

## PSYCHO-EDUCATIONAL ASSESSMENT OF A DYSLEXIC CHILD – A CASE STUDY

Ganesh Kumar J\* and Maya Rathnasabapathy\*\*

---

**Abstract:** Dyslexia is characterized by difficulties in accuracy of word recognition, poor spelling and encoding abilities. Difficulties in dyslexia result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction (Lyon et. al., 2003). Psycho-Educational Assessments should be administered for diagnosis and facilitate special children with the required remediation. This is a case study conducted on an 8.3 year old dyslexic girl. The psycho-educational assessment was done by using “**Test of Non-Verbal Intelligence TONI-IV**”. Administration of **Wide Range Achievement Test (WRAT)**. The girl was found to have an average level of intelligence. Administration of **Wide Range Achievement Test (WRAT)** indicated that her reading, spelling, vocabulary and comprehension were not grade appropriate. These assessments of her Academics showed that there was an immediate necessity for special intervention program. Combination of Feuerstein’s Instrumental Enrichment program, Orton-Gillingham multi-sensory phonetic approach and brain gym exercises. Intervention was given for 8 months with 3 sessions per week, after which a significant progress was seen in her reading and writing. It was very effective module of intervention since the number of errors in accuracy was significantly reduced and a considerable improvement was observed in her spelling.

**Keywords:** Dyslexia, Feuerstein’s Instrumental Enrichment, Intervention, Orton-Gillingham.

### CASE STUDY: BACKGROUND

The subject was an 8.3 years old, right handed girl. Her family history stated that she was the first child of a 32 year old father and a 29 year old mother and both were private employees. Her birth history stated that she was born normal and weighed 3.1 kg at the time of birth. She began walking at the age of 13 months. Mother’s milk was stopped within a year itself as her mother had to go for a job. She had problem in sleeping at night. She often woke up at night during sleep. She was more intimate with her mother than her father. She was always dependent on her mother and was scared of being with strangers. She started going to school at the age of 3.2 years. Her school was changed after her first year of Pre-primary schooling. She used to do her homework with the help of her mother. She learnt to speak two languages-Urdu and Tamil, at home as it was a bilingual family with the former one being her mother tongue and the latter being the regional language. She played with her younger sister and sometimes with neighboring children. Her father was very strict with her. She favored Math to other subjects. According to her new school report, she had difficulty in the core academic skills of reading, spelling and writing and

---

\* Corresponding Author: Psychology, School of Social Sciences and Languages, VIT University, Chennai Campus, Pin-600127. Email: ganeshjk3@gmail.com

\*\* Psychology, School of Social Sciences and Languages, VIT University, Chennai Campus, Pin-600127.

was being recommended by the school for a formal assessment to be done. So, she was brought to the center where she underwent the intervention programme for eight months. The observations during the study are mentioned below.

### Observations

She was neatly dressed and was friendly. She was Co-operative throughout the assessment program. Sometimes she got distracted easily and was not attentive. Though she had difficulty in understanding the test instructions, her visual and auditory acuities were found to be satisfactory. She was found to do best of her abilities throughout the assessment.

## TEST ADMINISTERED AND RESULTS

### Pre-Test (Initial Assessment)

Following two tests were administered to the client.

**TABLE 1: TEST OF NON –VERBAL INTELLIGENCE TONI-IV**

<i>Index Score</i>	<i>Percentile Rank</i>	<i>Descriptive Term</i>
109	73	Average

First 19 items from the TONI-IV were administered to the subject as her age was below 10 years. Generally it takes 15 minutes to complete the test but for the subject it took 25 minutes as she was not attentive during the test. The test score indicated that she had an average level of intelligence.

**TABLE 2: WIDE RANGE ACHIEVEMENT TEST (WRAT)**

<i>S.No.</i>	<i>Test</i>	<i>Age equivalent</i>
1	Reading	5
2	Spelling	6.6 years
3	Writing	< 5 years
4	Numerical operations	8 years
5	Auditory Sequential Memory	8.6 years
6	Vocabulary	7 years
7	Comprehension	5

## TEST FINDINGS

### Non Verbal Reasoning

This is a language free test that measures the cognitive ability. It contains abstract and figural drawings where a variety of complex reasoning strategies have to be

applied to solve them. Her index score of 109 falls in above average scale ruling out intellectual disabilities. She was quite quick in choosing the correct response to solve the problem. From the assessment it is clear that she has a good reasoning ability.

**Reading and Comprehension**

In this area, she performed much below her grade level. She made errors in reading such as ‘far’ for ‘fast’; ‘amount’ for ‘mother’; ‘rat’ for ‘ride’; ‘write’ for ‘work’; ‘back’ for ‘black’; ‘rat’ for ‘ready’, etc. Her pattern of errors showed that she was only looking at the first letter and reading out the words she was familiar with. In the case of unfamiliar words, she struggled in recognizing the word and pronounced the word with a lot of stress on the accent. In the oral reading task, she was able to read known words better than unknown words. She was easily able to read the words containing four or five letters such as car, cycle, water, fire, road etc. She struggled to read unfamiliar words and words containing many letters such as ‘Expression’, ‘Assessment’, ‘Conscious’, ‘Aeroplane’, ‘Guitar’, ‘Pumpkin’, etc. Sometimes she used to mispronounce the words and even skip the words in a given sentence. Her reading difficulty contributed to her low scores in her comprehension skill as well.

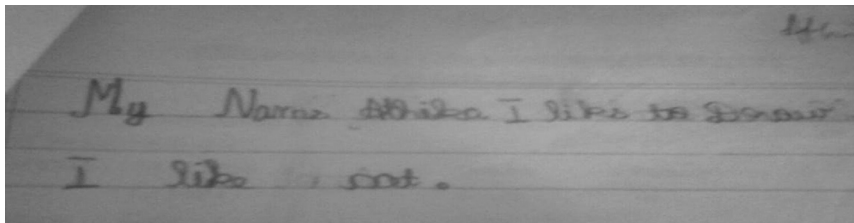
**TABLE 3**

<i>Actual words</i>	<i>Client’s words (What the client said)</i>
Fast	Far
Black	Back
Ride	Rat
Ready	Rat
Work	Write
Rain	Air

**Spelling:** The spelling ability of the subject was limited to only a few four letter words. She had difficulty in spelling a whole word and associating the words with their respective accents.

**Writing:** Her writing sample showed that her sentences were very simple and lacked structure.

**Writing sample of the subject**



In performing writing accuracy tests, the following mistakes were found:

1. In copying words, 'door' was written as '**boor**', 'garden' was written as '**garben**', 'blooms' was '**dlooms**', 'minus' was '**nimus**'; 'superb' was '**superd**'.
2. In dictation task she made many spelling and punctuation errors such as '**bal**' for ball, '**kow**' for 'cow', '**afice**' for 'office', '**battle**' for 'bottle'.

**Numerical Operations:** Her numerical ability was almost at par with her age. She was able to identify the numbers and arithmetic symbols. Also she was able to perform simple calculations such as addition, subtraction and multiplication but was unable to perform simple division.

**Auditory Sequential Memory:** In this subtest she performed at par with her age. Her short term memory was good.

**Summary of the Test Findings:** The test profile showed that she was good at applying her cognitive functions for logical reasoning, making comparisons etc. She had difficulty in the areas of reading, writing, spelling and comprehension. It was found that these deficits were hindering her academic performance. Her performance in the above mentioned areas were evident enough for the necessity of providing a structured remedial intervention to enable her to cope with her academic difficulty.

## REMEDIAL INTERVENTION

### Description of the Program

Remedial intervention was given to the subject based on the Combination of brain gym exercise, Feuerstein's Instrumental Enrichment program and Orton-Gillingham multi-sensory phonetic approach. It includes teaching of sight words, phonetic and non- phonetic words, spelling rules and patterns with multi-sensory phonetic approach and fundamentals of sentence writing. Brain gym exercises were given to enhance subject's cognitive functions. The duration of the intervention was given for 8 months with 3 sessions per week, after which a significant progress was observed in subject's reading and writing. Every session included a combination of techniques from all the three strategies mentioned above and the duration for every session was of one and half hours with each strategy being 30 minutes.

### Program Design (Activities Schedule)

**Brain Gym Exercise:** Paul and Gail Dennison, in the 1970s designed Brain Gym techniques which helps to improve various outcomes including attention, memory and academic skills. The present study included the techniques such as "think of an X", "cross crawls" and "space buttons", "the elephant", "belly breathing" and "calf pump". This study consists of 96 sessions in which the above mentioned techniques were alternatively given with the first three techniques for the 'odd sessions' and the next three for the 'even sessions'.

TABLE 4

<i>Months</i>	<i>Sessions</i>	<i>Activities performed</i>
1 through 8	96	Odd sessions: Think of an X, Cross crawls and space buttons Even sessions: The Elephant, Belly breathing and Calf Pump

**The Elephant:** This exercise involves relaxation of the eyes that helps in improving cognitive abilities such as attention, perception, memory, recognition and discrimination

**The Calf Pump:** This exercise helps oneself to engage in activities and Improves concentration, attention and comprehension

**Space Buttons:** This exercise helps in relaxing the eyes and the body and improves attention, motivation and decision-making ability.

**Cross Crawl:** This technique helps in improving the basic learning skills such as listening, reading, writing and memory by co-ordinating the whole brain.

**Think of an X:** This exercise involves visualizing the letter ‘X’ as symmetrical and associating it with the body’s symmetrical organization which contributes to whole brain- body coordination thereby enhancing thought , communication and performance of the subject)

**Belly Breathing:** This is a breathing exercise that helps in supplying oxygen to the cells, relaxing the central nervous system and keeping the person energetic resulting in improvement of both reading and speaking abilities.

**Feurstein’s Instrumental Enrichment Program**

Four instruments of Feurstein’s Instrumental Enrichment Program were used in the study to improve the cognitive skills such as strategy development, transformation of visual images, concept formation, learning methods and development of metacognition of the subject. They are organization of dots, orientation in Space, comparisons and analytic perception. These four instruments were divided into two pairs which were alternatively given through 84 sessions and in the last 12 sessions, all the four were given alternatively to check the effectiveness and influence of the program.

TABLE 5: FEURSTEIN’S INSTRUMENTAL ENRICHMENT PROGRAM SCHEDULE

<i>Months &amp; sessions</i>	<i>Instruments</i>
1 through 7 months (84 sessions)	Organization of dots & orientation in space (24 sessions alternatively) Analytical perception & comparisons (24 sessions alternatively) Organization of dots & comparisons (24 sessions alternatively) Orientation in space & Analytical perception (12 sessions alternatively)
8 <sup>th</sup> month (12 sessions)	All the four activities were given alternatively

**Organisation of Dots:** This technique helps in developing the strategies required for the given task, improves accuracy in the performance and keeps oneself calm.

**Orientation in Space:** This technique involves projection of spatial relationships which helps in understanding the interpersonal relationships of objects and also flexibility of thoughts.

**Comparisons:** This technique helps in improving the ability to perceive, compare and establish relationships among the pictures presented in the task.

**Analytic Perception:** This technique helps to perceive things analytically which includes perceiving the holistic things into its component parts and vice versa.

### Orton-Gillingham Multi-Sensory Phonetic Approach

The Orton-Gillingham multi-sensory phonetic approach focuses on teaching the basic skills required for learning that involves utilizing the multiple senses (such as visual, auditory, tactile and kinesthetic senses) simultaneously to improve the learning ability. The dimensions being focused in this study are tabulated below.

**TABLE 6: SHOWS THE ORTON-GILLINGHAM MULTI-SENSORY PHONETIC APPROACH SCHEDULE**

<i>Months &amp; Sessions</i>	<i>Skills taught (learning styles)</i>
1	Phonetics
2	Vocabularies
3	Phonetics & vocabularies
4	Paired reading & independent reading
5	Sentence writing
6 & 7	Sentence writing & Comprehension
8	Reading, Writing & Comprehension

Initially, the two fundamental skills-phonetics and vocabularies were focused intensely for the 1<sup>st</sup> and 2<sup>nd</sup> months respectively. After adequate focus and practice, these two dimensions were together focused in the third month (first two sessions of practice and the next two sessions of testing).

Once the subject was found to be stable in using words fluently, reading skill was focused with paired reading as a supportive and confidence development method. In this method, the researcher helped the subject by reading along, which reduced the rate of reading errors. As the subject developed confidence in reading alone, paired reading was offered when required. This reading skill was focused in the 4<sup>th</sup> month with 1<sup>st</sup> quarter of the sessions having paired reading, (2<sup>nd</sup> quarter) independent reading with little support and the remaining sessions with complete independent reading.

The 5<sup>th</sup> month focused on ‘sentence writing’. This was initiated after teaching the basic rules (syntax) explicitly with ample amount of practice. Based on the performance of the subject, the complexity in the level of sentence writing exercise was modified and increased.

For the next two months (6<sup>th</sup> and 7<sup>th</sup> month), sentence writing and comprehension was given using all the above skills. In the last month of the intervention, all the skills ranging from phonetics to sentence writing were tested through comprehension and there was improvement in the performance of the subject.

## RESULTS AND DISCUSSION

### Post-Test

Post-test was conducted after 8 months of the intervention program and the greater improvement was observed in all (reading, writing, spelling, and comprehending) the areas of learning.

**TABLE 7: TABLE SHOWS THAT THE PERFORMANCE OF THE SUBJECT BEFORE AND AFTER INTERVENTION**

S.No.	Test	<i>Age appropriateness seen in activities (in years)</i>	
		<i>Before Intervention</i>	<i>After 8 Months of Intervention</i>
1	Reading	5	8.3
2	Spelling	6.6	8.2
3	Writing	< 5	8.1
4	Numerical operations	8	8.9
5	Auditory Sequential Memory	8.6	9.3
6	Vocabulary	6	7.9
7	Comprehension	5	7.6

Initially the subject was taught “**phonetics**” in which, the sound of each vowel was taught with very simple words having two, three and four letters like at, cat, mat, sat, fat, etc. Similarly, the sound of the other vowels were also taught by joining the other vowels to the above mentioned words to teach them the common sounds such as joining “e” to the word “at” becomes “ate”. When this word “ate” is joined with other consonants such as “D”, “F”, “G”, “H”, “L”, “M”, “R” etc., the words become “Date”, “Fate”, “Gate”, “Hate”, “Late”, “Mate”, “Rate” respectively. This helped the child in associating the common sounds with the other consonants to form new words that do not even exist and this supported her in improving reading, spelling and word forming skills. The spelling age of the subject, measured using WRAT was found to have been improved from 6.6 years to 8.2 years. Positive reinforcement such as chocolates, biscuits, sweets were given on her new word

formation which not only motivated but also improved her self-confidence. After a considerable improvement was seen in reading, spelling and word formation.

The next step- “**vocabulary**” was followed wherein the list of vocabulary were given with meaning to the subject and asked to memorize it. Every session the subject had to write 5-10 new words with meaning. The child had a prior knowledge of many of these words as she had come across those words in her surroundings such as with her classmates, teachers, playmates and at home. Many fable and moral stories were told to the subject which helped to improve her vocabulary. So this step was easier for the child to grasp as she knew the meanings for many of the words that were being taught. In this way the child learnt many words and their meanings as well. Her vocabulary age was found to have increased from 6 years to 7.9 years.

Some brain gym exercises were given which had physiological effects like activating the brain cells, improving the attention, enhancing the memory. She enjoyed doing these exercises which helped her in reducing the tediousness to a greater extent.

The reading skill was checked, in which **paired reading** was done to help her and when she found that she was reading equally well with the paired reading partner, she gained confidence. Gradually, she was being moved to the “**independent reading**” wherein the paired reading partner slowly reduced the voice and just whispered to make her feel that the partner is there with her and she is not alone. Later, she was able to read confidently with conscious awareness that the partner was not reading along with her. Such an environment generated a sense of reading ability and satisfaction to the subject through “small successes” in dealing with reading books and stories. It was observed from the post test that her reading age improved from 5 years to 8.3 years. Animated stickers like “stars”, “Smiley”, was given as a remark which helped in maintaining her interest in learning. This was the area where the subject showed highest improvement.

She learnt the basic grammar rules of writing a sentence, which included “the subject-verb identification”, “action word”, “helping verbs”. She was also taught the initial word of the sentence must begin with a capital letter and the sentence must have a subject, verb etc. As she gathered vocabularies, she implemented them along with the grammar rules in making stories which improved the sentence writing skill and comprehensive ability. The writing age which was less than 5 years in the beginning was found to be 8.1 years after intervention and the comprehensive age also improved from 5 years to 7.6 years. The subject was appreciated with verbal appreciations such as “good”, “excellent”, “wow” for her small improvements too, which maintained her enthusiasm throughout the sessions.

## CONCLUSION

The readings in the above Table no 7 shows dramatic improvement from Pre-test to Post-test indicating that the structured remedial intervention was helpful in



improving the subject's performance in the academic skills such as spelling, reading, writing and comprehension. This finding is supported by the following studies, In 2002, Joshi et. al., found significant improvement in all the areas of learning such as reading, writing, spelling and comprehension by using Orton Gillingham multisensory approach. According to Hyatt (2007) Brain Gym consists of 26 simple movements that enhance academic and behavioral performance and also promote whole brain learning by activating the hemispheres of the brain. Dennison & Dennison claimed that the learning problems, emotional, and psychological stress can be reduced by integrating left and right sides of the brain which helps in optimizing the learning experiences of the individuals. Cooke (2009) found a statistically significant improvement in Reading accuracy Age after 12 weeks of Brain Gym. Spaulding, Lucinda S et.al,(2010) observed significant improvement in reading age.

**Recommended steps to be taken to improve the performance of the dyslexic children:**

- Screening and classroom assessments, including measurements of skills and teacher observations, should be conducted frequently for the students showing poor academic performance.
- Duration of the intervention program can be increased.
- Time should be allocated each day for reading, writing, spelling activities in a structured pattern (such as choosing a book, reading, submitting a written report, etc.).
- Other brain Gym exercises can also be used to improve performance of the dyslexic children.
- Study can be done on a large sample.
- Parents will be requested to spend extra time on children's learning process.
- According to the severity of the difficulties more specialized intervention module should be developed.
- The effectiveness of module will vary according to the individual cases.

***References***

- Blagg, N. (1985). Introduction of Feuerstein's Instrumental Enrichment Programme into four Bridgwater Secondary Schools. Focus—Somerset Education Magazine
- Hopkins, D. (1985). A Teacher's Guide to Classroom Research. Milton Keynes: Open University Press.
- David McLoughlin, (1994). Assessment, Counselling and Training published , Whurr.
- Wade-Woolley, L., & Geva, E. (2000). Processing novel phonemic contrasts in the acquisition of word reading. Scientific Studies of Reading
- Gillingham, A. & Stillman, B.W. (1997). The Gillingham Manual: remedial training for students with specific disability in reading, spelling and penmanship. (8th ed.). Cambridge, MA: Educators Publishing Service.

- Henry, M.K. & Brickley, S.G. (Eds.). (1999). *Dyslexia: Samuel T. Orton and his legacy*. Baltimore: The International Dyslexia Association.
- Hornsby, B. (1984). *Overcoming Dyslexia*. London: Dunitz.
- Joshi, R.M., Dahlgren, M., & Boulware-Gooden, R. (2002). Teaching reading in an inner city school through a multisensory approach. *Annals of Dyslexia*.
- Miltenberger, Raymond G. *Behavior Modification: Principles and Procedures*. 2nd ed. Belmont, California: Wadsworth/Thomson Learning, 2001.
- Spaulding, Lucinda S.; Mostert, Mark P.; and Beam, Andrea, (2010) "Is Brain Gym an Effective Educational Intervention?". Faculty Publications and Presentations.
- Trahan, 2004, Educational Kinesiology Trust UK 2009.