CHAPTER X
Perhaps the oldest and most persistent scourge of mankind that affects children most and destroy their life opportunities is the failure of society to look beyond the handicap and to ignore the potential present in every child. And a young differently abled child needs help to realize that potential, physical handicaps, sensory impairments and cognitive disorders do restrict some areas of personal functioning but their impact need not destroy the potential of every child to progress normally in other areas of development. The impact of other disabilities can be diminished if proper and timely attention is given to help a child and overcome the limitations imposed by the condition.

Early intervention programmes are effective and do facilitate development and learning in young children whose futures are uncertain because of a disability. Educators and communities have to assume responsibility for making special services available to these children. In early years the initial patterns of learning and behaviour that set the pace for and influence the nature of all subsequent development are established. The time from birth until a child enters school is a particularly significant period. Early intervention can make a difference in the lives of children and can enhance their success in school.
Intervention strategies for learning disabled individuals have changed somewhat in recent years as professionals have begun to view this area as a constellation of specific problems rather than a generic category. A learning disabled child is neither damaged nor permanently impaired. The disability is an inability to make use of the unspecialized instruction usually found in the typical classroom. Given proper and specialized instruction, the disability disappears. The problem is, thus, an educational problem and not a medical problem.

One of the most common problems attributed to learning disabled children is reading disability. Reading is the base for all the other academic learning. The child’s ability or inability to read affects learning in all school areas: Arithmetic, Social Studies, English and Science. Reading disability signifies disharmony in the life of a child. Reading skills are needed throughout life. All children with reading disability manifest some disequilibrium in their lives.

A child has a reading disability when there is a significant discrepancy between his reading level and his intellectual potential as measured by standardized tests. Other terms such as specific reading retardation, specific dyslexia, specific learning disorder, specific learning difficulties and many others are used interchangeably to
describe the same syndrome, but often confuse matters. More recent definitions have attempted to further specify the nature of the language and processing impairments. A large body of research conducted within the last 10 to 20 years has focussed on finding out individuals with dyslexia often have difficulty in performing tests that require the processing of phonological information (Stanovich, 1985). It is also suggested that dyslexia is a cognitive language disorder of development (Snowling, 1987). Reading disability can be reduced or eliminated through various remedial strategies such as Multisensory Structured Linguistic method, Alphabetic Phonic method, Behaviour Modification method and Eclectic method.

A close analysis of review of related literature (chapter III) shows that various remedial strategies mentioned above, have been employed abroad to reduce reading disability. A very few studies have been conducted to see their comparative effectiveness. To the best of the knowledge of the investigator, no such study has been conducted in India. If this problem is dealt with well in time, e.g., during early school years, children can be saved from becoming drop outs or problem children and also their academic achievement can be boosted up.

There is a great paucity of research in the field of learning disabilities in India. Instead of basking in the prevailing climate of despair and institutional paranoia the
investigator tried to explore several strategies of success that offer positive reinforcement to the motives and ideals of education for learning disabled children. Investigator was inspired to try out the effectiveness of different remedial strategies for reducing reading difficulties of dyslexic primary school children in Indian conditions. Children with learning disabilities are perceived as dull, lazy and notorious in schools. Such children continue to stay and struggle in the mainstream in schools without detection and no guidance is provided to channelize their strengths and potentials. Inattention to the problems of dyslexic children may compound their difficulties and make remediation more difficult at later stage.

Thus, the prevalence and severity and seriousness of the specific learning disability (dyslexia), necessity of early intervention to reduce reading difficulties, lack of intervention programme in the educational settings to deal with the problem, effectiveness of various remedial strategies tried out abroad and lack of such research work in Indian conditions greatly inspired and encouraged the investigator to take up the present study.

**STATEMENT OF THE PROBLEM**

The problem under investigation can be stated in the following words:
"Differential Impact of Various Remedial Strategies on Reducing Reading Disability of Dyslexic Primary School Children."

Objectives:

The present investigation took its shape keeping in view the following objectives:

1. To identify dyslexics from among primary school children studying in English medium schools of Chandigarh.
2. To assess the impact of remedial strategies to eliminate or reduce reading difficulties of dyslexic children.
3. To compare the effectiveness of various remedial strategies for reducing the reading difficulties of dyslexics.
4. To study the side effects of reduction in reading difficulties on other sub-skills of reading i.e., spelling and writing.
5. To find out the impact of reduction in reading difficulties on enhancement of intelligence quotient.
6. To find out the side effects of reduction in reading difficulties on reduction of neuropsychological deficits.
7. To find out the impact of reduction in reading difficulties on improvement of academic achievement in
the form of percentage of marks obtained after intervention.

DELIMITATIONS

The present investigation was delimited to children
1. In the age group of 7 to 9 years, studying in second and third grade.
2. Having IQ upto 90 and above.
3. Having no evidence of sensory, mental and any apparent emotional deficits.
4. Belonging to middle class socio-economic status.
5. Studying in English medium schools of Chandigarh.
6. Having reading retardation in English upto one year and above.
7. Besides, the study was restricted to a few neuropsychological processes (i.e., visual discrimination, auditory sequential memory, visual sequential memory, sound blending, sound discrimination) which are most relevant and essential to learn word recognition.

DESIGN OF THE STUDY

A variety of experimental designs are used for planning treatment programmes for reading disabled to determine whether a given intervention is effective for improving the reading skills of dyslexic children. In the present study, control group experimental design on the
lines of Craighead et al. (1976) was used. Control group experimental design includes at least two groups, whose subjects have been randomly assigned. In the present study, there were five groups. Subjects were randomly assigned to various treatment groups and control group. All the five groups were assessed before and after treatment on the criterion measure of reading disability and sub-skills of reading problems. Control group was given no treatment but was given pre and post test on the criterion measures of reading disability and related sub-skills of reading.

In the present study, Multisensory Structured-Linguistic method, Alphabetic-Phonic method, Behavioural Modification method, and Eclectic method as remedial strategies served as independent variables and their effectiveness was studied on the criterion variable of reduction or elimination of reading problems in dyslexic children. Variables of intelligence and socio-economic status were taken as controls. All the experimental conditions were carried out during school hours in the schools.

**SAMPLE**

Multistaged randomized sampling technique was used in the present study as follow:

**Total Sample (Stage I) -** Director Public Instructions (DPI) of schools (UT) Chandigarh was contacted
and the list of existing English medium schools was collected from the DPI. Out of these 109 schools, 10 English medium schools were randomly selected for the purpose of data collection.

**Initial Sample (Stage II)** - During the second stage teachers were made aware of the specific learning disabilities of the children. After that Teacher's referral forms were given to teachers to assess the specific learning disabilities of children. Children fulfilling the following criteria were included in the initial sample:

1) Children between the age group of seven to ten years and belonging to grade second and third.
2) Children who scored 65% and above on Teacher's referral forms.
3) Children having specific reading disabilities.

Out of surveyed 205 children (172 males and 33 females) were found eligible. Hence, only 205 children were included in the initial sample.

**Final Sample (Stage III)** - At the third and final stage, on the basis of Teacher's referral form out of the total 205 children who constituted the initial sample, 39 children were identified as reading disabled. These 39 children were administered Indian Adaptation of Wechsler Intelligence scale for children (Primary) by Malin (1969), Aston Index (revised) by Newton and Thomson (1982), Brigance Diagnostic Comprehensive Inventory of Basic skills by
Brigance (1982), Socio Economic Status scale by Srivastava (1978), Academic achievement scores of all subjects taken from school records. On the basis of these tests, children who fulfilled the following criteria besides the above mentioned criteria for the initial sample, were included in the final sample:

1. Average or above average intellectual ability (Full scale IQ 90 or above)
2. All children were from middle class families.
3. At least one year and above retarded in word reading.

On the basis of above mentioned criteria, out of 39 children, only 30 eligible children were selected for the final sample. Out of these 30 selected children, six were randomly assigned to each of the five groups that is four experimental groups and one control group.

HYPOTHESES

After a close perusal of related literature and objectives of the present study, the following hypotheses were formulated:

1. Various remedial strategies would be helpful in reducing reading difficulties of dyslexic children.
2. There would be differential impact of various remedial strategies in reducing reading difficulties of dyslexic children.
3. Reduction in reading difficulties would result in improvement of neuropsychological abilities of dyslexic children.
4. Reduction in reading difficulties would improve spelling and writing expression of dyslexic children.
5. Reduction in reading difficulties would result in IQ gains.
6. Reduction in reading problems would enhance academic achievement of dyslexic children.

TOOLS USED

To test the above mentioned hypotheses, the following tools were used:
1. Indian adaptation of Wechsler Intelligence Scale for children (Primary) by Malin (1969).
3. Brigance Diagnostic Comprehensive Inventory of Basic skills by Brigance (1982).
5. Teacher’s Referral form prepared by investigator.
6. Academic achievement scores (of all subjects) taken from school records.

PROCEDURE

The data of the present study was collected in the following phases:
Phase I

In the first phase of data collection Principals of English medium schools were contacted and permission was sought for data collection. Class Teachers of second and third grade children of 10 randomly selected English medium schools of Chandigarh were contacted and made aware of various specific learning disabilities of school children. Teacher's referral forms were distributed to all the teachers of second and third grade students.

Phase II

During second phase, various tests were administered to all the referral cases who were selected for the final sample under various sessions. Indian adaptation of Wechsler Intelligence scale for children by Malin (1969) was administered individually on all second and third grade referral cases during first session and second session in order to test their IQ. During the third session SES scale by Srivastava (1978) was administered to find out SES of the families of second and third grade children. Aston Index by Newton & Thomson (1982) was administered individually during the fourth session to assess their reading, writing, spelling and to assess their neuropsychological abilities i.e., visual discrimination, sound discrimination auditory sequential memory, visual sequential memory and sound blending. Brigance Diagnostic Comprehensive Inventory of
Basic skills by Brigance (1982) was administered on the subjects in the fifth session in order to assess their oral reading and listening comprehension.

On the basis of these tests 30 eligible reading disabled students were taken for the present study.

**Phase III**

Intervention was provided to 24 reading disabled primary school children through various remedial strategies. These techniques included Multisensory Structured Linguistic method, Alphabetic Phonic method, Behaviour Modification method and Eclectic method (combination of all method). Six subjects were assigned to each of the four experimental groups. Six subjects were taken up in the control group. Remedial reading activities were planned and taught step by step through these technique. Faulty learning habits were reduced, subjects were given social & material reinforcement when they did less errors while reading and showed more improvement.

**Phase IV**

Phase IV consisted of re-administration of Aston Index, Brigance Diagnostic Comprehensive Inventory of basic skills to check the scores of oral reading, comprehension, spelling and writing, in order to see the effectiveness of various remedial strategies. Academic achievement scores of 4th unit test of all subjects were taken from school records. Indian Adaptation of Wechsler Intelligence Scale for
children (primary) by Malin was also re-administered to find out if there was any significant gain in IQ as a result of treatment provided to the subjects through various remedial strategies.

**Statistical Analysis** - Various statistical techniques were employed for testing research hypotheses. Raw scores of Indian adaptation (WISC) by Malin were converted in IQ according to the instructions in manual. Analysis of variance was worked out to find out variance (differences) between various treatment techniques. Further t-test was applied to different treatment groups to test the efficacy of various remedial strategies. In addition, graphic representation was done wherever necessary.

**RESULTS**

**Effectiveness of various remedial strategies**

- Mean differentials (t-values) between pre and post-test scores on oral reading (from LG to UG) and between different EGs and CG on the basis of post-test were found significant beyond 0.01 level of confidence.

- All the obtained t-values between pre- and post-test scores on reading comprehension (from primary to UGIII) and between different EGs and CG on the basis of post-test were found significant beyond 0.05 and 0.01 level of confidence.
Significant t-values (p<0.05 and p<0.01) were found between post-test scores of different EGs and CG with regard to word reading. These significant t-values indicate the effectiveness of different remedial strategies on oral reading, reading comprehension and word reading of all experimental groups.

Differential Impact of Remedial Strategies

- Mean differentials among the post-test scores on oral reading between EG_1 to EG_4 (UG_I), between EG_1-EG_2 (total scores of all grades), EG_2 and EG_4 (from LG_I to UG_III) were found significant beyond 0.05 level of confidence.

- Mean differentials among post-test scores on reading comprehension between EG_1 and EG_2 (LG_I to UG_I), between EG_1 and EG_4 (LG_II and LG_III) between EG_2 and EG_4 (primary to UG_III) were found significant beyond 0.05 level of confidence.

- For total scores of all grades for reading comprehension all t-values were found significant beyond 0.05 level of confidence except between EG_1 and EG_3 which was not significant at any level of confidence.

Impact of Reduction in Reading Difficulties on Neuropsychological Abilities and Sub-skills of Reading (Spelling and Writing)

- Mean differentials between pre- and post-test scores of all EGs for all neuropsychological abilities were significant at 0.01 level of confidence.
Mean differentials between post-test scores of different EGs and CG for all neuropsychological abilities were significant beyond 0.05 level of confidence.

Mean differentials between pre- and post-test scores of all EGs for spelling were significant at 0.05 level of confidence. Mean differentials between post-test scores of all EGs and CG were also significant at 0.05 level.

Mean differentials (t-values) between pre- and post-test scores of all EGs for writing were significant beyond 0.05 level of confidence. Mean differentials between post-test scores of all EGs and CG were significant at 0.01 level.

**Impact of Reduction in Reading Difficulties on Intelligence and Academic Achievement**

Mean differentials (t-values) between pre- and post-test scores for Verbal Intelligence Quotient (VIQ) were found significant at 0.05 level of confidence (EG₂ and EG₃) and at 0.01 level of confidence (EG₄). t-values between pre- and post-test scores of EG₁ were not found significant at any level of significance.

Mean differentials (t-values) between pre- and post-test scores of different EGs with regard to Performance Intelligence quotient (PIQ) were not found significant at any level of confidence.
Mean differentials (t-values) between pre- and post-test scores for Full Scale Intelligence Quotient (FSIQ) were not found significant at any level of confidence (EG₁, EG₂ and EG₃). Significant t-value at 0.01 level of confidence was found for EG₄.

Mean differentials (t-values) between post-test scores of EG₁ and CG, EG₂ and CG for Verbal Intelligence Quotient (VIQ) were not significant but t-values between EG₃ and CG, EG₄ and CG were found significant at 0.05 level of confidence.

For Performance Intelligence Quotient (PIQ) the mean differentials between EG₁, EG₂, EG₃ and CG were not found significant but the t-values was significant at 0.05 level of confidence between EG₄ and CG.

For Full Scale Intelligence Quotient (FSIQ) t-values between EG₄ and CG was significant at 0.05 level of confidence and t-values between rest of EGs and CG were found insignificant.

Mean differentials (t-values) between pre- and post-test scores of all EGs with regard to IQ were significant at 0.05 level (VIQ, FSIQ), for PIQ it was not significant at any level of confidence.

Mean differentials between pre- and post-test scores of different EGs for academic achievement was significant at 0.01 level of confidence except EG₂ which was significant at 0.05 level of confidence.
Mean differentials between post-test scores of different EGs with CG with regard to academic achievement were significant at 0.01 level of confidence.

Mean differentials between pre- and post-test scores of all EGs with regard to academic achievement were significant at 0.01 level of confidence.

Conclusions

The present investigation examined the effectiveness of various remedial strategies in the context of early childhood education and special education. The inferences drawn from the obtained results allow the investigator to draw certain conclusions and make recommendations about impact of remedial strategies on primary school going dyslexic children.

From the results obtained from this investigation it can be inferred that remedial strategies were effective in reducing reading difficulties of dyslexic children. The levels of reading comprehension were also improved after the remediation. The reading age of the children was also considerably increased after intervention.

However, Multisensory Structured Linguistic method and Eclectic method were superior to Alphabetic Phonic method. Behaviour Modification method was equally effective in reducing reading difficulties of dyslexic
children. For reading comprehension, Eclectic method was found superior to Alphabetic phonic method. Behaviour modification, Multisensory structured linguistic methods were equally effective in improving reading comprehension of dyslexics.

It was found that various remedial strategies were effective in improving various neuropsychological abilities that are related to reading performance. There was considerable improvement in spellings and free writing after the remedial programme among all the dyslexics. It was found that Verbal Intelligence Quotient (VIQ) was increased of three different EGs except one which was trained through Multisensory structured linguistic method. Performance Intelligence Quotient (PIQ) was not increased of any EGs. FSIQ was also not increased except EG_4 (trained through Eclectic method). So there was a slight improvement in VIQ, FSIQ but not in PIQ after remediation.

Finally, academic achievement of all EGs was increased as a result in reduction in reading difficulties, improvement in reading comprehension, improvement in spelling and writing and improvement in neuropsychological abilities after the intervention period.
Suggestions for Further Research Work

1. The present investigation was limited to reduce or eliminate reading difficulties of primary school children. Such studies should also be conducted to reduce or eliminate other related problems as well.

2. The studies similar to the present one are to be replicated with larger sample size.

3. The age range chosen for this study was 7 to 9 years. It would be beneficial to expand the age range from 6 years and above.

4. Apart from deficiency in reading, more and more behavioural symptoms which are unique to dyslexics need to be explored.

5. The present study has been conducted on middle class families. It would be also fruitful to replicate the present study on families of all strata of the society in India.

6. In the present investigation, reduction in reading difficulties has resulted in enhancing Verbal Intelligence Quotient (VIQ), Full Scale Intelligence Quotient (FSIQ) also improving neuropsychological abilities (VD, SD, VSM, ASM, SB) and academic achievement of dyslexics. To confirm such results, the present study should be replicated.

7. Further research work should be undertaken to replicate the present study in other regional languages of India.