of behavioural disturbance, 4 of the Opportunity Class boys and four seven year old good readers and three boys each in the control group SRR and in the 9 year old good readers fell into this category. Of these, none of the Opportunity Class boys could be classed as Antisocial, while all of the SRR control, and two out of four of the 7 year old good readers and two out of three of the 9 year old good readers were seen to be Antisocial. (Table 29, p. 158).

TABLE 26

Means of groups and standard deviations

on Rutter CBQ Antisocial Scale Retest Scores

	Mean	S. D.
Opportunity Class SRR	.58	.90
Control Group SRR	1.00	2.34
7 Yr. old good readers	.67	1.23
9 Yr. old good readers	1.50	1.57

TABLE 27

Means of groups and standard deviations

on Rutter CBQ Total Retest Scores

	Mean	S. D.
Opportunity Class SRR	8.75	7.33
Control Group SRR	7.33	8.13
7 Yr. old good readers	5.08	5.01
9 Yr. old good readers	7.08	5.55

TABLE 28

Means of groups and standard deviations

on the Rutter CBQ Neuroticism scale Retest Scores

	Mean	S. D.
Opportunity Class SRR	2.67	2.46
Control Group SRR	1.25	1.48
7 Yr. old good readers	1.17	1.34
9 Yr. old good readers	1.50	1.50

TABLE 29

Number of Children in Each Group

with Total Rutter CBQ Retest Scores Over 9,

Indicating Primarily Neurotic or Antisocial Behaviour

Group	Number	Neurotic	Antisocial
Opportunity Class	4	4	0
Control SRR	3	0	3
7 Yr. old good readers	4	2	2
9 Yr. old good readers	3	2	1

TABLE 30

Item Analysis of Retest Scores on the Rutter CBQ

Question	Poor Readers		Good Readers	
	Number	N	%	N	%
Overactive	1	7	29.1	10	41.7
Fidgety	3	11	45.8	7	29.1
Twitches	11	2	8.3	2	8.3
Poor concentration	16	18	75.0	14	58.3
Stammers	24	3	12.5	2	8.3
Other Speech Defects	25	0	0	1	4.2
Destructive	4	1	4.2	1	4.2
Fights	5	5	20.8	8	33.3
Disobedient	15	5	20.8	7	29.1
Lies	19	6	25.0	7	29.1
Steals	20	2	8.3	2	8.3
Bullies	26	3	12.5	2	8.3
Irritable	9	5	20.8	5	20.8
Not Liked	6	7	29.1	7	29.1
Solitary	8	12	50.0	6	25.0
Worries	7	14	58.3	12	50.0
Miserable *	10	7	29.1	2	8.3
Fearful	17	12	50.0	13	54.2
Fussy	18	5	20.8	3	12.5
School Fears	23	2	8.3	0	0
Absent	14	4	16.7	2	8.3

SCORE
110
100
90
80
70
60
50
40
30
20
10
0
UR
OR
N
BSAG SCREENING DISTRIBUTION
FIGURE 7

SCORE
110
100
90
80
70
60
50
40
30
20
10
0
UR
OR
N
OPPORTUNITY CLASS
CONTROL SAR
BSAG RE-TEST DISTRIBUTION
FIGURE 8

No Ss
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 19 20 23 30
CBQ TOTAL SCORE SCREENING DISTRIBUTION
FIGURE 9

No Ss
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 19 20 23 30
CBQ TOTAL SCORE RE-TEST DISTRIBUTION
FIGURE 10

II-READING

Each of the four groups of boys was retested for reading accuracy and comprehension, again using the Neale Analysis of Reading Ability.

The one-way analysis of variance for the Neale accuracy retest indicated that there were significant differences between the four groups. ($F=20.44$, $p < .001$) (Table 31, p. 162 and Figure 12, p. 163). The Newman-Keuls test indicated that the nine year old good readers were significantly different from each of the other three groups ($q=17$, $p < .01$ with Opportunity Class boys, $q=14.92$, $p < .01$ with seven year olds, and $q=14.56$, $p < .01$ with control SRR). There were no significant differences between the other three groups.

The one way analysis of variance for the Neale Comprehension retest indicated that there were significant differences between the groups for comprehension. ($F=11.5$, $p < .001$). (Table 32, p. 162 and Figure 14, p. 163). The Newman-Keuls test indicated that the nine year old good readers were significantly different from the other three groups ($q=7.05$, $p < .01$ with seven year olds, $q=7.03$, $p < .01$ with Opportunity Class boys and $q=6.13$, $p < .01$ with control SRR). There were no other significant differences between the groups.

TABLE 31

Means of groups and Standard Deviations

of Neale Reading Age Accuracy Retest Scores in months

	Mean	S. D.
Opportunity Class SRR	99.3	5.56
Control SRR	102.75	8.56
7 Yr. old good readers	103.30	13.51
9 Yr. old good readers	127.00**	9.76

**p <.01

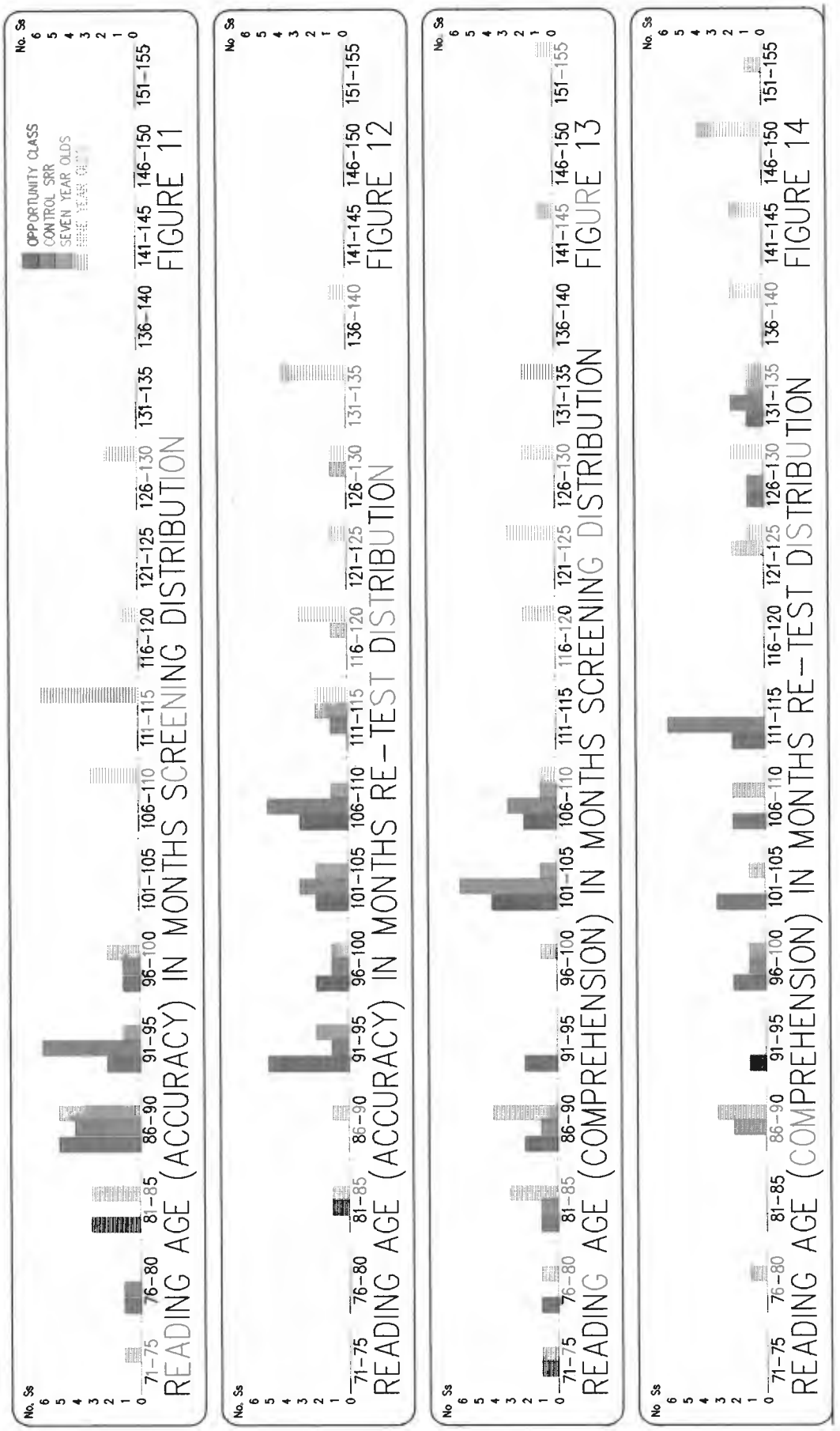
TABLE 32

Means of groups and Standard Deviations

of Neale Reading Age Comprehension Retest Scores in months

	Mean	S. D.
Opportunity Class SRR	107.83	11.57
Control SRR	111.75	14.82
7 Yr. old good readers	107.75	22.19
9 Yr. old good readers	138.75**	9.20

**p <.01


No. Ss
OPPORTUNITY CLASS
CONTROL SRR
SEVEN YEAR OLDS
71–75
76–80
81–85
86–90
91–95
96–100
101–105
106–110
111–115
116–120
121–125
126–130
131–135
136–140
141–145
146–150
151–155
READING AGE (ACCURACY) IN MONTHS SCREENING DISTRIBUTION
FIGURE 11
READING AGE (ACCURACY) IN MONTHS RE–TEST DISTRIBUTION
FIGURE 12
READING AGE (COMPREHENSION) IN MONTHS SCREENING DISTRIBUTION
FIGURE 13
READING AGE (COMPREHENSION) IN MONTHS RE–TEST DISTRIBUTION
FIGURE 14

III-ANALYSIS OF READING ERRORS

An analysis of the reading errors of the four groups indicated that the nine year old good readers had a higher percentage of mispronunciations, but a much lower percentage of refusals than the other groups. There were no differences between the three groups of boys with the same reading age in percentage of errors of mispronunciation. Opportunity Class SRR boys tended to have a higher percentage of substitutions and a lower rate of refusals than either the control group SRR boys or the seven year olds. Omissions were more frequent in the Opportunity class group and the nine year old good readers than in the other two groups. The greatest differences occurred in the kinds of substitutions, with the control group SRR boys making more grammatical substitutions than the other groups, and fewer graphic substitutions. Opportunity class results were close to those of the nine year old good readers, whilst the control SRR boys had results closer to those of the seven year olds. (Tables 33 and 34, p. 165).

A chi square test yielded significant differences between the four groups of readers with reference to frequency of types of errors (chi square=35.08, $p < .001$). However, a chi square test of the three groups reading at the same level was not significant.

A chi square test yielded significant differences between the four groups of readers with reference to graphic or grammatical substitutions. (chi square=8.26, $p < .05$). A chi square test between the three groups reading at the same age level was not significant.

TABLE 33

Analysis of Types of Reading Errors

on the Neale (in percentages) on retest

	Mispron	Substit	Refuse	Add	Omit	Reverse
Opp Class SRR	35	40	19	0	5	0
Control SRR	38	35	26	0	1	0
7 Yr. olds	35	31	30	1	1	1
9 Yr. olds	57	31	4	3	5	0

TABLE 34

Analysis of Grammatical and Graphic Substitutions

(in percentages) on retest

	Grammatical	Graphic
Opp Class SRR	22	78
Control SRR	35	65
7 Yr. olds	30	70
9 Yr. olds	19	81

Retest results, after 15 months, therefore indicated that:

1) The 9 year old good readers were still significantly better in accuracy and comprehension than the other three groups. However, the gap between 9 year olds and the others was not as great in comparison with screening results for either accuracy or comprehension. There was no significant difference between the Opportunity Class and the SRR controls in either accuracy or comprehension.

2) There was no longer a significant difference in underreactiveness or overreactiveness between SRR boys and good readers. Opportunity Class boys were no longer significantly more underreactive; however, on an individual subscale measuring depression, they appeared significantly more depressed than the other three groups, whilst SRR control boys were rated as being more maladaptive towards their peers. This was also true of the CBQ, where Opportunity Class boys with measurable behavioural difficulties were all rated as Neurotic, while all SRR control boys were rated as Antisocial. SRR boys were rated as being more miserable, but they no longer suffered from poor concentration.

3) There were no longer differences in kinds of reading errors committed by 7 year olds and SRR boys, but differences between the three groups reading at the same level and 9 year old good readers. Control group SRR boys tended to make more grammatical and fewer graphic substitutions, but this did not reach significance. In pattern of substitutions, Opportunity Class boys seemed closer to 9 year olds, whilst SRR controls had results more like 7 year olds.

Table 35

Summary Table of Retest Results

	Opp Class	SRR Controls	7 Yr. olds	9 Yr. olds
RA Acc.	99.3	102.7	103.3	127.0**
RA Comp.	107.8	111.7	107.7	138.7*
BSAG UR	4.0	1.7	.9	1.9
BSAG OR	6.5	5.0	3.4	6.3
BSAG UR DB	8.0***	1.0	0.0	1.0
BSAG OR QB	22.0&	11.0	12.0	9.0
BSAG OR PA	4.0	12.0*	3.0	6.0
CBQ N	2.7	1.2	1.1	1.5
CBQ AS	.6	1.1	.7	1.5
CBQ T	9.6	7.3	5.1	7.1
Reading Errors ***				
Mispronun.	35.0	38.0	35.0	57.0
Substitut.	40.0	35.0	31.0	31.0
Refusals	19.0	26.0	30.0	4.0
Additions	0.0	0.0	1.0	3.0
Omissions	5.0	1.0	1.0	5.0
Reversals	0.0	0.0	1.0	0.0
Substitutions *				
Grammatical	22.0	35.0	30.0	19.0
Graphic	78.0	65.0	70.0	81.0

* p <.05

** p <.01

*** p <.001

RELATIONSHIPS BETWEEN READING GAINS AND FACTORS ASSOCIATED WITH READING RETARDATION

The previous sections have looked at comparisons between the four groups of readers, and also at comparisons within the groups when examining the screening and retest results. Screening results examined reading accuracy and comprehension, kinds of reading errors, IQ, perceptual motor skills, motor impairment, and emotional factors . Retest results examined reading accuracy and comprehension, kinds of reading errors and emotional factors.

The following section will examine the more complex relationships between reading improvement and differences in intelligence, in perceptual motor ability, in motor impairment and in emotional stability within the two groups of SRR children.

I-COGNITIVE FACTORS RELATED TO READING GAINS

Reading comprehension gains indicated that those children in the SRR group with Verbal IQs of 100 or above made greater progress than those with VIQs below 100. The mean gain for comprehension for those with VIQ 100 or above was 16 months, while for the below 100 group it was 8 months. This difference was significant at $p < .025$ (one tailed). There were no differences in gains in accuracy between the 100 or above and below 100 VIQ groups, the 100 or above group gaining 11.5 months and the below 100 10.9 months. (Table 36, p. 160).

There were no differences in gains in accuracy or comprehension between the 100 or above and below 100 PIQ groups.

In order to look in detail at those children who demonstrated gains in reading in comparison with those who showed no gains or a loss, the adjusted gain score was used. This is derived from the formula O-E (Retest) minus O-E (Screening), where O is the observed reading age predicted by Yule's regression formula and E is the expected reading age. In examining the data, it can be seen that only 9 children out of 24 SRR boys showed any gain in accuracy and only 8 in comprehension. These were equally distributed between Opportunity Class and control children. (Table 37, p. 171, and Table 38, p. 172).

A Spearman Rank Correlation Coefficient was computed in order to see if there was a positive relationship between Verbal IQ and adjusted accuracy and comprehension scores. The correlation between VIQ and accuracy was -.10 and was not significant. However, there was a positive correlation between VIQ and comprehension (rho=.49) and this was significant at the .05 level for a one-tailed test.

TABLE 36

A Comparison of Verbal IQs of SRR Boys with Gains in Months in Reading Age Accuracy and Comprehension

VIQ	RA Acc Test	RA Acc Retest	Gain	RA Comp Test	RA Comp Retest	Gain
122	8.3	8.11	8	8.11	10.8	21
114	6.11	7.10	11	6.6	8.11	29
114	7.0	7.11	11	7.3	7.10	7
114	7.10	8.10	12	8.5	11.2	33
111	7.10	8.10	12	8.10	10.11	25
111	7.2	7.11	9	8.5	8.2	-3
109	7.3	8.3	12	8.5	8.10	5
108	7.11	9.4	17	8.7	10.11	28
106	7.2	8.3	13	7.10	8.7	9
103	8.2	9.1	11	8.11	10.8	21
100	7.4	8.10	18	8.8	9.3	7
100	7.4	7.9	5	7.4	8.2	10
97	7.9	8.8	11	8.8	9.6	10
97	7.5	8.6	13	7.6	8.7	13
97	7.0	7.10	10	7.10	8.5	7
97	7.7	8.5	10	8.7	9.6	11
94	7.7	8.9	14	8.7	9.3	8
92	7.5	8.7	14	8.10	9.3	5
92	7.8	8.2	6	8.8	9.3	7
89	7.6	9.0	18	8.7	9.3	8
88	6.6	7.7	13	7.1	8.2	13
86	7.9	9.2	17	8.10	9.6	8
86	7.2	8.2	12	7.1	7.6	5
85	6.6	7.10	16	6.3	7.3	12

TABLE 37

Adjusted Gain Scores for Accuracy

Group	Screening O-E	Retest O-E	Gain
Opp Class	-23	-16	+7
Control	-27	-20	+7
Control	-27	-21	+6
Control	-36	-31	+5
Control	-27	-22	+5
Control	-37	-35	+2
Opp Class	-26	-24	+2
Opp Class	-32	-30	+2
Opp Class	-29	-28	+1
Opp Class	-32	-32	0
Opp Class	-31	-31	0
Opp Class	-42	-42	0
Opp Class	-35	-35	0
Control	-27	-27	0
Control	-23	-23	0
Opp Class	-49	-50	-1
Control	-34	-35	-1
Control	-25	-26	-1
Control	-24	-25	-1
Control	-33	-35	-2
Opp Class	-36	-39	-3
Opp Class	-41	-44	-3
Control	-30	-35	-5
Opp Class	-25	-34	-9

TABLE 38

Adjusted Gain Scores for Comprehension

Group	Screening O-E	Retest O-E	Gain
Control	-19	0	+19
Control	-35	-19	+16
Opp Class	-27	-14	+13
Opp Class	-50	-38	+12
Opp Class	-34	-26	+8
Control	-19	-11	+8
Control	-38	-36	+2
Opp Class	-35	-34	+1
Control	-30	-31	-1
Control	-25	-27	-2
Opp Class	-24	-27	-3
Opp Class	-23	-28	-5
Opp Class	-44	-49	-5
Opp Class	-28	-33	-5
Control	-17	-22	-5
Control	-16	-22	-6
Opp Class	-9	-15	-6
Opp Class	-14	-27	-7
Control	-30	-39	-9
Control	-25	-34	-9
Control	-16	-26	-10
Opp Class	-19	-31	-12
Control	-22	-37	-15
Opp Class	-40	-56	-16

II-PERCEPTUAL-MOTOR FACTORS RELATED TO READING GAIN

In order to examine the relationship between perceptual motor skills and reading gains in SRR boys receiving full-time remedial help, Spearman Rank Correlation Coefficients were computed for the Bender-Gestalt test and:

Neale screening scores in reading accuracy and comprehension,
Neale retest scores in reading accuracy and comprehension,
Adjusted gain scores in accuracy and comprehension.

There were no significant relationships between scores on the Bender-Gestalt test (taken at the time of the other screening tests), and screening scores for either reading accuracy or comprehension. Boys with better scores on the Bender did not achieved higher scores on reading tests. Nor was a relationship found after a year in the Opportunity Class. Comparing original Bender scores with retest reading scores, results were non-significant for both accuracy and comprehension. Therefore, by looking at absolute retest scores alone, it would not have been possible to predict outcome by original Bender scores. (Table 39, p. 175).

Even using adjusted gain scores there appears to be no relationship between Bender-Gestalt scores and reading acquisition. By using the formula (O-E retest)-(O-E screening), and comparing these scores with the original Bender, it would not have been possible to state that boys who had better perceptual motor skills at the beginning of full-time remedial provision would have made greater gains in reading than those boys who had

poorer skills.

Correlations were also computed for the SRR control group. (Table 40, p. 175). SRR controls also did not demonstrate a relationship between screening reading scores and perceptual motor skills. Correlations between Bender scores and reading retest scores were somewhat higher than the Opportunity Class, but did not reach significance. There was no relationship between adjusted gains and perceptual motor skills in either accuracy or comprehension.

TABLE 39

Spearman Rank Coefficients of Correlation for the Bender-Gestalt test and the Neale accuracy and comprehension screening, retest and adjusted gain scores for Opportunity Class boys

N=12

	R^S	Significance
Reading accuracy screening	.17	ns
Reading accuracy retest	-.07	ns
Adjusted gain in accuracy	-.05	ns
Reading comprehension screening	.17	ns
Reading comprehension retest	-.17	ns
Adjusted gain in comprehension	.01	ns

Table 40

Spearman Rank Coefficients of Correlation for the Bender-Gestalt test and the Neale Accuracy and Comprehension screening, retest and adjusted gain scores for the SRR control group

N=12

	R^S	Significance
Reading accuracy screening	.35	ns
Reading accuracy retest	.27	ns
Adjusted gain in accuracy	-.05	ns
Reading comprehension screening	-.06	ns
Reading comprehension retest	.29	ns
Adjusted gain in comprehension	.18	ns

III-MOTOR IMPAIRMENT AND READING GAIN

In order to examine the relationship between motor impairment and reading gain, Spearman Rank Correlation Coefficients were computed for the TMI and reading age accuracy and comprehension screening and retest scores, as well as adjusted gain scores on both RA accuracy and comprehension.

There was no relationship between screening scores on motor impairment and reading gain. Four of the 12 subjects in the Opportunity class received a perfect score on the TMI. Of the remaining 8, 5 had only 2 errors, and the highest score was 5 errors. These scores did not correlate with screening scores, retest scores or adjusted gain scores on either RA accuracy or comprehension.

The same held true for the control SRR boys. Six of these achieved perfect scores on the TMI, and of the remainder, one had a score of 1, two a score of 2, two a score of 4 and one a score of 6. These did not correlate with screening, retest or adjusted gain scores on RA accuracy or comprehension.

IV-EMOTIONAL FACTORS RELATED TO READING GAINS

Reading Gains and Screening Rating Scale Scores

Emotional factors, as measured by behaviour rating scales (BSAG and Rutter CBQ) did reveal differences between those children who succeeded in making gains and those who did not. Children with

VIQs of 100 or above who did not make progress in comprehension were those with high scores on the over-reactive or under-reactive scale of the BSAG or the neuroticism scale of the Rutter CBQ, as rated by their teachers at the beginning of the study. All of these children were from the Opportunity Class. (Table 36, p.170).

Examining the results of the combined groups of SRR boys on screening behaviour rating scales, it appeared that the behaviour rating scale scores of the eight boys who made progress in reading accuracy were not significantly different from those who did not make progress, although they had somewhat higher scores in the BSAG over-reactive scale. SRR boys who made progress in comprehension had lower mean scores on the Rutter CBQ total and BSAG over-reactive than those who made no progress or a loss, but higher scores on the BSAG under-reactive. Again this did not reach significance. (Table 41, p. 178 and Table 42, p. 179).

TABLE 41

Adjusted Gains or Losses in Reading Age (Accuracy) and Scores on BSAG and Rutter CBQ Behaviour Rating Scales

Group	O-E	BSAG		Rutter			BSAG Retest		Rutter Retest		
		UR	OR	N	AS	T	UR	OR	N	AS	T
Opp	7	2	20	3	2	10	5	3	0	0	6
Con	7	1	8	1	0	6	0	9	0	0	6
Con	6	2	9	2	2	8	6	9	0	1	13
Con	5	2	0	2	0	7	3	0	0	0	6
Con	5	0	30	2	5	23	0	17	5	8	30
Opp	2	8	9	0	0	3	0	24	6	3	20
Opp	2	0	0	0	0	0	0	0	0	0	0
Con	2	1	12	0	5	9	3	2	0	0	7
Opp	1	13	5	0	0	0	5	12	0	0	0
Mean		3.2	10.3	1.1	1.5	7.3	2.4	8.4	1.2	1.3	9.8
Opp	0	2	3	0	2	5	3	1	0	0	8
Opp	0	3	27	3	4	19	2	1	0	0	3
Opp	0	16	1	3	0	8	15	2	7	0	20
Opp	0	5	0	0	0	0	1	0	0	0	1
Con	0	0	19	0	2	11	0	8	0	0	10
Con	0	4	7	1	0	3	4	4	0	0	3
Opp	-1	2	25	1	2	13	1	12	5	0	15
Con	-1	0	0	0	0	0	0	2	0	0	1
Con	-1	9	9	3	0	13	0	5	0	0	6
Con	-1	0	0	0	0	1	0	0	0	0	0
Con	-2	1	8	1	3	8	5	6	0	0	6
Con	-3	9	0	0	0	3	15	7	0	0	8
Con	-3	12	0	3	0	5	0	1	0	0	3
Con	-5	0	0	0	0	0	0	0	0	0	0
Opp	-9	0	19	0	0	4	3	13	5	0	14
Mean		4.2	7.9	1	.8	6.2	3.2	4.1	1.1	0	6.5

Opp=Opportunity Class SRR

Con=Control SRR

TABLE 42

Adjusted Gains or Losses in Reading Age (Comprehension)

and Scores on the BSAG and Rutter CBQ Behaviour Rating Scales

Group	E-O	BSAG		Rutter			BSAG Retest		Rutter Retest		
		UR	OR	N	AS	T	UR	OR	N	AS	T
Con	19	4	7	1	0	3	4	4	0	0	3
Con	16	1	2	2	0	7	3	0	0	0	6
Opp	13	2	3	0	2	5	3	1	0	0	8
Opp	12	12	0	3	0	5	0	1	0	0	3
Opp	8	9	0	0	0	3	15	7	0	0	8
Con	8	9	9	3	0	13	0	5	0	0	6
Con	2	0	0	0	0	0	0	2	0	0	1
Opp	1	8	9	0	0	3	0	24	6	3	20
Mean		6.5	3.7	1.1	.2	4.9	6.9	5.5	.7	.4	6.9
Con	-1	0	30	2	5	23	0	17	5	8	30
Con	-2	1	8	1	3	8	5	6	0	0	6
Opp	-3	3	27	3	4	19	2	1	0	0	3
Opp	-5	13	5	0	0	0	5	12	0	0	7
Opp	-5	16	1	3	0	8	15	2	7	0	20
Opp	-5	5	0	0	0	0	1	0	0	0	1
Con	-5	2	9	2	2	8	6	9	0	1	13
Opp	-6	2	20	3	2	10	5	3	0	0	6
Con	-6	1	8	1	0	6	0	9	0	0	6
Opp	-7	0	0	0	0	0	0	0	0	0	0
Con	-9	0	19	0	2	11	0	8	0	0	10
Con	-9	1	12	0	5	9	3	2	0	0	7
Con	-10	0	0	0	0	1	0	0	0	0	0
Opp	-12	0	19	0	0	4	3	13	5	0	14
Con	-15	0	0	0	0	0	0	0	0	0	0
Opp	-16	2	25	1	2	13	1	12	5	0	15
Mean		2.7	11.4	1	1.6	7.5	2.9	5.9	1.4	.6	8.6

If scores for the Opportunity class boys are examined separately, one can see that although those that made no progress in accuracy had similar scores to the others on the BSAG and Rutter Neuroticism and Antisocial scales, they had higher scores on the Rutter Total. Again, these differences were non-significant. In comprehension, there were differences in the BSAG over-reactive scale, where those children in the Opportunity Class who had made no progress or a loss had a considerably higher mean score in comparison with those who made gains. The boys who had made gains had a mean OR score of 3, whilst those who had remained the same or had lost ground in comprehension had a mean score of 12.13. These results, however, did not reach significance. (Tables 43 and 44, p. 182).

The control group SRR boys did not have the same pattern. Those who showed gains for accuracy had higher over-reactive scores on screening BSAG and on the CBQ total scale, but were similar on other scales. In comprehension, though those who made gains did have lower scores on the over-reactive scale than those who did not, the difference between the two was not as great as the Opportunity Class group. The control group also showed a slight difference in under-reactivity, the boys who made gains having a mean score higher than those who did not, and slight differences in the Rutter Antisocial scale. (Tables 45, p. 182 and 46, p. 183).

Looking at the group of children who had a total CBQ screening score over 9, in the combined SRR group two boys made gains in accuracy while 4 had no gains or a loss. In comprehension, only one boy gained, whilst 5 had no gains or a loss. Of the three

boys in this group with VIQs of 100 or more, only one made a gain in accuracy. In comprehension, only the child in the Control SRR group with VIQ over 100 made progress. The two in the Opportunity Class made substantial losses. (Table 47, p. 183).

TABLE 43

Means of Screening Scores on the BSAG and Rutter CBQ Behaviour Rating Scale for Reading Age (Accuracy) Gain and No Gain Groups for the Opportunity Class

	UR	OR	N	AS	T
Gain Group Mean	5.75	8.5	.75	.50	3.25
No Gain Group Mean	6.12	9.37	1.25	1.0	7.12

TABLE 44

Means of Screening Scores on the BSAG and Rutter CBQ Behaviour Rating Scale for Reading Age (Comprehension) Gain and No Gain Group for the Opportunity Class

	UR	OR	N	AS	T
Gain Group Mean	7.75	3.00	.75	.5	4.0
No Gain Group Mean	5.12	12.12	1.25	1.0	6.75

TABLE 45

Means of Screening Scores on the BSAG and Rutter CBQ Behaviour Rating Scale for Reading Age (Accuracy) Gain and No Gain Groups for the Control Group SRR

	UR	OR	N	AS	T
Gain Group Mean	1.2	11.8	1.4	2.4	10.6
No Gain Group Mean	2.0	6.1	.71	.71	5.14

TABLE 46

Means of Screening Scores on the BSAG and Rutter CBQ Behaviour Rating Scale for Reading Age (Comprehension) Gain and No Gain Groups for the Control Group SRR

	UR	OR	N	AS	T
Gain Group Mean	3.5	4.5	1.5	0	5.7
No Gain Group Mean	1.2	10.7	.75	2.1	8.2

TABLE 47

Adjusted Gains or Losses in Reading Age (Accuracy and Comprehension) for SRR Boys with Screening Scores over Nine on Rutter CBQ

Subject	Total CBQ	N	AS	VIQ	Adjusted Accuracy	Adjusted Comprehension
Op Class 4	19	3	4	97	0	-3
Op Class 8	13	1	2	111	-1	-16
Op Class 11	10	3	2	100	+7	-6
Control 3	11	0	2	86	0	-9
Control 6	23	2	5	85	+5	-1
Control 8	13	3	0	103	-1	+8

Reading Gains related to Retest Scores on Behaviour Rating Scales

An examination of retest scores indicated that when the two groups of SRR boys were combined, there were no differences between the children who made progress and those who did not.

However, when looked at separately, some differences emerged. The Opportunity Class SRR boys who made progress in reading accuracy had higher scores on the over-reactive scale of the BSAG on retest than those who did not make progress. These differences did not reach significance, however, when measures with a chi square test. Nor were there any significant differences between the control SRR boys who had or had not made gains in reading on any of the behaviour scales. (Tables 48 and 49, p. 186).

In comprehension, there were no significant differences in means of Opportunity Class SRR boys or control SRR boys, but control group boys who did well had a lower BSAG over-reactive scale mean score than those who did poorly, and in the Rutter CBQ total mean score. Again, this was reversed in the Opportunity Class where those who had made gains had higher over-reactive score than those who had made no gains. (Tables 50, p. 186 and 51, p. 187). None of these differences reached significance when measured with a chi square test.

Adjusted gain scores for accuracy and comprehension for those SRR boys whose CBQ retest scores were above 9 were examined. Three boys made a gain in accuracy, whilst 4 made no gain or a loss. In comprehension, only one made a gain, whilst 6 made a loss. Neither of the two boys with VIQs above 100 made any gains in accuracy or comprehension. (Table 52, p. 187).

TABLE 48

Means of Retest Scores on the BSAG and Rutter CBQ Behaviour Rating Scale for Reading Age (Accuracy) Gain and No Gain Groups for the Opportunity Class

	UR	OR	N	AS	T
Gain Group Mean	2.5	9.75	1.5	.75	6.5
No Gain Group Mean	5.0	4.62	2.12	0	9.0

TABLE 49

Means of Retest Scores on the BSAG and Rutter CBQ Behaviour Rating Scale for Reading Age (Accuracy) Gain and No Gain Groups for the Control Group SRR

	UR	OR	N	AS	T
Gain Group Mean	2.4	7.4	1	1.8	11.0
No Gain Group Mean	1.28	3.57	0	0	3.71

TABLE 50

Means of Retest Scores on the BSAG and Rutter CBQ Behaviour Rating Scale for Reading Age (Comprehension) Gain and No Gain Groups for the Opportunity Class

	UR	OR	N	AS	T
Gain Group Mean	4.5	8.25	1.5	.75	9.75
No Gain Group Mean	4.0	5.37	2.12	0	8.25

TABLE 51

Means of Retest Scores on the BSAG and the Rutter CBQ Behaviour Rating Scale for Reading Age (Comprehension) Gain and No Gain Groups for the Control Group SRR

	UR	OR	N	AS	T
Gain Group Mean	1.75	2.75	0	0	4.0
No Gain Group Mean	1.75	6.37	.62	1.12	9.0

TABLE 52

Adjusted Gains or Losses in Reading Age (Accuracy and Comprehension) for SRR Boys with Retest Scores over Nine on Rutter CBQ

Subject	Total CBQ	N	AS	VIQ	Adjusted Accuracy	Adjusted Comprehension
Op Class 6	20	7	1	114	0	-5
Op Class 7	20	6	3	97	+2	+1
Op Class 8	15	5	1	111	-1	-16
Op Class 10	14	5	0	88	-9	-12
Control 3	10	1	2	86	0	-9
Control 6	30	5	8	85	+5	-1
Control 7	13	0	1	86	+6	-5

UR=BSAG Underreactive
OR=BSAG Overreactive
N=Rutter CBQ Neuroticism
AS=Rutter CBQ Antisocial
T=Rutter CBQ Total

To summarise:

1) SRR boys with VIQ above 100 did significantly better in comprehension than those below 100, but there were no differences between those who attended the Opportunity Class and those who did not. There were no differences in accuracy between the above and below 100 groups.

2) Among those boys in the Opportunity Class who did have VIQ > 100 and did not make progress, all had high scores on one of the teacher's behaviour rating scales at the beginning of the study.

3) SRR boys who had better scores on the Bender-Gestalt perceptual motor test at the beginning of the study did not do significantly better in comprehension or accuracy when measured by adjusted gain scores. Even when the groups are examined separately, there were no significant differences in either group.

4) There were no significant differences in reading accuracy or comprehension between boys with high or low scores on the Stott-Moyes- Henderson Test for Motor Impairment.

5) There were no significant differences between SRR boys with high ratings on behaviour rating scales and those with low ratings in gains in reading accuracy or comprehension. However, those who made gains in comprehension tended to have somewhat lower BSAG OR scores on screening questionnaires. Retest results also yielded no significant differences between boys who made gains in accuracy and comprehension and those who did not with

reference to emotional indicators. There was a tendency for Opportunity Class boys who had made gains in accuracy or comprehension to score higher on BSAG OR and for control SRR boys who had made gains in comprehension to have lower BSAG OR scores. None of these reached significance. (Table 53, p. 190).

Table 53

The Relationship Between Reading Improvement and Intelligence, Motor Impairment, Perceptual Motor Skills and Emotional Stability for Boys with Specific Reading Retardation

	Reading Age	
	Accuracy	Comprehension
VIQ > 100	ns	.025
PIQ > 100	ns	ns
VIQ and Emotional Stability (Op)	ns	.05
Perceptual Motor Skills	ns	ns
Perceptual Motor Skills (Op)	ns	ns
Perceptual Motor Skills (Con)	ns	ns
Motor Impairment	ns	ns
BSAG UR	ns	ns
BSAG OR	ns	ns
CBQ N	ns	ns
CBQ AS	ns	ns
CBQ T	ns	ns

CHAPTER EIGHT

DISCUSSION OF RESULTS

As stated in Chapter 5, this study set out to examine in detail the children who were placed in full time remedial education and to measure the effectiveness of this sort of educational provision on the acquisition of reading skills. In order to ensure that a well defined group was being examined, an operational definition of Specific Reading Retardation (SRR) was used. This allowed the researcher to identify groups of boys with a similar degree of reading disability based on chronological age, IQ and expected reading age, and to examine their progress. It also allowed comparisons with other studies using the same sort of sample, and to make hypotheses about the group based on these studies.

Within the group of SRR boys, the differential effects of full time remedial provision for different IQ levels, levels of perceptual motor maturation, motor impairment and emotional behaviour were examined. In order to measure the reading progress of the SRR boys in the Opportunity Class, comparisons were made between screening and retest reading scores, using the boys as their own controls.

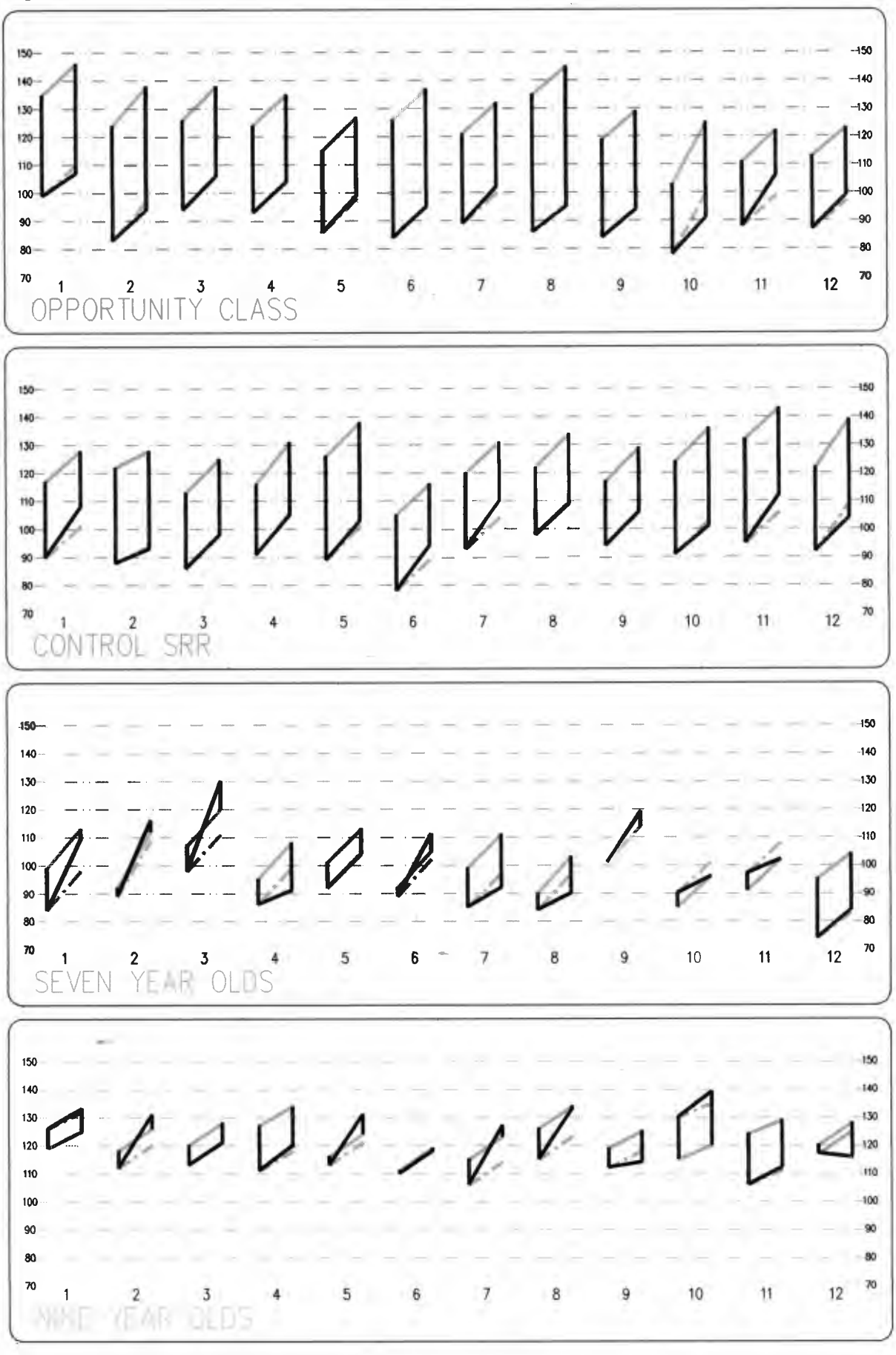
The Opportunity Class SRR boys were also compared with a group of boys meeting the criteria for SRR but remaining in mainstream classes, in order to see whether full time remediation made an appreciable difference in reading gains.

Retest results indicated that children in the Opportunity Class had not made greater gains in reading than the control SRR group who remained in their ordinary schools. This was true of both accuracy and comprehension. In fact, in both accuracy and comprehension, the controls made greater gains than the Opportunity Class boys, and the seven year old good readers made greater gains than either of the SRR groups. The pattern of gain appeared to be the same for all 9 year old groups, whether they were reading retarded or good readers. Each of these groups made about a year's progress in one year, while the 7 year olds advanced 15 months in accuracy and 18 months in comprehension in the same amount of time. Many investigators (Rutter and Yule, 1973, Levin, 1985, Pillener and Reid, 1975) have pointed out that reading attainment cannot be assumed to progress at a uniform rate, and that a year of reading gain at age 7 does not mean the same as a reading gain of a year at age 9. The present study would suggest that the 'average' child of nine, to use Spache's term (Spache, 1976), will grow a year in reading in one school year, but that the average child of seven will make more progress both in accuracy and comprehension. This would suggest that the nine year old SRR child is closer to his CA cohorts than his RA cohorts in pattern of reading growth.

Hayes (1975) in a study of reading failures used each child as his own control and looked at the gain each child made by

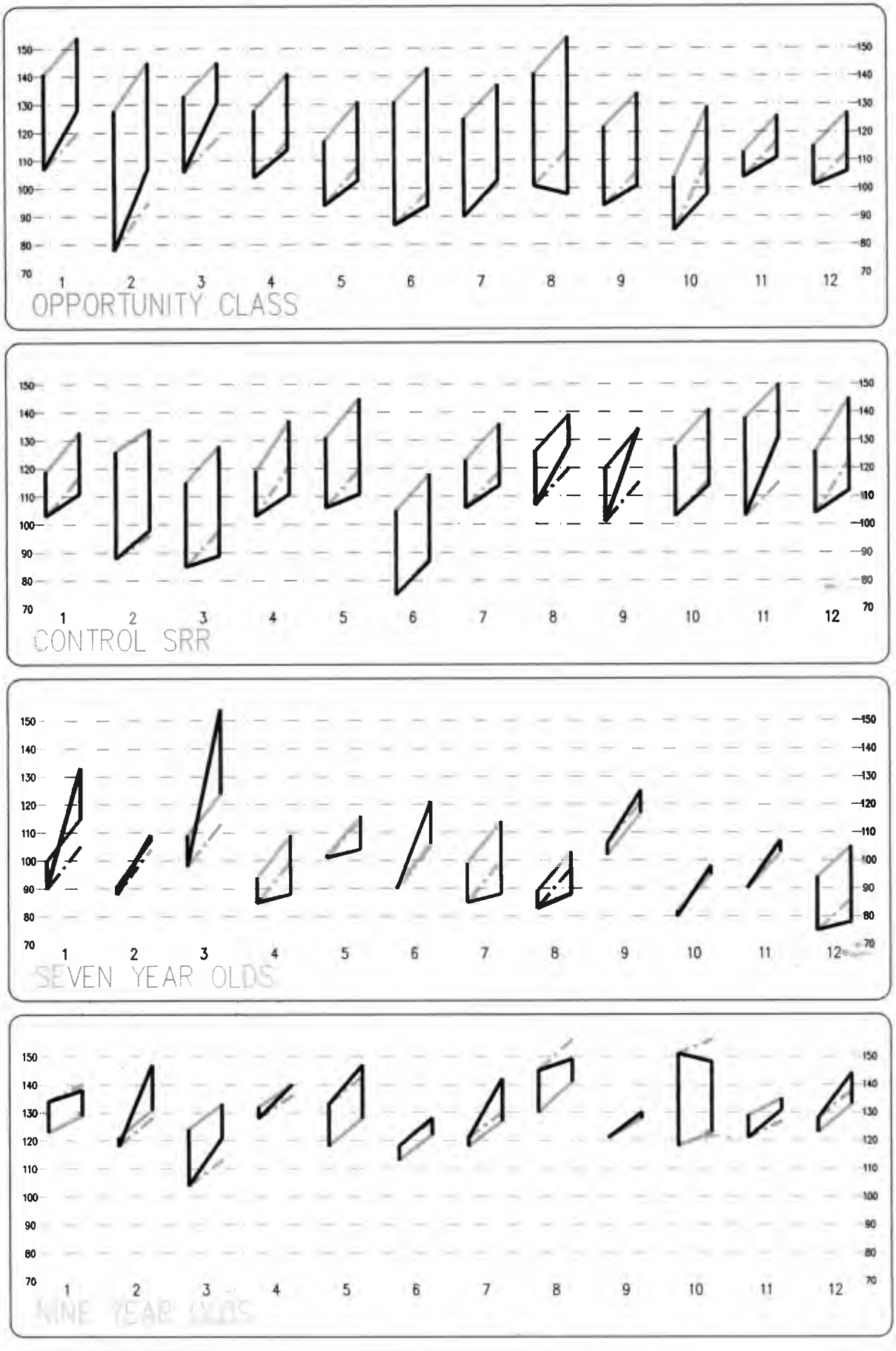
comparing his actual reading age with the expected reading age on the Neale. A similar method for the data in the present study is presented in Table 37 on page 171 and Table 38 on page 172. It can be seen that, rather than recording gains, the scores indicate a mean loss in the Opportunity Class of 4 months for accuracy and 24 months for comprehension. In the control group there is a gain of 10 months between expected and observed for accuracy, but a loss of 8 months for comprehension. Figures 15-18 on page 194 and 19-22 on page 195 indicate that the gaps between observed and expected remain essentially the same in both SRR groups.

Figures 15–18
COMPARISONS OF OBSERVED AND EXPECTED ACCURACY SCORES OF THE FOUR GROUPS



Left side of bar indicates screening scores, right side retest scores.
Black lines connect observed scores, red lines expected scores.
Dotted red lines indicate slope of expected gain superimposed onto slope of observed gain.

Figures 19–22
COMPARISONS OF OBSERVED AND EXPECTED
COMPREHENSION SCORES



Left side of bar indicates screening scores, right side retest scores.
Black lines connect observed scores, red lines expected scores.
Dotted red lines indicate slope of expected gain superimposed onto slope of observed gain.

In contrast, the good reader groups not only had some boys whose observed reading scores were better than their expected in screening tests, but a number of boys who demonstrated a much greater observed than expected gain over the one year period.

Yule (1976) pointed out that there is a growing concern that there is little hard evidence to suggest that remedial education is beneficial. He states that this is an unhealthy and dangerous attitude. Most studies show an initial spurt in learning and then a slowing down. Levin et al. (1985) feel that screening measures which provide a baseline may be spuriously low because of lack of motivation, prior discouragement and limited effort. Once placed in a remedial setting, the children learn new things, and also apply what they already know but had not been using, giving a high rate of growth at the beginning of the study, and then tapering off. Most studies show that after a few months, the untreated groups of poor readers will catch up as much as those given extra help. This is essentially the finding of this study. Some children did respond, though in comparison with their expected reading ages, this response was minimal, and those who made gains in accuracy were not necessarily the same as those who made gains in comprehension. For example, it appears that children with verbal IQ scores of 100 or above made significantly more progress in comprehension than those with IQ scores below 100, though intelligence did not appear to have a differential effect on the acquisition of skill in reading accuracy. These results are similar to those of Yule and Rigley (1967-8) who found that children who were behind and had some remedial teaching gained more in comprehension than accuracy, and that children with higher VIQs made greater gains.

The control SRR group in the present study, however, had similar results to the group receiving remedial help, though they remained in their normal classrooms. This would suggest that the enriched programme provided for the Opportunity Class had less effect on acquisition of reading comprehension skills than the child's ability to abstract and synthesise and a better than average knowledge of words, abilities which the children brought to the remedial situation and which were measured in the short form of the WISC administered at the time of screening.

Vernon (1971) points out that intelligent children with IQs between 116 and 138 and dull children with IQs between 72-84 may have similar results in word recognition, but the more intelligent are superior in comprehension. Certainly, even at the lower range of 100 to 122 for brighter and the higher range of 85-97 for the less bright children, this appeared to be the case. It raises again the question of selection for Opportunity Classes, and whether gains in reading comprehension are the criteria by which the success of a programme should be judged, rather than reading accuracy. If so, then the selection of brighter children would ensure that results would be satisfactory, but whether this was due to the remediation process or to intelligence, would be difficult to ascertain.

It appears that children who improved in reading comprehension were those who had better verbal IQs, but that the improvement was not related to full-time remedial provision. Whether control children were receiving extra help in their own schools is not known, but it is suspected that teachers and heads would have

provided some extra help on a regular or sporadic basis for children who were so far behind. Thus, it is difficult to gauge the response of these children to a possibly different sort of remedial provision. On the basis of reading results alone, however, the conclusion which can be drawn is that full-time remedial provision for one year was not more effective in remediating SRR than the lack of such provision.

The results of the study suggest several avenues for speculation. These include:

1-The comparability of the SRR groups used in the study

2-Criterion measures of success

3-The irremediability of Specific Reading Retardation

4-The nature of the remedial experience

SRR Group Comparability

Intelligence

Although the screening procedure indicated that there were no significant differences between the four groups in terms of short form IQ scores, the WISC did indicate a particular pattern. The specifically reading retarded group had higher performance than verbal IQs. These findings agreed with other investigators who also found that reading retarded children had higher performance IQs. (Hunter and Johnson, 1971, Yule, 1979). However, the major contributors to the higher performance IQ in the SRR group were the control SRR boys. Only two boys in this group had higher verbal than performance IQ scores, whilst 10 had higher

performance scores. Among the Opportunity Class SRR boys, there was an equal distribution of higher verbal or higher performance IQs. Related to this was the large number of children in the control SRR group with performance IQs above 120. (4 out of a group of 12).

There were also differences between the Opportunity Class and control SRR with reference to VIQ distribution. Controls had peaks at the low end of the distribution, with 8 of 12 below average VIQs, whilst Opportunity Class boys had peaks at just below average and above average, with 8 of 12 above average VIQs. (See Figures 2, 3 and 4 on page 118). This suggests that the control SRR boys may have been able to demonstrate competence in areas of the curriculum other than those requiring reading skills, and that this in turn may have influenced the teachers in their decision not to recommend them for the Opportunity Class. It may be that, although both the Opportunity Class boys and control boys met the criteria for inclusion in the study by being specifically reading retarded, other criteria may have been the basis for inclusion in the Opportunity Class. As previously mentioned, the researcher had no control over the composition of the Opportunity Class. The WISC patterns suggest that we may be comparing two rather different groups of SRR boys, with comparable Full Scale short form scores, but with different combinations of VIQ and PIQ scores contributing to the Full Scale score.

Emotional Indicators

The behaviour rating scales, both the BSAG and the CBQ, suggest that children who are poor readers have significantly more emotional difficulties than good readers by the time they reach age 9 or 10. They are significantly more depressed and neurotic, as well as being antisocial and exhibiting more acting out behaviour (as measured by these scales). These results are in contrast to Yule's findings on the Isle of Wight study, where he found that anti-social disorders are particularly characteristic of children with SRR. However, Yule designed the CBQ as a discontinuous measure, and when used in this way it was found that of those children meeting the criteria for behavioural disturbance, more of the SRR children fell into the Antisocial than Neurotic category. None of the good reader groups was found to be primarily Antisocial.

The children in the Opportunity Class seem to be the major contributors to the depressive scales, scoring significantly higher in the depression subscale of the under-reactive scale of the BSAG. This leads to the assumption that this group was not altogether comparable to the control group of poor readers. Their lack of confidence, timidity, and unsociability may , to some extent, stem from the fact that they appear to be less able in many skills, performance as well as reading, as was seen in their lower WISC performance scores. Depression as a function of separation from one's friends and classmates and placement in a new and unfamiliar environment cannot be ruled out, however. Quietness and uninvolvement with others would also lend itself to selection for the Opportunity Class, as those boys would be less

likely to have behaviour (acting out) problems, and thus would be children who might gain more and disturb the others less. At the same time, this sort of selection may ensure that the children who are in the Opportunity Class are those who are more neurotic, less responsive, have fewer inner resources and are therefore less likely to make good use of the placement.

Kalverboer (1976) points out the complex interaction between the individual and his environment. Apathetic children may get less attention from parents in the years before they arrive at school. This would also confirm McMichael's (1979) findings that Infant school children with reading problems had both anti-social and neurotic problems, and arrive at school with these problems before reading instruction began. Behaviour differences in young children will have developed partly as a result of these interactions and may be strengthened by the social environment at school, eliciting from the teacher the same sorts of reactions that were elicited from the mother.

If the Opportunity Class tends to be composed of quiet, withdrawn, neurotic children, whilst those with equally severe reading problems who remain in regular classrooms are more boisterous and self-assured, not to say anti-social, we are perhaps trying to overcome not only a reading problem, but one which is strongly associated with emotional problems.

Other Criteria of Success

If one were to evaluate the remedial programme on reading results alone, the advice to an educational authority would be that full-time remedial classes are no more effective than mainstream education for children with SRR. Measured by other criteria, however, especially those relating to improved emotional status and gain in confidence leading to the use of new strategies of learning, the value of remedial classes becomes apparent.

Emotional Indicators

At the end of the study, there were no longer significant differences between the SRR group and the group of good readers in any of the behaviour rating scales. Both Opportunity Class and control SRR boys had shown improvements in emotional difficulties. Differences between the two groups of SRR boys were not apparent in the major scales of the BSAG. However, by looking at the sub-scales, especially at those measuring depression, and the differences in scored items on the over-reactive scale, one can see a trend.

Retest results of the behaviour rating scales tend to support the theory that Opportunity Class children had gained in self-confidence and had a less depressing outlook than was evident at the beginning of the study. They were no longer as shy and timid or withdrawn, and instead tended to ignore the teacher, as rating scale responses by teachers indicated. This may have been the result of transfer to an ordinary classroom or comprehensive school after a year of special treatment. It also indicated a

certain amount of ego strength and independence, borne out by their misbehaviour when the teacher isn't looking or inventing silly ways of doing things, items within the scales scored by teachers.

In contrast, the control group SRR seemed to be engaging in maladaptive behaviour which is attention seeking. Of those boys in the SRR group who met the criteria for behavioural disturbance on the CBQ, all of the control SRR boys scored as Antisocial, while all of the Opportunity Class boys scored as Neurotic. The control group's depression sub-scale on the BSAG had not changed. Rutter et al. (1966) and Gregory (1965) suggest that emotional difficulties may arise as a reaction to poor reading ability. Spache (1976) comments that we can help make school life more tolerable for many by maintaining our helping relationship. This study has demonstrated the effects of that helping relationship on the child's image of himself, his willingness to take risks to find out, and his generally more positive behaviour in school. Placement in the Opportunity Class of SRR children with emotional problems did not appear to have a significant effect on their reading ability, but did tend to ameliorate their emotional difficulties.

Analysis of Reading Errors

The analysis of reading errors seems to verify the findings of Weber (1968) and Biemiller (1970). Biemiller states that in the higher grades it is the retarded readers who make errors indicative of overuse or misuse of graphic information, because they may be trying to master the graphic skills at this later

stage that they hadn't picked up in earlier grades. Opportunity Class SRR children relied almost exclusively on graphic substitutions rather than grammatical ones and, to a greater extent than seven year old good readers who had begun to use grammar and contextual clues. The control SRR group, although using graphic substitutions more frequently had a much higher percentage of grammatical substitutions.

The analysis of retest reading errors indicates that the Opportunity Class children may have gained a certain amount of self-confidence. They tended to make fewer outright refusals to attempt to read words in comparison with either the control group SRR boys or the seven year old good readers. They also attempted many more words than they did in comparison with their screening results at the beginning of the study, when their refusal rate was slightly higher than the control group SRR. The shift from graphic to grammatical substitutions is marked. Both Opportunity Class boys and seven year olds demonstrated a shift toward grammatical substitutions and, although the control group still exhibited a higher percentage of grammatical substitutions than any of the other groups, there had been no movement. A comparison at this time with the group of good readers aged 9-10 indicated a shift back in the other direction, with 81% of the 9-10 year old good readers using graphic substitutions. These results appear to fit Biemiller's theory that as a child's interest shifts from sound to print, letters are more important than syntax or meaning. Later, substitutions are made which retain the meaning, but ignore the letters. At an even later stage (the 9-10 year old good readers), there is a synthesis of the two with syntax and meaning adding information to the graphic

clues. The shift in emphasis from graphic to grammatical substitutions amongst the Opportunity Class children suggests that they have been given new strategies and perhaps a greater amount of confidence to try these strategies. This is also evident in the shift from 38% refusals to try the word at the beginning of the study to 19% at the end. In the same period the children in the control SRR group went from 31 to 26% refusals and the seven year old good readers from 44 to 30%. The greatest change was in the Opportunity Class, and this may well have been due to a greater amount of self-confidence.

Spreen (1976) has pointed out that the discrepancy between the number of potential learning problems and the number of those actually referred or treated doesn't only stem from the inadequacies of the school system, but from a large number of 'survivors' who are able to pull through without remedial help. It appears from the results of this study that remedial classes are catering for the casualties, and that, looking at the increase in self-confidence and the decrease in depression as measured by the teachers' ratings on behaviour rating scales, even in one year, they have been successful. Objective criteria, such as reading ages have always been able to have a greater influence on educational forward planning and resource deployment. Behaviour rating scales, by their more subjective nature have been less well respected and therefore the emotional life of the child tends to be subsumed under his academic progress. Only when one is faced with large scale truancy or delinquent behaviour in school do the two begin to interact in the minds of the educational establishment. More studies are needed which stress the emotional development of the child and

the influence of a sympathetic environment on the specifically reading retarded. In the current climate of integration of children with special needs into mainstream schools, this issue becomes even more important. The provision of extra help within the classroom situation (an attempt at redeployment of special needs teachers into mainstream schools along with special needs children) will not create the same atmosphere nor level of care and attention. It will certainly not provide the SRR child with a level of work with which he can cope and which will give him a sense of accomplishment, nor will it protect him from inevitable comparisons with his classmates who may be coping with a much higher standard of work.

Irremediability of Specific Reading Retardation

The poor results of the SRR group appear to bear out Yule's observation that the majority of children who were found to have reading difficulties at 10 years of age will continue to lag behind in reading to the end of their comprehensive school days. (Yule, 1973). This appears to be true, even with a year of intensive full-time remedial work. There has been much evidence to suggest that children with SRR do not "catch up" with their age group in reading as they grow older, and exhibit other learning disabilities in spelling and writing. Most researchers have suggested that an early programme of remediation will help to alleviate the problem more effectively, though Spache (1976) disagrees, and justifies the provision at a later age by pointing out stronger motivational factors in older children. Whether or not the reading problem is entirely overcome by early provision, the educational experience of the child should be more positive,

leading to greater self-esteem and a more positive attitude to school. As Rourke (1976) has stated in his discussion of deficit versus lag models, "Until it is shown that retarded readers catch up, the weight of evidence would appear to favour a deficit and not a lag position." Some children do make progress and these might be said to have a lag in development. Rourke states that even though they do advance, data shows that they never actually catch up or even approximate the performance of normal readers. The present study has found this to be the case over a year of intensive remedial work. The evidence may not entirely justify the deficit theory. Developmental lag may be permanent, with the child making slow progress but always behind his peer group whilst a deficit would not necessarily change over time.

Whatever the theoretical model, the evidence seems to point to a need for ongoing provision, possibly for the duration of the SRR child's stay at school as Levin et al. (1985) advise. Bullock (1975) points out that there is no mystique associated with remedial education. The essence is in providing additional time and resources and adapting good teaching methods to the needs of children with reading problems. He states that children who are taught in special groups are sometimes returned to their normal classes without the level of reading competence needed to make independent progress. They lack continued support and then do not keep up the rate of progress they had made in remedial classes. Cashden and Pumphrey (1969) have also pointed out that longer periods of remedial teaching are necessary to produce significant results. This contrasts with Andrews and Shaw's (1986) finding, that increased time in treatment doesn't necessarily lead to further gains. Whether one can justify the

expenditure based on significant gains in reading is doubtful, if one accepts that SRR children will always demonstrate reading problems. The current study has shown that the rate of gain of 9 year old SRR children is closer to other 9 year olds, that is, about a year in a year, than it is to 7 year old readers. If SRR children continue to make gains appropriate to their CA level, this may be as much as one can expect. However, as previously stated, other criteria for success of the remedial experience may need to be considered. Andrews and Shaw (1986) also stated that gains in reading were due to the fact that children were now placed in a sympathetic learning environment. One may have to look at provision of an appropriate educational experience to fit the needs of the child as outlined in the 1981 Education Act.

Specific and Non-Specific Remediation

This study did not attempt to identify specific reading problems for each child, but to identify some possible factors within the group of SRR children, ie. language factors in the examination of Verbal and Performance IQs, intelligence factors, perceptual and motoric factors and emotional factors which might contribute to their reading problems. As Ingram (1971) stated, before remedial measures are employed, it is very important that the precise cause of the difficulty in learning to read and write should be explored in depth. An attempt was also made to identify those SRR children who would derive greater benefit from placement within a special class. Yule (1976) suggests that within the general group findings, some individual children benefit greatly and asks which children will benefit from which approach. He points out that there are few studies which try to match children

with different types of reading problems to different methods. Hinson and Kelly (1986) also suggest matching the appropriate strategies, methods and materials to the individual's learning requirements, and advocate specific diagnostic techniques and a tailor-made remedial programme.

This study examined the effectiveness of only one sort of remedial reading provision, full-time special reading classes, with smaller groups and specially trained teachers using a broad spectrum approach, primarily based on language and communication skills. Historically, no effort had been made to use task analysis to determine each child's strengths and weaknesses, no routine screening was done to see if the children placed in the units had specific problems in language, perceptual or motor skills or emotional problems, or if any of these made a difference in reading acquisition. No programmes using precision teaching to remediate specific deficits were developed. At the end of the year of full-time remedial work, progress was measured by crude gains in reading age, with no reference to intellectual level or to any other growth indicators. Because of more careful screening methods, some of the above parameters were able to be examined in this study.

Perceptual Motor Skills

Differences in reading gains between boys with better or poorer perceptual motor skills were not found. Boys with better Bender-Gestalt scores did not make significantly greater gains in either accuracy or comprehension than those with poorer scores. This was the case with each of the SRR groups. It appears that

the teaching approach used in the Opportunity Class was no more beneficial to those boys who had developed more proficient perceptual motor skills than those who did not. Research done by Koppitz (1975) suggests that both reading and Bender performance are greatly influenced by a child's age and mental ability. Once subjects in her investigation were matched for age and IQ, the relationship between reading and the Bender test disappeared, especially if the children were atypical. This was also the case with SRR children in this study, where there was no relationship between Bender scores and accuracy and comprehension adjusted gain scores.

Motor Impairment

There was no relationship between motor impairment and reading improvement. Boys in the Opportunity Class with better scores on the Test of Motor Impairment did no better on either accuracy or comprehension after a year of full-time remedial instruction. This was also true of control SRR boys. The range of scores was quite limited, however, and none of the SRR group would have been identified as being motor impaired by this test, although the SRR group as a whole were significantly different from the control good readers in one of the scales of the test measuring control and co-ordination of upper limbs. These results were somewhat similar to those obtained in the Isle of Wight study and reported by Yule (1979). In that study it was found that retarded readers were clumsier than controls and were significantly poorer in motor impersistence and right-left discrimination. It appears that there is some link between lack of motor control and reading retardation. However, this particular sample of subjects did not

provide a sufficiently wide range of scores on the TMI to be able to examine the effects of the Opportunity Class on children with motor difficulties. Whilst this measure may be used as a screening device in identifying a group of children, it has no power to predict the progress of individual children. That is, children with higher scores on this test will not necessarily do more poorly than children with low scores in relation to gains in reading age for accuracy and/or comprehension.

The results of the Stott-Moyes Henderson TMI suggest that poor readers may have very specific difficulties in control and co-ordination of upper limbs, and that these may be hampering them in the area of reproducing graphic information. As they, along with the other groups, had difficulty with items related to manual dexterity with emphasis on speed, the combination of the two deficits may ensure that poor readers are defeated in their attempts to copy from the board, write stories or take written spelling tests. Kinetic learning, which is available for other children may be only an area of further frustration to the child already hampered by lack of success.

Gentile et al. (1985) suggest focusing on skills which children have, and state that emphasis should not be placed on skill weaknesses but on competencies. They feel that the focus should be on comprehension, using a language experience approach, not one which stresses decoding. This appears to be the approach used in the Opportunity Classes. It appears to have made little or no difference. As no specific programme was developed, one can only speculate about the usefulness of the decoding approach for these children, especially if each child's deficits were

carefully analysed and a programme designed and monitored throughout the year. Recent research has shown that code emphasis programmes which include phonemic awareness, decoding, and attention to specific orthographic patterns of the writing system have been of greater benefit to all children, but especially to those with learning problems (Williams 1979,1984, Juel 1986, Jorm 1986, Perfetti 1986).

Emotional Indicators

The boys in the Opportunity Class whose adjusted gain scores indicated a gain in accuracy or in comprehension, were not significantly different in their behaviour from those who showed no gains or a loss, as rated by their teachers either in screening or in retest scores. There were some indications that children who did better in comprehension were less overreactive or less disturbed. Of those children who met the criteria on the CBQ for behaviour disturbance, only two of the 6 showed gains in accuracy and one of the six in comprehension when screening rating scale scores were examined. When retest behaviour rating scale scores were used to compare adjusted gains in reading, 3 out of 7 behaviourally disturbed boys showed some improvement in accuracy, but only one out of 7 in comprehension.

Looking at the interaction between behaviour and intelligence with relation to reading gains, it appears that all of the children who had IQs of 100 or above and who did not make progress in comprehension had high scores on the over-reactive or under-reactive scales of the BSAG or the neuroticism scale of the Rutter CBQ, as rated by their teachers at the beginning of the

study. All of these children were from the Opportunity Class. Of those SRR boys who were behaviourally disturbed on the CBQ and had VIQs over 100, one showed a gain in accuracy and one in comprehension using screening scores, and none showed gains in either accuracy or comprehension using retest behaviour rating scores. This suggests that emotional difficulties may prevent children from using the skills they already possess and hamper them from deriving benefits from remedial instruction. It also suggests that the broad-based philosophy which provides a sympathetic climate for learning, which Hinson and Kelly (1986) talk about, may not be enough without the other half of their approach, specific diagnostic techniques and tailor-made remedial programmes based on the results of careful assessment.

In summary, children with better perceptual motor skills, as measured by the Bender-Gestalt test, did not make greater gains in reading than those with poorer skills when placed in the Opportunity Class. There were no differences in reading gains between good and poor scorers who remained in mainstream classrooms.

Children who were rated by their teachers as having more emotional problems were not significantly different from those having fewer problems in terms of reading gains over the year. This was true for all SRR children, whether in the Opportunity Class or in mainstream classes. However, the fact that those children in the Opportunity Class with verbal IQs over 100 who did not make gains in comprehension were those with high scores on behaviour rating scales suggests that these children may need more intensive individual work before they are ready to learn in

a classroom.

The preceding results suggest that there is indeed an interaction between a large number of variables including emotional stability, cognitive functioning and perceptual and motor skills, and that any or all of these may contribute to differences in reading ability as Jorm (1983) suggests. Rutter and Yule (1985) also state that specific reading retardation has multiple causes. Some variables can be isolated and identified in specific children and may lead to suppositions about the aetiology of the individual's reading retardation. However, this approach does not appear to bring us any closer to matching the needs of the child with the most helpful method of remediation. A more useful approach would seem to be a careful diagnosis of the child's learning deficits, task analysis of the skills to be learned, and a carefully worked out programme of learning based on the child's individual needs. If all of this can take place within a caring and supportive atmosphere, some progress should be expected. However, research has shown that children with specific reading retardation are fairly resistant to remediation, and that slow progress over a long period of time with a constant lag factor may be all that can be expected.

A Comparison of Chronological and Reading Age Controls

The preceding section raises the question of whether we are looking at a discrete group of children with specific problems who differ in quality from other children with reading problems, or whether we are looking at a continuum of reading with children with SRR at the bottom of the distribution. Rutter and Yule

(1985) argue that because there is no single pattern which occurs in all dyslexic children, a separate subgroup with specific developmental anomalies has not been demonstrated. However, other investigators (Backman et al 1984, Seymour and Porpodas (1981, Bryant and Bradley 1981) have suggested that matching reading disabled children with RA cohorts would allow one to examine whether these children perform at a lower level or in a different way than younger normally reading children. If SRR children have a lower level of performance on non-reading measures, or a different pattern of reading or spelling errors, then they are qualitatively different from their RA cohorts and may have a deficit rather than a lag. Seymour and Porpodas (1981) go further in stating that "the experiment is tapping an area of dysfunction which possibly makes a causal contribution to the disorder."

Bryant and Goswami (1986) point out some problems in interpreting the results of a Reading Age and Chronological Age design. They state that where results show differences between SRR and Reading Age cohorts, one can conclude that these have contributed to differences in acquisition of reading. The same can be said of similarities between SRR and Chrolological Age cohorts, where the variable can then be ruled out as a contributing cause of reading difficulty. But, when no differences between SRR and Reading Age cohorts is found, it may be because there is no underlying difference, or that differences are masked by the fact that SRR children have a higher mental age. They might be able to adopt additional strategies not available to RA cohorts.

They also ask whether a difference between SRR and RA controls is a qualitative or quantitative one. The implications are that a qualitative difference is a deficit while a quantitative one is a delay in development. They suggest that to distinguish between a deficit, (which would suggest a causal effect), and delay, one should sample over all levels of reading to see the relationship between that variable and reading development. This sort of longitudinal study might identify difficulties before the child learned to read, making it more certain that the variable in question was a qualitative and not a quantitative one.

The results of the present study indicate that SRR children were performing at the same level as their CA controls in perceptual motor skills, suggesting that they were not experiencing difficulty with perceptual motor tasks. It is not known if, in earlier years, these children had demonstrated developmental lag in this area. Other researchers (Satz, 1976, Koppitz, 1975)), suggest that perceptual motor skills are less well developed in children who have learning difficulties in the early years, but it is not known if this is due to a lag in brain development as Satz suggests or to perceptual deficits connected with cognitive structuring as Vellutino (1978) has suggested. Further work with SRR children at the age of six or seven to determine if they do demonstrate perceptual motor problems, coupled with a longitudinal study comparing those who had remedial help with those who did not would shed some light on both the incidence of perceptual motor immaturity in children with SRR and also on the influence of maturation and of remediation on these skills.

In contrast, SRR children tested did considerably worse than either their CA or RA controls in some motor skills, experiencing difficulty with control and co-ordination of upper limbs, suggesting that even at age 9-11 these children might be finding it hard to hold pencils and pens, write quickly or produce neat work. The incidence of this sort of problem at this late stage of development suggests that, rather than being a result of developmental lag, this may be a deficit in children with SRR. Yule and Rutter (1976) have stated that there were no neurological disorders and fewer motor and praxic abnormalities in their sample of SRR children. This study has not found similar results. A recent study by Baker, et al (1984) suggests that there is a slower developmental course for reading disabled children in coding and speed of information processing. They had different developmental patterns than normal readers in symbolic processing speed with boys indicating lower scores than girls and disabled readers indicating lower scores than able readers. There were also lower verbal IQ scores amongst disabled readers. Baker et al feel that it is likely that some of the deficit with regard to both reading performance and symbolic processing speed will persist into adulthood and state that if symbolic processing speed is fundamental to normal reading performance, then slower developmental rate in the reading disabled child may lead to a delay in acquisition of reading skills. Seymour and Porpodas (1981) found that dyslexics differed from RA controls in sensitivity to orthographic regularity, slowness and errors in grapheme-phoneme translations. They also concluded that SRR or dyslexic children have structural coding deficits. Slow development may also be related to the inability to co-ordinate and control upper limbs. If a child processes symbols more

slowly, he reads more slowly. He may also be unable to move quickly or to write quickly because of lack of proper control. This would have implications in the teaching of reading and writing in remedial classes and in the provision of ongoing remedial help throughout school.

SRR children appear to be similar to their RA cohorts in patterns of reading errors on the Neale and in their choice of grammatical or graphic substitution. This would suggest that these particular difficulties stem from reduced experience with written language and are not a cause of reading difficulties. Poor comprehension skills are also a victim of reading problems and appear to become a greater problem with time. At the beginning of the study, SRR boys were slightly ahead of their RA cohorts in comprehension, though far behind their CA cohorts. On retest, there were no differences between SRR boys and 7 year olds in comprehension, despite the difference in age and life experiences.

To summarise, nine year old SRR boys appear to be similar to nine year old good readers in perceptual motor skills, which would rule out perceptual motor variables as a contributing factor in SRR. They are also similar in rate of reading gain. They are similar to 7 year old good readers in reading age accuracy and comprehension, and in patterns of reading errors, including grammatical and graphic substitutions. Their slower progress in comprehension skills over a period of 15 months suggests that, rather than using their higher mental age to succeed, SRR children continue to fall further behind, and may indeed be indicating a difference between them and normal readers, even at

the 7-8 year level.

They differ from both CA and RA controls in motor impairment and in patterns of behaviour. The former suggests a possible deficit in symbolic processing speed and slowness in grapheme-phoneme translation. Children with these problems would need continuous special educational provision to compensate for their difficulties. Emotional problems are probably the result as well as a contributing cause of reading problems, and must be taken into account when planning educational provision for SRR children.

CHAPTER NINE

CONCLUSIONS AND IMPLICATIONS FOR FURTHER RESEARCH

This chapter will examine the social and historical context of the study, with reference to theories of reading acquisition, retardation and remediation extant at the time the study took place. It will then look at the present study critically and will attempt to relate the findings to contemporary research. The chapter will consider more recent advances in reading theory and will close with implications for further research, and for remedial teaching based on research findings.

Social and Historical Context

This study was conducted in 1976, immediately after the publication of the Bullock Report (Bullock, 1975). In the aftermath of the report, Local Education Authorities were trying to respond by looking at their provision for teaching reading and providing remedial help for those children who were having difficulties learning to read. At the same time, a major epidemiological study carried out on the Isle of Wight (Rutter et al. 1976) highlighted the needs of such children by providing an accurate estimate of their number through the use of careful screening methods and an operational definition. In this climate,

with colleges of education and local authorities beginning to make decisions about how they approached literacy and reading failure, this study was constructed.

I Theories of Reading

At the time the study was undertaken, there were a variety of theories of reading. Some investigators suggested that reading was a psycholinguistic guessing game (Smith, 1977). This theory, based on Gestalt psychology and educational philosophy, stresses the `whole word' or `reading for meaning'. Gibson (1966, 1977), on the other hand, put forward a step-by-step process which involved making discriminative responses to graphic symbols, decoding them to speech and then getting meaning from the printed page. Lenneberg (1967) stressed experience and stimulation, and felt that if this is curtailed, cognitive processes such as categorisation and extraction of similarities may not be fully realised. This would lead to limited ability to formulate ideas about letters and words and severely limit reading acquisition. A number of investigators saw reading as a developmental language process. Ilg and Ames (1950) said that in the early stages there appears to be a predominance of visual errors, whilst in later stages errors of meaning become more prevalent, indicating that the child is beginning to use contextual clues. Based on the work of Ilg and Ames and others, Beimiller (1970) suggested that children learn that there are grammatical rules through spoken language, and that substitutions which are made while reading, retaining the meaning of the passage are made as the child progresses, relying on grammatical constraints. Because of the

`great debate' surrounding the way in which reading is acquired, two main teaching strands emerged, one based on the look and say method, or sight vocabulary, with reading for meaning taking precedence, and the other based on a phonics approach, which stressed letter sounds, grapheme-phoneme correspondences and decoding.

II Reading Difficulties

A number of theories of reading failure were also put forward. Although there was some discussion about the emotional readiness of children to learn to read (primarily related to boys) the bulk of the discussion centred around those theories relating to aetiological factors (dyslexia) and those relating to educational measures (specific reading retardation). For many years, the inability to learn to read was thought to be related to brain dysfunction or developmental dyslexia. There had been a search for the underlying nature and the cause of specific reading disability for almost a century. Previous research has characterised reading disabled children as having cognitive deficits, from perceptual to attention to memory problems, and as having performance or process deficits which prevented them from acquiring knowledge and skills needed for reading. The single factor theory of reading disability attempted to isolate the development of children's visual, auditory, or visual motor abilities as causal factors in reading retardation. Perceptual motor deficits have been identified with reading disability especially in the child's early years (Satz et al. 1970). Others (Vellutino, 1977) focused on early verbal and language deficits

as causal factors. Boder's work, (Boder, 1973), suggested that there may be two types of reading disabled children, dysphonic and dyseidetic, the latter having an inability to decode symbols. Other researchers (Silver 1968), have suggested that perceptual motor deficits may remain with children beyond the early years, possibly occurring at ages nine and ten. Motor problems, or as Stott (1966) termed it, motor impairment, was also linked with children whose reading was poor. It was noted by many investigators that learning disabled children had minor incoordination problems, (Johnson and Myklebust, 1967), were clumsy, had motor impersistence and were poor in right-left discrimination (Yule, 1979). Rourke, (1976) suggested that retarded readers did not catch up with their age group and that they might have a deficit rather than a delay in development. Rutter et al. (1975) however, found that there appeared to be two separate groups of poor readers, the retarded and the backward, and that overt neurological disorders were much more frequent in the generally backward group. They also tended to have a wider range of developmental difficulties including motor and praxic abnormalities than the specifically retarded group.

The work of Tizard (1972) and Vernon (1971) challenging the concept of dyslexia, changed the thinking of local educational authorities with reference to remediation. Rather than regarding reading retardation as irremediable because of a defect or dysfunction of the brain, it was suggested that children may be behind in reading for a variety of reasons, and could be provided with specialist teaching to overcome their reading problems. Other researchers (Pillener and Reid, 1972, Senz, 1968) found the medical model of dyslexia unhelpful and noted

that most children with severe reading disabilities were not able to be defined by this syndrome. They also preferred a definition which was educationally based, and which focused on remediation rather than aetiology. The Isle of Wight study (Rutter et al. 1975) provided this definition, by identifying children who were reading below their expected level, with a statistical model using a multiple regression formula based on the child's age and IQ.

III Remediation

However, as with theories of reading and reading retardation, there were also a variety of theories of remediation. Teachers had not been taught a single method of teaching reading, nor a particular method of remediation. Remedial provision sometimes depended on the theoretical models available. Early investigators such as Orton (1925), believed that reading difficulties stemmed from incomplete cerebral dominance. The dyslexic child's major weakness was thought to lie in visual aspects of coding. Methods which depended upon these aspects of reading and writing were disapproved of. Instead, the child's strengths were stressed, and auditory and kinaesthetic modalities were used. A multisensory method which established sound-symbol associations and systematically built up words from letters was used by Gillingham and Stillman (1960) eliminating the guesswork inherent in sight methods.

The look and say method also had its advocates for children requiring remedial help. This method emphasises self-motivation, which is helped by rapid acquisition of a sight vocabulary. The children could read with meaning much sooner than with a coding method, and this was felt to be an advantage with children who were finding reading difficult. It used flash cards of words most frequently used by the children themselves. There were no constraints with reference to phonic regularity, but only a small number of words were able to be learnt at one time. Its disadvantage was that it did not ensure a wide enough variety of words or opportunity for repetition, according to Naidoo (1981).

Naidoo also commented that reading for meaning relies on the child forming associations to phonics through experience, but some children need specific instruction in phonics. She suggested that the complex operations inherent in learning to read, while possibly adequate for children without specific reading problems, make too many demands on children who have problems with short-term auditory or visual memory or grapheme-phoneme encoding and decoding problems.

The Nurture Group Model

However, at the time the present study was undertaken, the basic approach in use in the remedial classes was one arising out of a nurture group philosophy which put forward a model that included small classes, increased teacher-child contact, a supportive and stress-free atmosphere, and experiential language learning in which the child's reading material was generated by the child's experiences within and outside the classroom. It tended to be a

whole-word approach which was supplemented by teaching coding, including alphabetic and phonic systems, both fairly traditional methods of teaching non-problematic children to read.

Therefore, the present study was set within the framework of previous research which stressed developmental delay or deficit in a number of areas which were thought to be underlying causes of reading retardation. These theories, however, did not appear to contribute to philosophies of reading remediation, which were primarily broad based approaches stressing the use of the child's experiences in learning new words by reading for meaning, with supplementary coaching in phonics. Within this historical context, the question asked in the study was of importance in both a practical and theoretical sense. Many local educational authorities were financing such groups, with no provision for evaluating their success. This study was set up to examine what such a group was providing for specifically retarded readers, and whether that provision was effective. For practical reasons, the study focused on only one group, which was thought to be typical of many groups functioning at that time. Specifically, the study was an attempt to examine the way in which a particular local education authority was responding to the needs of reading retarded children, and the effects of that response. It was hoped that this would provide some practical feedback and contribute to literature on research and theories of reading and the remedial process.

Contributions and Limitations

Before looking at the conclusions, it is important to look at the study in terms of its particular contributions as well as its limitations.

I Innovative Features of the Present Research

1) Controlled Study

The present study was the first controlled study using the model of Specific Reading Retardation as outlined by Yule (1967,1973), and upon which the Isle of Wight study was based. Using this model, it was possible to isolate a group of children who, by meeting operationally defined criteria, could be considered as a statistically homogeneous group of retarded readers. Remedial provision for this group could then be evaluated in a systematic fashion by a comparison of screening and retest scores. A similarly defined group of SRR boys not receiving full-time remedial help served as one control group. At the same time, by holding to a specific definition of reading retardation other variables, which might have contributed to lack of reading attainment or have had a differential effect on the remedial process could also be examined.

Because of the dearth of studies using an operationally defined group of retarded readers at the time, it was felt that these variables needed examination within the context of a well-defined group, especially as it might have implications for remedial

teaching. Another consequence of measuring the effects of remedial provision on loosely defined groups was lack of knowledge about the homogeneity of the group. Little was known about the perceptual motor development, possible motor impairment, verbal as well as non-verbal IQ scores and, in most instances, reading comprehension in addition to reading accuracy of the boys in the classes. As a result, it was not known whether some children, because of a variety of differences, were deriving more benefit from placement in a full time remedial class than others, and whether they were deriving benefit from the particular approach to remediation which was being offered. As Rourke (1983) noted, "... it would seem highly probable that different subtypes of children... would respond quite differently to methods of remedial instruction that emphasise 'verbal' as opposed to 'visual-spatial' modes of information processing. Furthermore, it would seem likely that much of the intervention literature has yielded negative results largely because children with some subtypes have benefited from the procedure, whereas children with other subtypes were impaired by them."

It was felt that further examination of these variables was needed in the context of an operationally defined group of SRR children. At the same time, because the design of the study used Reading Age as well as Chronological Age control groups, the developmental delay/deficit dimension could be examined.

2) Reading Age and Chronological Age Control Groups

There has been much discussion in the past few years of the value of using a reading age as well as a chronological age match in order to evaluate factors which contribute to reading retardation. Backman et al. (1984) state that when differences are found between retarded and normal readers of the same age group, they could be a consequence of reduced experience with written language rather than a cause of poor reading. Seymour and Porpodas (1981) comment that "Only if the dyslexic performance can be shown to differ either quantitatively or qualitatively from both reading and chronological age controls will we conclude that the experiment is tapping an area of dysfunction which possibly makes a causal contribution to the disorder". In her most recent book Snowling (1987) notes, "No doubt the best experiments will turn out to be those which compare dyslexic readers with both mental age matched normal readers (chronological age controls) and reading age matched children younger than themselves. Few have done so up to the present time."

The present study, conceived in 1976, was innovative, in that it responded to a major deficiency in evaluative research, the lack of a reading age control group. It had built into it three sets of controls. The first, as stated above, was a statistically controlled group of SRR boys not receiving full-time remedial help. The second was a chronological age control group (mental age match), reading at their age level, and the third was a reading age control group of children, reading at the same level

as the SRR boys, but appropriately for their age. In this way more meaningful comparisons could be made, not only of the reading process itself, which included rates of progress in both accuracy and comprehension, and error analysis, but also of other variables which have been associated with reading retardation. These included perceptual-motor skills, motor impairment and emotional stability. The inclusion of a reading age control in the design has led to more differentiated conclusions about the nature of reading development and of reading retardation.

3) Presentation of Data

Although gross gains in reading age give some indication of the progress made by SRR children, they are inadequate in looking at the long-term prognosis of such children. One can say that a child has gained a year or more in reading age in a year, and that this demonstrates the efficacy of the particular programme. However, this begs the issue of whether that gain represents an increase or decrease in the expected gain, given the age and intellectual level of the child. As Gittelman and Feingold (1983) state in their study of the efficacy of reading remediation, "In spite of the encouraging results obtained in this study...though the reading programme led to significant improvements, many of the children, at the end of treatment, would have qualified for the study. Though they were reading better, they were not normal readers."

What constitutes a "normal" reader depends, to some extent on the measures used. By using the regression equation developed by Yule (1967), which takes into account both the age and IQ of the

child, one can determine the gap between the expected and observed reading age. At the time this study was devised, the use of a regression equation was not a normal practice in studies designed to measure reading retardation or to identify those children most in need of remediation.

Using the information obtained by the use of regression equations at the beginning and end of the study, a more exact approximation of the child's expected reading level could be obtained, thus giving a better idea of actual reading progress. Because of the complexity of the data and in order to present it in a form which would allow the reader to gain as much information as possible in the most economic fashion, special means of presenting data were devised and included in the discussion of the results.

In summary, this was the first study of its kind using both chronological and reading age control groups to examine remedial provision for retarded readers. It was important as it was based on a natural field study, examining methods which had been commonly adopted by local educational authorities. By the use of an operationally defined group of retarded readers, it attempted to control variables which had, at best, been loosely controlled in the past. It utilised novel modes of data analysis and presented the results in a new form which would make them more understandable to the reader. Lastly, it was a study done in response to educational pressure with respect to resources and sought to address current educational issues in the teaching of language and literacy.

II Limitations

1) Generalisability

All studies have their limitations. In this particular study the central issue was the degree of specificity of the results to the particular geographical area in which the study was carried out. Although only examining in one area, other areas in the county and elsewhere had similar provision. In order to improve the study, it would have been necessary to include a sample of children from other parts of the county, also in remedial provision and in mainstream schools. One must therefore consider this study as an in-depth process, bearing in mind that one can then proceed at the next stage to take the most important conclusions and test them out in other contexts. This would include an examination of SRR children in full-time remedial provision in other areas, as well as a comparison of this group with SRR children receiving part-time help through withdrawal or provision of in-class teaching assistance. The latter has been the result of efforts to integrate children with special needs into mainstream schools. However, changes in the nature of the management and organisational structure which are currently being experienced in education may also change the nature of the investigative process in evaluating remedial schemes. Although there will be a national curriculum with achievement targets for children, it is uncertain which children will be exempt from testing. It is more uncertain whether provision will be made in individual schools for those children with SRR who have not had statements of special need, or if there will be a centralised resource for them. It is therefore difficult to envisage the

contexts in which a broad based-investigation can be carried out at this time.

A further limitation must be the small size of the sample. With only twelve boys in each group, there was a greater likelihood of an atypical group. This was especially true in Performance IQ scores of the control SRR boys, and in the TMI scale of control and co-ordination of upper limbs, where the SRR boys did particularly poorly as a group.

2) Measuring Instruments

Viewed in the light of current psychological practice, this study appeared to lean heavily on normative rather than criterion referenced tests. The use of IQ scores might lead one to assume that, to some extent, verbal IQ is independent of reading ability. However, there is sufficient evidence that IQ scores and reading skills are correlated, and for that reason the study was based on the use of regression equations which take into account the relationship between these two variables. Further, the use of the Neale as a reading test has been criticised by many investigators as being poorly standardised and of having too low a ceiling, creating a negative skew. (Rodgers, 1983). This was not relevant to this particular study, however, as no child in any group was near the top of the test.

The Bender-Gestalt test was a poor discriminator of perceptual-motor ability at the nine-and ten-year level. All boys at that age, regardless of reading level, attained a perfect or near-perfect score. It is probably true that by this age perceptual

motor deficits are no longer in evidence. However, it may also be the case that with a more sensitive instrument, some differences may have been detected.

Error analysis, using the categories devised by Neale, are inexact and confusions may often result when trying to interpret a child's responses. The results of this analysis would have carried more weight had a second rater been employed, and inter-rater reliability scores been presented.

The most vulnerable measures were the Teacher Rating Scales. Teachers' attitudes toward their pupils may have varied, depending upon the emotional investment they had in their success, how well they felt they knew the boys, and at what time in the year they filled in the forms (as some delayed for many months). This last point may have been a reflection of the motivation of the individual teacher. Personality variables may have also played a part and, as there were no other raters, there was no check on the perception of the boys by their individual teachers, nor of the subjective interpretations of the scale items.

3) Interpretation of the Data

Given the above limitations in instruments, the study must be seen as indicating trends rather than pointing to definite differences in emotional stability and in types of reading error. A larger sample would have given more weight to these findings and the results would have been more generalisable. At the same time, the smallness of the sample may not have fully justified

the use of Analysis of Variance in order to analyse the data. However, the use of the Scheffe or Newman-Keuls test to determine significance mediated the finding of significant results by basing them on conservative measures.

To summarise, because of the limited area in which the study was carried out, and the smallness of the sample, the results may not be generalisable to a wider population. A larger sample would also have given more weight to the analysis of the results, particularly as there were a number of subscales in each measure, calling into question the reliability and validity of the scores. In those measures where a degree of subjectivity may have been in operation, for example, in scoring error types in the Neale and in the use of behaviour rating scales by the teachers, the use of a second scorer would have given greater credence to the results. Lastly, some of the measures, particularly the Bender-Gestalt seem inappropriate for the age group examined.

Conclusions

In presenting the results of the study, one must recognise its limitations as described above. While it is most unlikely that all of the potential problems identified here are in fact operating, one or more of them may by distorting the obtained picture and it is to this extent that caution is in order.

As stated in the hypotheses, the aim of this study was to examine in detail the children who were placed in full time remedial education and to measure the effects of this educational

provision on the acquisition of reading skills. Hypotheses were made which related to reading improvement in boys placed in the Opportunity Class, to the relationship between reading improvement and differences in IQ, perceptual motor skill, motor impairment and emotional stability, and to comparisons between SRR boys and CA and RA controls as well as differences between SRR boys and good readers.

Hypotheses relating to Reading Improvement

> 1) There will be no improvement in reading age accuracy or comprehension within the Opportunity Class group when measured by the Neale Analysis of Reading Ability, using comparisons of differences between observed and expected reading ages at the beginning and end of the study.

The null hypothesis was supported by the results of the study. As stated in the discussion, Opportunity Class boys had lost rather than gained in both accuracy and comprehension, their scores reflecting a greater gap between expected and observed RA on retest than they had on screening.

> 2) There will be no differences in reading improvement between boys in the Opportunity Class and control group SRR boys when means of retest scores for the Neale Analysis of Reading Ability accuracy and comprehension are compared.

The null hypothesis was supported by the results of the study. Retest scores taken a year after the screening scores indicated no differences between the group which had had a year of full-time remedial help and the group which had remained in mainstream education.

> 3) There will be no differences between patterns of acquisition of reading skills as exhibited by SRR boys and good readers when measured by comparisons of differences between observed and expected reading ages within each group at the beginning and end of the study.

The null hypothesis was not supported by the results of the study. There were no differences between rate of acquisition amongst nine year olds, whether they were good or poor readers, both groups gaining a year in a year of teaching. The seven year old good readers, however, made 15 months progress in accuracy and 18 months progress in comprehension, suggesting a differential rate of gain with respect to age.

> 4) There will be no differences between the two groups of SRR boys with relation to changes from graphic to contextual clues when analysing accuracy errors on the Neale Analysis of Reading Ability.

The null hypothesis was not supported by the results of the study. Opportunity Class boys indicated a shift toward grammatical substitutions while the control SRR group did not, indicating that the Opportunity Class had learnt and been able to make use of new strategies in reading.

The foregoing results would lead one to conclude that the Opportunity Class was no more effective in producing reading gains in either accuracy or comprehension for SRR children than mainstream education. Boys of nine, whether they are reading retarded or are reading at their appropriate age level, appear to have the same rate of gain, regardless of the input of specialist provision. Looking at a more fine-grained measure, however, it appears that Opportunity Class boys were able to make use of specialist teaching to acquire new strategies in learning how to

read. This result must, however, be viewed in the light of previously stated potential limitations.

Hypotheses relating to differences in IQ level, perceptual motor skill, motor impairment, and emotional stability and their relationship to reading improvement in boys with Specific Reading Retardation in remedial education.

> 5) There will be no relationship between high scores on the Verbal IQ scale of the WISC (short form) and amount of gain in reading accuracy and comprehension scores as measured by the Neale Analysis of Reading Ability in the group of SRR boys in the Opportunity Class.

The null hypothesis was not supported by the results of the study. Although gains in reading accuracy were not related to IQ scores, children with IQ scores of 100 or above made significantly more progress in comprehension than those with IQ scores below 100.

> 6) There will be no relationship between scores on the Bender Gestalt test and amount of gain in reading accuracy and comprehension scores as measured by the Neale Analysis of Reading Ability in the group of SRR boys in the Opportunity Class.

The null hypothesis was supported by the results of the study. Boys with better Bender-Gestalt scores did not make significantly greater gains in either accuracy or comprehension than those with poorer scores when adjusted gain scores were used to compute gain.

7) There will be no relationship between scores on the Stott-Moyes-Henderson Test of Motor Impairment and amount of gain in reading accuracy and comprehension scores as measured by the Neale Analysis of Reading Ability in the group of SRR boys in the Opportunity Class.

The null hypothesis was supported by the results of the study. Boys in the Opportunity Class with better scores on the Test of Motor Impairment did no better on either accuracy or comprehension after a year of full-time remedial instruction. None of the Opportunity Class boys would have been identified as being motor impaired by the scores on the TMI, however.

8) There will be no relationship between scores on the Bristol Social Adjustment Guides or the Rutter Children's Behaviour Questionnaire and amount of gain in reading accuracy and comprehension scores as measured by the Neale Analysis of Reading Ability in the group of SRR boys in the Opportunity Class.

The null hypothesis was supported by the results of the study. Opportunity Class boys whose adjusted gain scores indicated a gain in accuracy or in comprehension, were not significantly different in their behaviour from those who showed no gains or a loss in reading scores. This was true of both screening and retest behaviour ratings.

The results suggest that children with better verbal IQs, made better use of a full-time remedial facility with a broad-based language enrichment approach. Children who were rated by their teachers as having more emotional problems were not significantly different from those having fewer problems in terms of reading gains over the year. These results, however, must be viewed in the light of other information gained from the study. For

example, although Opportunity Class boys with higher verbal IQs made gains, SRR controls with higher VIQ also made gains in comprehension. This raises the question of selection for Opportunity Classes. If gain in reading comprehension is the criterion measure of the success of the programme, the selection of brighter children would ensure that results would be satisfactory. Whether this was due to the remediation process or to intelligence and maturation factors would be difficult to ascertain without a control group. The present study suggests that for these children, placement in a full-time remedial facility of this sort made little difference to reading gain.

Looking at the interaction between IQ and behaviour variables, it was found that Opportunity Class children with IQs above 100 who did not make progress were those with high scores on behaviour rating scales. This suggests that better IQ scores of themselves are not good predictors of success, and that the emotional stability of the child must also be taken into consideration when looking at remedial provision.

Hypotheses related to comparisons between SRR boys and CA and RA controls

> 9) Nine-year-old boys with Specific Reading Retardation will not be significantly poorer in tests of perceptual motor integration than nine-year- old boys who are reading at the nine year level. The scores of Bender Gestalt tests of nine-year-old SRR boys will more closely resemble other nine-year-olds than those of seven-year-olds when measured by a one-way analysis of variance.

The null hypothesis was supported by the results of the study. Nine-year-old SRR boys in both Opportunity Classes and in mainstream classes were no different in their Bender-Gestalt scores than nine-year-old good readers, both performing at their chronological age level.

> 10) Nine-year-old boys with Specific Reading Retardation will not be significantly different from nine-year-old good readers in the types of reading errors they commit. Scores for SRR boys on the Neale Analysis of Reading Ability for graphic and grammatical substitutions will not differ significantly from those of nine-year-old good readers and will more closely resemble the nine-year-olds than the seven year old good readers.

The results of the study did not support the null hypothesis. Screening results indicated a significant difference between the three groups reading at the same level. SRR boys made more pronunciation errors and had fewer refusals than RA controls. There were also significant differences in types of substitutions, but the Opportunity Class boys had a different pattern from the control SRR as well as the 7-year-olds, committing many more graphic errors than either of the other two groups.

At the end of the study there were significant differences between the four groups. However, control group SRR more closely resembled the 7-year-old good readers, while the Opportunity Class boys more resembled the 9-year-olds. When the three groups reading at the same age level were examined separately, there were no significant differences in type of substitution, nor in pattern of reading errors on the Neale. All three groups reading at the seven year level differed from the nine-year-old good readers in that they made fewer mispronunciations and had a far

greater percentage of refusals.

> 11) There will be no significant differences between boys with Specific Reading Retardation and RA or CA controls in motor impairment as measured by the Stott-Moyes-Henderson Test of Motor Impairment.

The results of the study did not support the null hypothesis. There was a significant difference between SRR boys and both groups of good readers, the SRR children having greater difficulty with control and co-ordination of upper limbs. Seven year olds, on the other hand, appeared to have greatest difficulty with manual dexterity with emphasis on speed. This suggests that the SRR group may be qualitatively different from good readers with respect to upper limb control and that this cannot be attributed to developmental delay.

> 12) There will be no significant differences between boys with Specific Reading Retardation and RA or CA controls in emotional stability as measured by the Bristol Social Adjustment Guides or the Rutter Children's Behaviour Questionnaire.

The results of the study did not support the null hypothesis. SRR boys had significantly more emotional difficulties than good readers at the beginning of the study. They were rated by their teachers as being more depressed, more neurotic, more anti-social and more acting out. On retest, major differences between SRR boys and CA and RA controls were no longer apparent. Subscale scores however indicated that there were significant differences between Opportunity Class boys and the three control groups, Opportunity Class boys scoring higher in Depression and Inconsequence. There were also differences between the SRR controls and the other three groups, the SRR controls scoring higher on Peer Maladaptiveness. The results suggest that the SRR

boys had gained in self control to some extent, and had become, in the views of their teachers, less depressed and better adjusted to the learning situation. However, the results of the SRR controls also suggests that they may have developed some antipathy toward their peers.

In summary, the results suggested that 9-year-old SRR boys were developmentally similar to their CA controls in perceptual motor development. This may in part be due to the fact that the Bender-Gestalt test did not differentiate at higher age levels. They were more similar to their RA than CA controls in their approach to reading, that is, in their patterns of reading errors and kinds of substitutions. Given the difficulty of scoring these errors, the results would have been more convincing if a second set of sores was used for comparison. They were behaviourally different from either CA or RA controls at the beginning, but not significantly so at the end of the study. A second set of behaviour ratings taken at the same time would have lent more weight to the findings. SRR boys, however, were significantly different from either CA or RA controls in motor development, scoring higher than either 7 or 9-year-old good readers in control and co-ordination of upper limbs, while 7-year- olds differed from all 9-year-olds in manual dexterity with emphasis on speed. Again, these results must be viewed within the context of the limitations of the measuring instruments and experimental design previously stated.

Implications of the Present Study

The present study was undertaken a) to measure the effectiveness of a full-time remedial unit for boys with Specific Reading Retardation; b) to determine whether, within this narrow category, certain children would derive greater benefit than others from the teaching approaches used in the unit; c) to see whether there were qualitative as well as quantitative differences between children who were successful readers and those who failed to make progress.

The results indicated that, in order to evaluate the effects of any remedial intervention, the mechanism for such an evaluation must be carefully outlined at the outset, and the goals carefully defined. If the effectiveness of the Opportunity Class was judged on gross gains in reading age alone, as had been the practice for many years, one could conclude that the intervention had been successful and that money had been well spent. However, this study has indicated that using other yardsticks of reading gain, the intervention was not successful. When measured against a control group of SRR children remaining in mainstream classes, Opportunity Class boys did not make better progress. When measured against the progress made by CA controls, it was found that all 9-year-olds, regardless of reading proficiency or special remedial provision made the same rate of progress. And when measured against their own observed and expected reading scores, Opportunity Class boys made a loss rather than a gain in both accuracy and comprehension.

Yule and Rutter (1976) pointed out that "while it is hoped that improved definitions and sounder conceptual frameworks will lead to better understanding of the neurological, developmental and psychological processes underlying SRR, it is also hoped that more careful studies will be undertaken in the areas of preventing reading failure and remedial education." The statement suggests a partnership between theoretical models of reading retardation and research in the schools. The present study attempted to isolate some of the aforementioned neurological, developmental and psychological variables associated with SRR, and to see whether certain children would benefit more than others from the Opportunity Class. The results suggested that there was little or no relationship between these variables and reading gain, if a broad-based, language enrichment programme was followed. For example, nine-year-old SRR boys were no different from nine-year-old good readers in perceptual motor development. This suggests that by the age of nine, boys with reading difficulties no longer have problems with perceptual motor skills. Conversely, in areas where there was a difference, both qualitatively and quantitatively, between good and poor readers, and even between SRR boys and their RA controls, scores on those variables were not related to reading gains made by the Opportunity Class. For example in motor impairment, scores on the TMI were not related to reading gains. Nor was there a relationship between behaviour rating scores and reading gain. The only variable which can be said to have had any relationship to reading gain was verbal intelligence, which was adversely affected by poor scores on behaviour rating scales.

Lewis (1981), in an article examining the role of the educational psychologist in the light of the 1981 Education Act said that evaluations have to be mounted if an accurate picture of organisational and legislative changes in relation to the educational and social achievement of children is to emerge. Educational psychologists are in a good position to design and carry out research and evaluate changes because they can be involved in their introduction. Both the process and outcome can be assessed, hypotheses tested and the results of differing curriculum innovations monitored, compared and evaluated. Lewis pointed out that these sorts of research programmes would seem to be particularly important in a time of diminishing finance in order to see whether scarce resources are put to their best use. In a recent article on the long-term results of remedial teaching of reading, Simm (1986) makes the point that one advantage of doing studies in on-going remedial services of LEAs is that it is the place where the vast majority of remedial teaching takes place. He points out that there has been an extremely large increase in the number and size of LEA remedial services in the past 25 years but, in spite of the cost, there is little record of any serious attempt to evaluate the effectiveness of the interventions in the long term.

The present study has pointed up some of the limitations of field rather than laboratory research. Applied research, as indicated by Fishman and Neigher (1982) tends to be problem oriented and to identify with the needs of the consumer who usually wants "answers," whilst laboratory research because it can control more variables tends to be more theoretical (and possibly hold a higher place in the scientific hierarchy). Field research,

however, seems most appropriate for educational research. Yule and Rigley (1967-8) stated that they are aware of the complexities in doing a field study, but the fact that all relevant variables cannot be controlled, "doesn't absolve us from our responsibility toward providing the best service we can for these handicapped children in the light of our present knowledge and limited resources."

Rutter (1970) stated that questions for research come from problems in service provision and research results can be taken into account when planning future services. He suggested that when services are in short supply, the alternative to planned use is unplanned attempts to deal with a series of crises. At the present time, however, it is difficult to determine where the responsibility lies for planning services. There is a shift in power from Local Educational Authorities to central Government, with schools asked to manage their own budgets. Ancillary services with an overview of remedial provision in the area may be phased out, and schools may opt for individual advice and evaluation, or may feel that their budgets can be better spent, leading to further unplanned and possibly inappropriate help for SRR children. It remains to be seen whether LEAs and/or individual schools under LMS will consider this to be a priority in their budgets. Under the new act, if LEAs are unable to make full educational provision to meet the needs of a child identified by the assessment procedure, the LEAs planning and resources strategies should be reviewed. However, at present there is no scheme for monitoring this process, nor guidelines suggesting how much time the LEA has to meet the needs of the child. As with other educational legislation, although the

measures for assessment and special provision have been laid down, implementation has been more difficult due to lack of funds. It remains to be seen whether the new Education Reform Act will truly meet the needs of children with Specific Reading Retardation, and whether evaluation of remediation schemes to meet those needs will be built into the system.

Although there was no significant improvement in reading amongst the Opportunity Class boys, other criteria suggested that the environment was conducive to improvements in self-esteem and in attitude to learning. There were indications that Opportunity Class boys may have been able to be more flexible and to make use of new strategies to learn to read. They were judged by their teachers to be less depressed at the end of the study and less prone than control SRR to anti-social acting out problems amongst their peers. This suggests that provision for boys with severe reading problems should include a supportive environment which recognises that learning disabled children enter the classroom with emotional problems which are exacerbated by further difficulty with learning. Topping et al. (1985) found similar results in a paired reading scheme, in which reading improvement was accompanied by gains in confidence and self image, reflected in improved behaviour in a school for emotionally and behaviourally disturbed children.

Current Theories of Learning and Learning Disability

In the past decade, that is, since the inception of work on this study, there has been a significant change in theories of learning, with important implications for the treatment of learning disabilities. Writing in 1983, Rourke commented that there were still several unresolved issues that required further work. He stated that in the field of learning disabilities, "it would appear that the necessary phase of rigorous clinical investigation of the disorders in question was all but overlooked at its earliest stages. Instead, definitions of the disability were formulated prematurely and were forced upon the research and clinical communities with reckless disregard for scientific rigour."

Current studies are looking at learning mechanisms which according to Brown and Campione (1986) "are specific to species operating in specific contexts." This has meant that in terms of looking at learning difficulties, detailed analyses of individual learning tasks can be made which can then be used to determine whether children have the requisite skills for these tasks. As Beck and Carpenter (1986) observed, this can only be examined in an educational context.

Along with this, there has been a shift from diagnosing cognitive deficits in children to identifying the specific skills with which the child is having difficulty. As Howell et al. (1979) stated, "Special education has long been confused by the need to explain the cause of the handicaps while attempting to cure them. This confusion has been increased by attempts to carry out the

precise medical approach with imprecise tools." Howell et al. (1979) held the view that new procedures are needed which go beyond explaining a disability and instead look at the treatment of a handicap. They stated that the final goal is to develop theories and diagnostic procedures which can explain and be used to influence learning. An example of this is the individual education programme, involving parents and teachers (Jewell, 1986). Jewell warns, however, that it is not enough to pick out one or two elements of the programme and use them in isolation. In order for programmes to be successful, as many components of direct instruction as possible should be implemented.

The new model attempts to integrate two areas of psychological theory. The first comes from cognitive psychology and emphasises well designed instruction based on a detailed analysis of specific kinds of tasks and how the information needed in these tasks is processed. Brown and Campione (1986) note that contemporary research has made great strides in making these detailed analyses. The second arises from learning theory and its offshoot, behaviour modification. This has led to a task-analytic approach to remediating learning difficulties. Howell et al. (1979) placed great importance on the diagnostic process, in which, they said, information is gathered which directly affects the child's treatment. It should predict how the child will behave in future. Testing information must be directly related to instruction and must remain so long enough for the instruction to be completed. As Brown and Campione (1986) pointed out, traditional standard tests have yielded static measures, making little attempt to directly assess the processes that have led to those levels. With a more dynamic assessment

model, a mini-learning environment is provided, where the child's current status and potential for learning are evaluated. The assessment provides information about how children learn within a particular domain rather than with respect to past knowledge. They felt that changing the emphasis from one focused on weak entities in the child to one which stresses partial knowledge that can be improved with guided practice has important psychological consequences. It changes the image of the child's learning potential from a static and general one to a dynamic and domain-specific one.

However, other views based on subtypes of deficit are still very much alive. Rourke (1983) for example, stated that the determination of reliable subtypes of learning disabilities appeared to be the most pressing issue at that time. He said that the results of studies based on a treatment by subtype interaction would contribute greatly to the understanding of learning disorders.

Current Research in Reading Disability

Current research has concluded that verbal language processes are generally more important than visuospatial skills in reading. Rutter and Yule ((1985) pointed out that visual perceptual difficulties may be correlated with reading difficulties, but they are seldom the major causal factors. The same may be true of other variables which have been investigated, such as patterns of eye-movement, sequencing skills, and short term memory and poor concentration. In fact, many of these have been found to be

a consequence of poor verbal labelling ability or arise out of slow and ineffective reading.

Bryant and Bradley (1985) found that children who are poor in rhyming skills at age 4 or 5 will have reading problems at age 8. They felt that retarded readers are less able to take advantage of letter-sound correspondences and are more dependent on context than good readers. Along with Beimiller (1970), Bryant and Bradley believed that SRR children persist in using an outmoded strategy for reading. Rather than becoming more flexible as normal readers do, they continue to use word recognition for reading, while being able to use phonological codes for spelling.

Morrison (1984) did not see perceptual deficit, short-term memory deficit or phonetic coding as uniquely responsible for reading disability. He said that the fundamental problem lies in acquiring knowledge about words and how they are pronounced. He stated that the difficulty stems from the child's failure to master the complex, irregular system of rules governing symbol-sound correspondences in English. This hampers the child from developing rapid, automated word-decoding operations. Morrison suggested that the three tasks facing the child learning to read are developmentally linked or dependent on one another. Developing comprehension skills depends on having automated word-decoding operations which in turn comes through mastering the symbol-sound correspondence rules. Morrison advocated a task analysis of the acquisition of basic word knowledge and word decoding skills.

Gibb and Randall (1988) also believed that phonemic awareness is crucial for the development of reading. They stated that there is even a case for developing phonemic awareness skills before approaching the written word, as a pre-reading skill. Naidoo (1981) pointed out that within the dyslexic population auditory dyslexia is accompanied by difficulty in recalling sounds and words, very poor short-term auditory memory, difficulty in rhyming, auditory discrimination and sound blending.

Snowling (1987) described deficits in verbal memory and phonemic segmentation and stated that reading retarded children have encoding problems. They do not use phonological codes for memory storage. The dyslexic child fails to break through to the alphabetic phase because of phonological difficulties.

Although there is no agreement about the particular area of verbal difficulty, most current research points to problems in some verbal language processes as contributing to reading difficulties. The situation is less clear in the areas of learning theory and learning difficulty, where opinion is still divided between educational models based on skills training and cognitive ability, and the deficit model which stresses aetiological causality and the identification of subtypes of disability. These differing strands have relevance with respect to the provision of remedial help.

Current Remedial Approaches

Hewison (1982) outlined three basic remedial teaching methods, which, she stated, have been prescribed by theoreticians and implemented by teachers for many years. The first is based on the `differential diagnosis-prescriptive teaching' model, where an assessment of psycholinguistic and perceptual motor abilities considered necessary for learning to read is followed by formulation of an individual remedial prescription, based on revealed patterns of underlying strengths and weaknesses. A second is classification into diagnostic groups based on the child's principal deficit, such as visual-perceptual, auditory-perceptual, or psycholinguistic. Children are then taught through a stronger modality or trained on the underlying weak abilities. A third remedial approach is that of skill-oriented teaching. Instead of training underlying psychological processes, the aim is the direct training of reading and spelling skills. Reading is taught by analysing words for recurring visual patterns of letters and the relationship between visual patterns and corresponding sounds is explained carefully and logically.

These methods suggest that, rather than looking at processes underlying SRR, it would seem more fruitful to focus on specific areas of reading difficulty for each child. These would include using an analysis of reading errors, identifying problems in hearing sounds and rhymes, careful analysis of spelling errors, determining use and misuse of analogy strategies and inference making as well as knowledge of vocabulary and syntax. The National Curriculum, with its emphasis on SATs at ages seven and

eleven, should be able to contribute to this area, providing diagnostic information as well as a framework for delivery of remedial teaching. However, as Williams (1979) pointed out, the exciting new areas in psychology have been language and cognitive processing, and these have had more relevance for issues of comprehension than decoding. At the same time, behavioural models of learning psychology have been more applicable to the teaching of decoding skills. In order to be of use in teaching comprehension skills, task analysis must devise methods of breaking down and measuring such skills as analogous thinking, inference making and conceptual understanding, tasks more difficult to define than number of words read correctly or mastery of vowel sounds. Cognitive psychological theory should be able to provide information which will help to redefine those tasks into more manageable sub-tasks.

However, as Williams (1979) commented, although research has indicated that a skills approach which is phonics-based is more useful for beginning readers and especially those children from disadvantaged backgrounds or who are slower to grasp the fundamentals of learning, there has been resistance to adopting this method of teaching in the classroom. Although in the past decade, parental involvement schemes such as paired reading (Morgan, 1976, Bushell, et al. 1982, Topping and McKnight, 1984) have been used, resistance still exists. Such schemes have less emphasis on skills and are based instead on the apprenticeship approach to beginning reading. Williams felt that resistance was due in part to the fact that the method has its roots in the old stimulus-response behaviourist psychology which was unacceptable to many teachers. This was true in spite of the fact that many

cognitive psychologists have attempted to integrate learning theory with cognitive research. Some of the resistance may have been due to a certain amount of over-simplification of the goals of the `psycho-educational model' as Howell et al. (1979) called it, and an overstatement of the behavioural model. For example, Howell et al. stated that treatment in the psycho-educational model is directed at changing the child's cognitive or perceptual ability. Many researchers have long realised that this may not be possible and it is not one of the goals of remedial teaching.

Based on research stressing the importance of linguistic skills, most current remedial strategies are language based. Naidoo (1981) suggested that what is needed for retarded readers is a technique which utilises visual strengths where the phonic structure of words is taught by working from whole word to constituent sounds. In order to teach dyslexic children, she felt one needed a structured, systematic and thorough approach, utilising a multisensory method. Bryant and Bradley (1985) stated that it is important to foster the retarded reader's awareness of sounds in words, show them how to make generalisations in spelling, emphasise and demonstrate the connections between reading and spelling and between the phonological and visual sides of reading and writing and cater for the fact that different retarded readers may set about reading in different ways. They advocated the use of plastic letters to show correspondence between sound and patterns of words. This improves phonological skill and connects them tangibly to the alphabet. Letters also emphasise visual patterns that words have in common and common sounds. Experience with

nursery rhymes and verses and word games are very important, and Bryant and Bradley also advocated a multisensory method which relies on tracing letters with fingers, combining visual information (seeing the word) with auditory-orthographic information (spelling out the letters).

Snowling (1987) agreed that training in sound categorisation can assist reading and spelling development. But, she suggested an alternative approach, which is to enhance directly the child's ability to deal with printed words: that is, explicitly show the child orthographic patterns so that the phonological analysis which usually makes it possible to abstract them will not be required. She also advocated the use of lexical units larger than the grapheme-phoneme correspondence for reading and spelling. This requires a knowledge of single letter-sound correspondences and the ability to segment spoken words into units of onset and rhyme(c-ake, b-ell). This reduces sound blending requirements in reading and reduces the load on auditory memory in spelling. Multisensory teaching was also recommended.

Hewison (1982), on the other hand feels that there is too much concentration on both the psychological characteristics of children as learners, and the choice of methods and materials available to their teachers. She sees as one promising departure from this pattern the interest shown in non-professional tutoring as a means of improving reading performance. Parents, peers and para-professional tutoring as a means of improving reading performance is suggested.

It is not surprising that, given the range of theoretical models

available, there should also be continuing controversy surrounding remedial methodology. As well as resistance to teaching decoding because of its behaviourist flavour and connection with repetitive drilling, there is also continuing disagreement about the role of phonic analysis and the place of word recognition. Added to this, is the move to enlist non-professionals in the teaching of reading, and the belief by some (Gentile et al. 1985), that some children who are reading-retarded are neurologcally impaired and that focusing on areas of weakness may prove damaging to the child.

Current Research on the Effects of Remediation

Even if the sources of academic delay are identified, as Brown and Campione (1986) noted, it isn't clear what sort of instruction is necessary to overcome them. There is also little evidence available to indicate that students with certain aptitudes will behave differently in certain programmes or treatments than they will in others. This was seen in the current study, where identification of possible sources of learning difficulty or ability did not have any relationship to either instructional plans or reading improvement.

Gittelman (1983) also made this point with reference to her own work and those of other researchers. She stated that given the lack of empirical data concerning the interaction between diagnostic differentiations and treatment responses these classifications are not currently relevant to a discussion of treatment efficacy. No one method is best, either for groups of

children, or for individual children with specific types of deficits. Gittelman and Feingold (1983) found that children improved with phonetic instruction, without regard to typology of the disorders. Random-assignment, parallel-group designs with large samples are needed. This will allow a determination of interaction between type of reading disorders and treatment efficacy.

As previously stated, any approach would need to have built into it an evaluative procedure and periodic review. However, no systematic study of contingent reinforcement, nor teaching programmes generated by the linguistic approach have been done. Hewison (1982) commented that although numerous books and articles are published every year, few include empirical data of any kind, and well-designed comparisons of remedial teaching methods are almost impossible to find. Exceptions to this are to be found in Topping and Wolfendale (1985), a series of studies on parental involvement in reading.

The issues that stimulated the current study remain as prevalent as they did at its inception. Indeed, as Gittelman pointed out, "Given the extraordinary stability of theoretical approaches to reading development, it would be overoptimistic to expect a shift in theoretical understanding since Diack reviewed the field in 1965. The views of the 1980's largely reiterate earlier writings." Although the latest theories place emphasis on language and linguistic skills, it appears that major gaps still exist in research design and methodology, whereby these theories can be tested in real-life learning situations. Problems of definition of reading retardation, measuring instruments and

measures of efficacy of particular remedial programmes still present problems when reviewing current literature. Questions of aetiology have not been answered, nor is it certain whether these are important when designing remedial strategies for retarded readers. The same may be true for different types of retarded readers. Nor is the `great debate' about teaching decoding skills or phonic approaches versus whole-word and reading for meaning or comprehension resolved. although we have moved toward text as much as word processing. However, there is still much interest in the phonetic-decoding question, as evidenced by a recent article of Ehri and Wilce (1987), writing about cipher versus cue reading. Recent research has supported the efficacy of reading remediation emphasising phonetic skills (Gittelman, 1983, Bryant and Bradley, 1985, Snowling, 1986,) and some have suggested that aetiology and typology are not important factors in the use of this method. These studies, however, have also suffered from imprecise definitions of reading retardation, and small sample size. Well designed studies, using larger samples, with operationally defined groups, reading as well as chronological age controls, longitudinal studies, and appropriate assessment techniques are badly needed to address questions of typology and its relationship to differential remedial treatments, and to examine the efficacy of the remedial programmes themselves.

The current study as well as previous research has found that, in spite of intensive remediation, Specifically Reading Retarded children will always remain behind in reading and may need a special curriculum or at least some sort of remedial provision as long as they remain in formal education. The present facilities

in most Comprehensive Schools provide for remedial help for the first three years only, that is, until children are to begin their course of study for exams. Bright children, who are unable to read quickly enough or write quickly enough are found in classrooms where they are either continually frustrated and become behaviour problems, or are in classes with less intellectually able children, and often lose interest in education and become depressed and disaffected. With the introduction of the National Curriculum, such children should be identified early by the use of the SATs, and the curriculum modified with the use of a special educational statement, specifying which parts of the curriculum are disallowed or changed. At the same time, statements are required to be annually reviewed and modified to correspond to the progress of the child. However, these measures are costly, and schools would have to decide whether they wish to maintain statements on all children with special needs. The current practice is that children with Specific Reading Retardation are not necessarily statemented, nor is statementing always seen to be in the best interest of the child. However, in order to remain truly comprehensive, a curriculum in each subject area needs to be developed for the reading retarded so that they can derive benefits and enjoyment from the educational system.

APPENDIX ONE

SCORE RANGES AND ANALYSIS OF VARIANCE TABLES

TABLE 54

Ranges of Scores on Screening Data

	Opp Class SRR	Control SRR	7 Yr. old good readers	9 Yr. old good readers
Age	8-11 to 10-11	9-0 to 11-0	6-11 to 7-5	9-4 to 10-8
Median	10-5	10-4	7-3	9-10
Reading Age Acc	6-11 to 8-5	6-6 to 8-2	6-2 to 8-11	8-10 to 10-10
Median	7-5	7-7	7-5	9-5
Reading Age Comp	6-6 to 8-11	6-3 to 8-11	6-3 to 8-10	8-8 to 12-7
Median	7-10	8-7	7-5	10-5
VIQ	88-122	85-114	88-121	94-119
Mean	105.5	95.5	102.7	109.9
PIQ	89-125	89-157	91-140	80-125
Mean	108.2	112.4	109.1	102.7
FSIQ	98-118	89-119	93-121	95-118
Mean	105.7	103.0	105.2	105.8
Bender-Gestalt	6.0 to 11	6.5 to 11	5.0 to 8.5	6.5 to 11
Median	9.0	9.0	7.5	9.0
TMI	0 to 5	0 to 16	0 to 8	0 to 26
Median	2	1	3	0
BSAG UR	0 to 18	0 to 30	0 to 8	0 to 4
Mean	6.1	4	1.7	1
BSAG OR	0 to 27	0 to 19	0 to 13	0 to 20
Mean	9.1	6	2.5	4.2
CBQ N	0 to 3	0 to 3	0 to 3	0 to 2
Mean	1.25	1	.75	.50
CBQ AS	0 to 4	0 to 5	0 to 3	0 to 3
Mean	.83	1.42	.42	.50
CBQ T	0 to 19	0 to 23	0 to 10	0 to 3
Mean	5.7	7.4	3.6	3.2

ANALYSIS OF VARIANCE TABLES

TABLE 55

WISC (short form) Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	22.89	3	7.63	.19	.90
Within groups	1730.41	44	39.33		
Total	1753.31	47			

TABLE 56

Reading Age (Accuracy) Screening Test

	SS	df	Mean Sq.	F	Sigma
Between groups	5918.72	3	1972.90	30.56	.00001
Within groups	1649.75	44	37.49		
Total	7568.47	47			

TABLE 57

Reading Age (Comprehension) Screening Test

	SS	df	Mean Sq.	F	Sigma
Between groups	9907.16	3	3302.38	30.5	.00001
Within groups	4763.50	44	108.26		
Total	14670.66	47			

TABLE 58

Stott-Moyes-Henderson TMI Total Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	6.91	3	2.30	.10	.95
Within groups	943.00	44	21.43		
Total	949.91	47			

TABLE 59

Bender-Gestalt Raw Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	62.91	3	20.97	4.34	.009
Within groups	212.33	44	4.82		
Total	275.25	47			

TABLE 60

BSAG Under-reactive Scale Screening Test Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	133.22	3	44.40	1.53	.21
Within groups	1271.58	44	28.89		
Total	1404.81	47			

TABLE 61
BSAG Over-reactive Scale Screening Test Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	376.91	3	125.6	2.93	.04
Within groups	1886.33	44	42.87		
Total	2263.25	47			

TABLE 62
Rutter CBQ Neuroticism Scale Screening Test Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	2.5	3	.83	.76	.52
Within groups	48.16	44	1.09		
Total	50.60	47			

TABLE 63
Rutter CBQ Antisocial Scale Screening Test Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	6.75	3	2.25	1.37	.26
Within groups	81.16	44	1.8		
Total	87.91	47			

TABLE 64
Rutter CBQ Total Screening Test Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	128.89	3	42.96	1.57	.20
Within groups	1197.91	44	27.22		
Total	1326.81	47			

TABLE 65
Reading Age (Accuracy) Retest Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	5862.75	3	1954.25	20.44	.00001
Within groups	4206.50	44	95.60		
Total	10069.25	47			

TABLE 66
Reading Age (Comprehension) Retest Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	8031.56	3	2677.18	11.50	.00001
Within groups	10240.42	44	232.74		
Total	18271.98	47			

TABLE 67
BSAG Under-reactive Scale Retest Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	61.89	3	20.68	1.83	.15
Within groups	494.08	44	11.22		
Total	555.98	47			

TABLE 68
BSAG Over-reactive Scale Retest Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	87.41	3	29.14	.61	.61
Within groups	2068.55	44	47.01		
Total	2155.99	47			

TABLE 69
Rutter CBQ Neuroticism Scale Retest Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	42.89	3	14.30	5.69	.002
Within groups	110.58	44	2.51		
Total	153.48	47			

TABLE 70
Rutter CBQ Antisocial Scale Retest Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	7.17	3	2.39	.93	.43
Within groups	112.83	44	2.56		
Total	120.00	47			

TABLE 71
Rutter CBQ Total Retest Scores

	SS	df	Mean Sq.	F	Sigma
Between groups	122.06	3	40.68	.93	.44
Within groups	1933.42	44	43.94		
Total	2055.48	47			

APPENDIX TWO

TABLE 72

A Sample of Studies of Children with Reading Disabilities Comparing Measuring Instruments and Criteria for Inclusion in the Study as Disabled Readers

APPENDIX TWO SAMPLE OF STUDIES

TABLE 72

A Sample of Studies of Children with Reading Disabilities Comparing Measuring Instruments and Criteria for Inclusion in the Study as Disabled Readers

Author	Date	Age of Sample	Size of Sample	I. Q. Test used	Reading Measure	Criteria for inclusion in the study
Friedmann	1958	7-11	?	Stanford Binet	Schonell	RA 20% or more retarded MA
Dunham	1960	9	20	NFER non-verbal	Burt	?
Hillman	1960	8-11	130	None	Burt	Two years below average for CA
Pidgeon	1960	7+,10+, and 14+	10,000	NFER non-vwebal	Own	?
Lytton	1961	?	24	Sleight picture group	Burt	RA15% retarded MA
Ravenette	1961	8-10+	?	Crichton Vocab. scale	Schonell	Discrepancy score of 20 or more , 2 Years behind in reading
Lovell	1962	?	210	none	Schonell	?
McLeod	1965	10 1/2+	116	WISC	?	Reading retardation in relation to CA at least 1 1/2 Years

Author	Date	Age of Sample	Size of Sample	I. Q. Test used	Reading Measure	Criteria for inclusion in the study
Walters and Doan	1962	.12-13	54	unspecified group	unspecified group	RAz-IQz = -5
Lovell	1964	9 1/2 to 10 1/2	50	NFER non-verbal or Moray House	NFER sentence	RQ = 80
Zimmerman and Allebrand	1965	10+	153	Calif. test of Mental Maturity	Calif. Ach. and WRAT	Two years or more below grade level
Belmont and Birch	1966	9-16+	300	Moray House	NFER sentence reading and MAT	Raw score on three or more reading tests at or below 10th percentile of the population tested
Kass	1966	7-10	21	Stanford Binet	Battery of diagnostic tests	Grade 2 = 1/2 year retarded Grade 3 = 1 1/2 years retarded Grade 4 = 2 1/2 years retarded
Yule	1967	9-11	147	WISC	Neale	28 months below RA as predicted by IQ and CA
Cashden and Pumphrey	1969	8.6	26	?	Burt	?
Van Meel	1970	7-9, 9 1/2 to 12	?	?	?	?
Stavrianos	1970	6-8 and 8-10	360	WISC	Gilmore, WRAT, MAT	Reading expectancy on Gilmore of 3 for IQ 90-115 and 4 or 5 for IQ 115+

Author	Date	Age of Sample	Size of Sample	I. Q. Test used	Reading Measure	Criteria for inclusion in the study
Huelsman	1970	9-10	167	WISC	Gates	CA-MA is negative and more than 17 months
Cashden	1970	8-11	?	Moray House	Burt	Three years behind in reading
Clark	1971	a)8 b)9	230 165	WISC WISC	Southgate Neale	RQ 85 or less No RA at age 7
Lawrence	1971	?	48	Sleight	Schonell	Behind in reading
Ingram	1972	7-15+	82	Stanford Binet	Schonell	Mild = AQ 10-14 points below IQ Mod. = AQ 15-24 points below IQ Severe = AQ 30+ points below IQ; Average reading age 2 years below CA
Lewis	1972	12-15	100	WISC PIQ	Iowa Test of Basic Skills	Reading and Vocab. means converted into RA and subtracted from WISC PIQ to = discrepancy scores
Camp	1973	9-13	69	Kuhlman-Anderson or WISC or S-B	WRAT and sight vocab.	More than two year deficit in reading
Aspelt	1974	7-8	24	ACER General Ability and WISC	ACER Reading	?
Kellagher	1974	10-11	48	none	Schonell	Lowest mean AQ
Berger	1975	10	458	WISC	SRA reading	2 S.D. below Isle of Wight mean
Hayes	1975	10-11	67	WISC	Neale	28 months below RA as predicted by IQ and CA

Author	Date	Age of Sample	Size of Sample	I. Q. Test used	Reading Measure	Criteria for inclusion in the study
Vellutino	1975	9-13	120	WISC	Gilmore	Two or more years behind
Owen	1978	7	76	WISC FSIQ	?	1 1/2 to 2 years behind in reading and/or spelling

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