

INVESTIGATING LINGUISTIC ERRORS AT WORD
LEVEL PRODUCED BY BILINGUAL DYSLEXICS
LEARNING HINDI AND ENGLISH

Thesis Submitted to Jawaharlal Nehru University

for the award of the degree of

DOCTOR OF PHILOSOPHY

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List of symbol used in Transcription of Indian English and Hindi

List of Vowels

Vowels	Examples
ə	mother, brother, sun,
a	father, ram
ɪ	it, bit, mint, give
i	read, teeth, heat
ɔ	saw, raw, bought
o	boat, goat, road
U	suit, mood,
u	you, root,
e	rain, cake
ɛ	bat, cat

List of Consonants

Consonants	Example
p	party, paint
b	boll, bat
k	kite, cross
g	god, great
t	teeth, turn
d	day, digit
s	sink, soap
z	rose, close
ʃ	shoe, sugar

Consonants	Example
f	laugh, leaf, flower
v	view, venture, venue
n	not, never
m	motor, mirror
h	home, hair
r	right, river
l	love, lotus
th	three, through
ð, d	that, this
ŋ	thing, ring
y	yellow, yes
w	what, water

Symbols used in Hindi transcription

Velar	k, kh, g, gh, ŋ
Palatal	c, ch, j, jh, ɟ
Dental	t, th, d, dh, n
Retroflex	ʈ, ʈh, ɖ, ɖh, ɳ
Bilabial	p, ph, b, bh, m

List of Tables

S. No.	Table No.	Comparative chart of total number of errors produced by dyslexic and control case	Page No.
1.	Table 1	Case Study 1	66
2.	Table 2	Case Study 2	71
3.	Table 3	Case Study 3	73
4.	Table 4	Case Study 4	78
5.	Table 5	Case Study 5	85
6.	Table 6	Case Study 6	90
7.	Table 7	Case Study 7	97
8.	Table 8	Case Study 8	104
9.	Table 9	Case Study 9	106
10.	Table 10	Case Study 10	111
11.	Table 11	Case Study 11	117
12.	Table 12	Case Study 12	122
13.	Table 13	Case Study 13	126
14.	Table 14	Case Study 14	131
15.	Table 15	Case Study 15	134
16.	Table 16	Case Study 16	137
17.	Table 17	Case Study 17	141
18.	Table 18	Case Study 18	144
19.	Table 19	Case Study 19	147
20.	Table 20	Case Study 20	150
21.	Table 21	Table of all the errors produced by Dyslexic group	152
22.	Table 22	Table of all the errors produced by control group	153

23.	Table 23	Total scores of English Writing errors	158
24.	Table 24	Total Scores of Hindi Writing errors	159
25.	Table 25	Total Scores of English Spelling errors	160
26.	Table 26	Total Scores of Hindi Spelling errors	161
27.	Table 27	Total Scores of English Reading errors	162
28.	Table 28	Total Scores of Hindi Reading errors	163
29.	Table 29	Number of correct response in English	164
30.	Table 30	Percentage of correct responses in English	165
31.	Table 31	Number of correct responses in Hindi	166
32.	Table 32	Percentage of correct response in Hindi	167
33.	Table 33	Total number of errors and correct responses with its percentage table	183

List of Figures

S. No.	Bar Graph with number and percentage	Page No.
1.	Bar graph of all the errors produced by Dyslexic group	152
2.	Bar graph of all the errors produced by control group	153
3.	Bar graph of total scores of English writing errors	159
4.	Bar graph of total scores of Hindi writing errors	160
5.	Bar graph of total scores of English spelling errors	161
6.	Bar graph of total scores of Hindi spelling errors	162
7.	Bar graph of total scores of English reading errors	163
8.	Bar graph of total scores of Hindi reading errors	164
9.	Bar graph of number of correct response in English	165
10.	Bar graph of percentage of correct responses in English	166

11.	Bar graph of number of correct response in Hindi	167
12.	Bar graph of percentage of correct response in Hindi	168

CONTENTS

Acknowledgement

PAGE NO.

CHAPTER -I

Introduction and Literature Review

1-43

- 1.0 Introduction
- 1.1 Scope of the present study and general research questions
- 1.2 Case of Hindi and English
 - 1.2.1 Types of writing system
- 1.3 What is Dyslexia: A Review of Literature
 - 1.3.1 Definitions of Dyslexia by various researchers and organizations
 - 1.3.2 Types of Dyslexia
 - 1.3.3 Common features of dyslexia
 - 1.3.4 Teaching techniques introduced in Schools
 - 1.3.5 History of Dyslexia
 - 1.3.6 Myths about Dyslexia
 - 1.3.7 Signs and symptoms of Dyslexia
 - 1.3.7.1 Signs and symptoms in Pre-School children
 - 1.3.7.2 Signs and symptoms in Primary School children
 - 1.3.8. Causes of Dyslexia
 - 1.3.8.1 Pre-natal causes
 - 1.3.8.2 Natal causes
 - 1.3.8.3 Post-natal causes
 - 1.3.8.4 Inherited factors
- 1.4 Models of reading
 - 1.4.1 The dual-route model of reading
 - 1.4.2 The single-route model of reading
 - 1.4.3 The balance model of reading
- 1.5 Role of orthography in reading and writing process
 - 1.5.1 Studies of Dyslexia in General and in Bilingual Children
 - 1.5.1.1 Case studies on bilingual dyslexic by earlier Researchers
- 1.6 Error Analysis
- 1.7 Overview

CHAPTER -II

Research Methodology 44-61

- 2.0 Introduction
- 2.1 The basic types of research methods
- 2.2 Aims and Objectives of the present study and research questions
- 2.3 Sampling procedures
 - 2.3.1 Random sample; select sample
 - 2.3.2 Elicitation of the Data
- 2.4 Tools and instruments for the present study
- 2.5 An overview
- 2.6 Brief description about the upcoming chapters

CHAPTER – III

Case Studies 62-146

- 3.0 Introduction: Format and Structure of case studies
- 3.1 to 3.20- 20 case studies

CHAPTER – IV

Results and discussion 147-170

- 4.0 Introduction
 - Substitution of consonants/Vowels
 - Deletion of consonant/vowels
 - Addition of consonant/vowels
 - Cluster reduction/Addition
 - Reduction of nasalization
 - Tables and graph of errors

Chapter-V

Summary and Conclusion 171-188

- 5.0 Introduction
- 5.1 Summary of all the chapters
- 5.2 Main findings of the research
- 5.3 Limitation for future projection

Bibliography	189-200
Appendix I –	201-274
▪ Errors Produced by Dyslexics	
Appendix II –	275-286
▪ English Questionnaire	
▪ Mathematics Questionnaire	
▪ Drawing Questionnaire	
▪ Hindi Questionnaire	

CHAPTER-I

INTRODUCTION AND LITERATURE REVIEW

1.0 INTRODUCTION

“Why am I not able to read and write the way my classmates do? Am I stupid? Am I lazy or am I not intelligent? I want to learn. Can you teach me the way I can learn?”

This is not just a question but an urgent need of someone who is willing to learn. Learn to read and write, to be literate, to achieve a goal, to be independent.

For many years dyslexia and other reading problems were not known to most teachers and parents. As a result, too many children passed through school without mastering the printed page. Some were treated as mentally deficient; many were left functionally illiterate, unable to ever meet their potential. But it has been only recently that we have known about Dyslexia. It has been a revolution in what we've learned about reading problems and dyslexia. Scientists like Sally Shaywitz and Berniger used variety of new imaging techniques to watch the brain at work. Their experiments have shown that reading disorders is most likely the result of what is, in effect, faulty wiring in the brain and not laziness, stupidity or a poor home environment. There's also evidence found that dyslexia is largely inherited. Scientists have defined four chromosomes that may have been involved. Dyslexia is now considered a chronic problem for some children, not just a “phase”. Scientists have also discarded another old stereotype, that almost all dyslexics are boys. Studies indicate that many girls are also affected and seeking help. (<http://www.dyslexia-teacher.com/t100.html>).

This research will investigate the linguistic errors produced at word level by the bilingual Dyslexic children learning Hindi and English in the schools of Delhi.

Language plays an important role in communication. Not only spoken language but written language has also acquired a predominant position in human civilization. Information exchange through some form of written language has become inevitable and indispensable in this modern world. Human invention of writing as a mode of representing spoken word is a major evolutionary development.

In today's modern and advanced society, education is a must for almost everyone. In order to survive and live a respectful life one needs to be literate. Even for small things in life like buying groceries from supermarket or paying bills one needs to recognize the printed page. Written language has acquired a dominant position in human civilization. No one can move on without getting mastered the printed page. Written language is an extremely valuable form of linguistic representation, since it allows humans to keep a permanent record of specific linguistic messages. (Caplan, D, 1987, p.233).

Dyslexia is a reading disorder where the person has problem in recognizing words and processing the grapheme-phoneme correspondence. Along with dyslexia, one can also have a writing disorder called dysgraphia and mathematics disorder called dyscalculia. Developmental Dyslexia occurs in children by birth. The child with normal IQ and no less than other children of their peer group can also be detected with developmental dyslexia. This is a time to wake up, to recognize the problem and proper diagnosis needed to understand the problem and proper remedy applied to overcome this problem. Dyslexia can be treated and almost 80% of the problem can be solved. Although it is a life- long problem as it is genetic but the best thing about this problem is that it is curable. There have been many famous dyslexics like Einstein, Tom Cruise and many who proved their ability. (Dyslexia-Wikipedia, the free encyclopedia)

Dyslexia usually manifests itself as failure in learning to read in the first grade at school. The reading difficulty can continue to adulthood. Early recognition of signs and symptoms can help the child to be identified and proper diagnosis can be done. (Shaywitz. S, Overcoming dyslexia, 2005)

1.1 **Scope of the present study and general research questions**

This research will investigate the linguistic errors produced at word level by the bilingual Dyslexic children learning Hindi and English in the schools of Delhi. A comparative study of error analysis will be done among 20 dyslexic children and 20 chronologically age (CA) matched controls in the age group of 6-15 years both in Hindi and English languages separately. This research will focus on the types of errors produced by the dyslexic students and try to find out the most problematic area of the language especially at word level in reading and writing. It might put some light in understanding the cognitive process of language learning specially in reading and writing. The orthographic effect will also be observed to understand the cognitive process in reading and writing in the two different orthographies.

The data from 50 dyslexic students were collected in the age group of 6-15 years. Out of 50 dyslexic students 20 students were selected for the further studies. 30 students were not selected for the research as they did not complete the tests given due to time constraint. They could attempt only writing tests both in Hindi and English language as well as drawing and maths tests. They did not attempt reading and spelling tests. 20 dyslexic children attempted all the five tests that were reading, writing and spelling in Hindi and English language as well as drawing and mathematics tests. Therefore select sample was 20 dyslexic students in the age group of 6-15 years, on which further case study was conducted and compared with 20 normal (CA) control group.

This research will investigate linguistic errors produced at word level by dyslexic children learning Hindi and English in the schools of Delhi. The subjects selected for the research are mostly Hindi speakers. Some of them have more than one language as their mother tongue like Punjabi. The age group of the students range between 6-15 years. This research includes students from both the gender. 15 boys and 5 girls were included for the research. This was on the basis of availability. Both the languages were examined separately for reading, writing and spelling. The test included questionnaire method as well as a small conversation with the teacher. The students were also interviewed to

know their problems regarding their studies. It was in a form of general conversation. Class assignments and homework notebooks of the students were also consulted. The questionnaire prepared for reading, copying and dictation included word list, sentences and paragraph to tests the ability of children in reading, writing and spelling. Separate tests was conducted for Mathematics and Drawing. Numeral writing test was conducted to test the sequencing order in Hindi and English language. Since students did not know the Hindi numeral writing, they were tested on the basis of writing the names of the days and months in Hindi. Separate tests were conducted for writing, reading and spelling in both the languages through Questionnaire method. The same Questionnaire was used to test reading, copying and dictation. The errors produced in all the tests was further identified and tabulated separately. Then the different types of errors were identified and tabulated. It included five types of errors. They were substitution, deletion, addition, metathesis, reversal and any other type. The types of errors produced was compared with the normal subjects of chronological age (CA) matched control group and the difference in number of errors produced by both the groups in both the languages was compared through the number and percentage table. Bar graph is also represented to observe the number and percentage of the errors produced in both Hindi and English including both the groups of students.

General research questions can be put forward as-

- Whether orthography plays an important role in word recognition process?
- Does the mother tongue or first language affects the acquisition of second language and are the types of errors produced related or are completely different from the first language?
- We know that different languages follow different cognitive routes for reading according to the complexities of the scripts. We will be able to cross check the above statement through the types of errors produced in reading, writing and spelling of Hindi and English.

- Will the regular and irregular spelled words in the script contribute to the complexities of word recognition process? Will there be more number of errors in reading irregular forms of words as compared to regular forms of words?
- Will there be less number of errors in more frequently used words as compared to less frequently used words irrespective of their complexities in word recognition process? Is it the frequency of usage of the word responsible for number of errors produced?
- Does the length of the word also play a role in word recognition process? Will there be less number of errors produced in one syllable or two syllable words as compared to three or four syllable words?

All these questions will be examined in the present research to understand the process of word recognition in both Hindi and English through the errors produced by dyslexic and control children. It can also throw some light on the study of the cognitive process of reading routes of dyslexic students. The maximum number of errors produced will contribute in identifying the problematic area of reading process and will help in language teaching. The identified area can be thoroughly studied and necessary modifications can be applied in order to help dyslexic students to do better.

How is this research different from earlier Studies?

This research will investigate linguistic errors at word level produced by bilingual dyslexics learning Hindi and English in the region of Delhi. These subjects will be in the age group of 6-15 years from both the gender. They will be from either mainstream section or attending special section in the same school. The subject's will be selected on the basis of their severity. Children who are dyslexic will be selected for further investigation. An error analyses will be conducted in both Hindi and English language. Errors produced by the dyslexic subjects will be compared with normal subjects of same age and gender. A detail case study will be conducted on the errors produced by them and a report will be written for each case separately.

Firstly, total number of errors produced by dyslexic subjects and the normal subject will be compared. Secondly, comparison between Hindi and English will be done in reading, writing and spelling. Finally, the results of all the cases will be compared and tabulated to show

- (a) Whether English will have more number of errors as compared to Hindi?
- (b) Whether English reading will have more number of errors as compared to Hindi reading?
- (c) Which area, reading writing or spelling has maximum number of errors and in which language?
- (d) Which area, reading writing or spelling has minimum number of errors and in which language?
- (e) Does orthography plays a role in learning a language especially in reading and writing. Will there be less numbers of errors in transparent script like Hindi and more errors in opaque language like English?

Orthography plays an important role in language learning. Shallow or transparent orthography is easier to learn than compared to deep or opaque script. Therefore Dyslexic children will produce more errors in opaque language than in transparent language. Therefore there will be more number of errors in English as compared to Hindi language. This hypothesis will be tested.

Dyslexic children who generally tend to make certain errors while reading such as reading 'listen' as 'lis-ton' follows a phonological route. In this example the child is trying to read it phonologically that is as it is written through GPC rule and not actually going through a whole word reading i.e. not following the direct route but following the indirect route that is GPC(grapheme-phoneme conversion) rule. When the child is not familiar with the word then obviously he uses the indirect route. But once the child is familiar with the new word he starts using the direct route. In the case of dyslexic children it is hard to find out which route the child is using at times. Another example like reading letter by letter, where the child makes such errors while reading "calm" spells out 'C ' 'A' 'L' 'M' but reads as 'CLAIM'.

Orthography plays an important role in language learning. Some of the research done on dyslexic students learning languages like English, French which are opaque languages and languages like German, Spanish which are transparent ,it was found that more numbers of errors were produced in opaque scripts than in transparent scripts.

If we compare them with the normal children then the numbers of errors produced by dyslexic students are much more than normal students. Dyslexic children do not match up with their peer groups or with their classmates. They lack behind and keep repeating the same mistakes every time which normal children do not show. Normal children generally do self-correction when reminded and corrects their mistakes after few reminders only whereas dyslexic children lack this quality and needs a special educator and also extra time for learning.

1.2 Case of Hindi and English

How different is the script of Hindi from the script of English?

This study will focus on the number of errors produced in Hindi which is a syllabic and English which is an alphabetic script. The Hindi script arguably has syllabic as well as alphabetic properties. The fact that phonemes are graphically marked aligns it with other alphabetic scripts. However, unlike most alphabetic scripts in which consonants typically stands alone as phonemes, consonants in Hindi have an inherent associated vowel and as such, Hindi resembles syllabaries. Hindi is written in the Devanagari script, a script that was developed to write down Sanskrit. Hindi follows the conventional pattern of Indic script which is based on the phonological analysis of the ancient Indian grammarians. First, the Vs, syllabic liquid and V-like nasals come. Then, series of Cs ordered for place of articulation from back to front: gutturals, palatals, cerebrals, dentals and bilabials come. Finally there are semivowels and sibilants. Every written sign represent a syllable since the C letters have an inherent neutral V which is usually transliterated as cited in (*Encyclopedia of writing system, 1996. p-204*) (*from masica,1991; Ohala1983*). The arrangement of letters in Devanagari is

strictly phonetic: letters are classified by place of articulation letters, with vowels and diphthongs presented first, followed by consonants. It consists of 48 letters and several diacritical (see Bright, 1996; Vaid & Gupta, 2002a). Hindi words are written and read from left to right. A horizontal bar links the letters of a word and may aid in perceptual discrimination of word boundaries (see Vaid & Gupta, 2002a). There is no cursive form nor there is upper versus lower case discrimination as in English. Hindi consonants are pronounced with an inherent schwa vowel which has no independent graphemic form. Consonant clusters are written either by forming ligature involving a half consonant attached to a full one or by adding a special sign to indicate the absence of the schwa. Vowel length is phonemic and there are different graphemes corresponding to long and short vowels. Vowel appears as separate letters in full form in word-initial positions and as diacritical signs (known as *maatras*) in medial or word final positions. In non-initial positions, vowel signs are placed nonlinearly above, below, left or right. Hindi is a transparent language as compared to English which is an opaque language.

In English the correspondence between graphemes and phonemes are many to many in both directions. A single sound of English, such as the sound of “long i”, can be written in a variety of fashions: i+consonant+e (as in *pike*), ay, ey, ie, etc. In English, however, graphemes are also ambiguous. The sequence of letters ea sounds like /ɛ/ in bread and head, like /i/ in heat or beat, and as the sound /ə/ in a word like search. A person who knew the set of correspondences between graphemes and phonemes in English would not automatically be able to read an English word correctly. For instance, given the word *read*, even a native English speaker does not know whether it is to be pronounced as reed (as in present tense) or red (as in past tense) because the grapheme ea is in fact ambiguous in this word. (Caplan, D. 1987, p. 234) Since there are variations in the sound of the grapheme with its phonemic relation it becomes more complex to stick to any particular pronunciation. The sounds of consonants as well as vowels can change in the same environment. For example the sound of the vowel /u/ changes in words like ‘put’ and ‘but’. For consonants like /c/ there can be different sounds like /k/ in ‘car’ and /ç/ in ‘chair’. Generally English

follows two routes for reading. The first one is semantic route where you already know the word and do not concentrate on grapheme-phoneme relationship. This is also called whole word reading. But when you come across a new word you try to read through the phonological route that is you concentrate on grapheme-phoneme relationship. Once you learn the word you store it in your memory as a whole word and then you start using the semantic route next time. One of the routes in dyslexic children is said to be damaged or absent. That is why they have problems in word recognition process.

As we all know language is acquired by children from their respective environment and they start speaking that language fluently. Language acquisition takes place before one starts learning to read or write. Therefore reading and writing is a learning process where one tries to connect the speech in a physical form in a written way that is through grapheme-phoneme relationship. Grapheme is a physical entity representing particular symbol denoting particular sound called phoneme. In world's languages we represent different languages through different orthography.

1.2.1 Types of writing system

Traditionally writing system of the world have been classified into three major types-

- the logographic
- the syllabic and
- the alphabetic.

A writing system technically referred to as a script or orthography consisting of a set of visible marks, forms, or structures called characters or graphs that are related to some structure in the linguistic system. Roughly speaking, if a character represents a meaningful unit, such as a morpheme or a word, the orthography is called a logographic writing system; if it represents a syllable, it is called a syllabic writing system; and if a phoneme, it is called an alphabetic system. (A phonetic alphabet, such as the International Phonetic Alphabet

devised by the International Phonetic Association, is one designed to transcribe any oral language into a common script.)

Pictorial signs, such as the informational signs at an international airport (insofar as they can properly be called writing), can bear explicit linguistic messages only because of the extremely limited set of alternatives from which a reader must choose. Such writing is of little use for conveying new messages, since there is no convention for decoding them and to that extent it cannot be a general writing system. It can, however, serve a limited set of purposes efficiently.

General writing systems all analyze the linguistic form into constituents of meaning or sound. Chinese script is primarily a **logographic script**; each word or morpheme is represented by a single graph or character. Two words, even if they sound exactly the same, will be represented by entirely dissimilar characters. But, as the number of distinguishable words in a language can run into the tens of thousands (written English has a recorded vocabulary of more than 500,000 words), the number of logographic characters to be memorized is extremely large.

Syllabaries provide a distinctive symbol for each distinct syllable. A syllable is a unit of speech composed of a vowel sound or a combination of consonant and vowel sounds; the sounds pa, pe, pi, po, pu are different syllables and are easily distinguished in a word. The word paper has two syllables, pa-per. Syllables are the most readily distinguishable units of speech; consequently, the earliest of the sound-based, or phonographic, writing systems are syllabic. The number of syllables in a language, while differing considerably from language to language, is always quite large; hence, some hundreds of graphs may be required to make a functioning syllabary. Even then, such writing systems are far from explicit, for any string of syllabic graphs may be read in a number of different ways. The reading of such a script would rely upon the reader's prior knowledge and ability to work from the context, along with some guesswork.

Consonantal writing systems, as the name implies, represent the consonantal value of a syllable while ignoring the vocalic element. Such a system, therefore, would represent the syllables pa, pe, pi, po, pu with a single character. Such scripts have graphs for consonant sounds but not for vowel sounds, with the result that a certain amount of guesswork is involved in determining which syllable is being represented. This ambiguity, however, should not be overemphasized. When a consonantal system is used to represent a language like English, in which vowels differentiate root morphemes (in English, pat, pet, pit, pot, put are all different morphemes), discarding the vowel results in a highly ambiguous written expression that can be understood only by a reader who already has a good idea of the content of the written message. But in Semitic languages, such as Hebrew and Arabic, the absence of characters representing vowels is much less serious, because in these languages vowel differences generally do not distinguish morphemes. Vowel differences mark inflections, such as tense and aspect, that, while of some importance to the representation of meaning, are both more readily recovered from context and less likely to change the overall meaning. The failure to notice the intimate relation between the morphophonemic structure of the language and the type of orthography has led some scholars to underestimate the efficiency of consonantal writing systems and, perhaps, to overestimate the centrality of the invention of the alphabet to the evolution of Western culture.

Alphabetic writing systems represent the phonological structure of the language. The smallest pronounceable segment of speech is a syllable, but a syllable may be analyzed into the distinctive underlying constituents called phonemes. The achievement of the alphabet is to analyze the syllable into its underlying consonant and vowel constituents. The economy of representation comes from the fact that a large number of syllables can be generated from a small set of these constituents. An alphabet consisting of 21 consonants and 5 vowels can generate 105 simple consonant-and-vowel syllables and more than 2,000 consonant-vowel-consonant syllables. In short, an alphabet can represent a full range of phonological differences. It is a script particularly suited to representing a language in which morphological differences are marked in

phonological differences; it is less useful for a language like Chinese, in which one syllable represents a large number of morphemes. For the Chinese language a logographic system is more efficient.

Featural writing systems exploit the fact that even phonemes are not the most fundamental units of analysis of speech. Rather, phonemes may be analyzed into sets of distinctive features. The phonemes represented by the letters n and d share the feature of the tongue touching the alveolar ridge above the upper teeth. Featural writing systems analyze the sounds described as consonants and vowels into their shared and distinguishing features. Examples of writing systems that employ a featural approach at least in part are the Korean Hangul script, created, according to tradition, by King Sejong in the 15th century, and Pitman shorthand, a system for rapid writing invented in Britain in the 19th century. In Hangul, vowels are represented by long horizontal or vertical lines distinguished by small marks, while consonants are represented by two-dimensional signs that suggest the articulations involved: pairs of lines representing lips together, tongue touching the roof of the mouth, an open throat, and the like. As the phonological system is organized around some dozen such features, an efficient script can be constructed out of 24 basic graphs. In addition, such a script makes syllables visually discriminable by organizing them into blocks to facilitate rapid reading. (<http://www.writing/Britannica.com.html>)

The scripts of the world range from those that facilitate the derivation of meaning directly from visual material without any mediation by sound, such as the ideographic scripts like the Japanese kanji; to those that economize highly on the number of visual symbols that are processed through the mediation of sound, by a complex series of grapheme-phoneme correspondences, such as English alphabet. Midway are through syllabic scripts like the Japanese kana mediated through grapheme phoneme correspondences, made relatively transparent by employing a large number of letter schemes representing the numerous possible sound combinations (Karanth, Pg. 23).

1.3 What is Dyslexia: A Review of Literature?

Dyslexia is a learning disability where one has problems in reading and writing. For over hundred years it has been recognized that even normal children can have impairment of learning to read and write. On November 7, 1896, Dr. W. Pringle Morgan of Seaford wrote in the British Medical Journal about Percy, F., fourteen years old, who was bright and intelligent, quick at games and in no way inferior to others his age but had great difficulty in reading. Morgan captures the basic element underlying what we refer today as developmental dyslexia. Morgan was the first to appreciate word-blindness as a developmental disorder occurring in otherwise healthy children. Adolf Kussmaul is credited to coin the term word-blindness in 1877 and termed this syndrome as ‘congenital word blindness’. Another German physician, Rudolf Berlin of Stuttgart, further refined our perception of these acquired reading problems. In his monographs *Eine besondere Art der Wortblindheit (A particular kind of a word-blindness)*, published in 1887, Berlin describes six cases that he personally observed for twenty years, used the term Dyslexia to refer to what he perceives as a special form of word blindness. (Shaywitz, S., Overcoming dyslexia, 2005, p.13-24)

Dyslexia is the term used for such kind of disability, where a person has a problem in reading, writing and spelling. Children who are born with such kind of learning disability have to go through a difficult path in recognizing and relating letters and phonemes to its grapheme. Children born with normal IQ and with potential to lead a normal life can also be diagnosed as dyslexics. Generally Dyslexia is associated with other disorders like ADD (Attention deficit disorder), ADHD (Attention deficit hyperactivity disorder), cluttering etc.

Dyslexia can also occur due to brain damage caused by accident, stroke, brain tumor or any brain disease. Language disorder caused by any kind of brain damage is called Aphasia. Aphasia is an umbrella term which includes language comprehension and production disorder. The four skills used in language learning are Reading, Writing, Listening and Speaking. Brain damage can cause

problem in any of the four skills. An Aphasic person who has been equipped with language previously can have problems in speech production and speech comprehension. It can also affect the person's ability to read and write. Reading disorder due to brain injury is referred to as Acquired Dyslexia and writing disorder as Acquired Dysgraphia." A" prefix is also used, especially in Europe and North America (Alexia, Agraphia). The label *Acquired* distinguishes the handicap from the more widely known *Developmental* kinds of Dyslexia and Dysgraphia that occur in young children where there is no evidence of any brain damage. (David Crystal, 1984:274)

This disorder is one type of specific learning disability. It commonly affects the person to have difficulty in verbal skills, abstract reasoning, hand-eye coordination, concentration, perception, memory and social adjustment. These problems result in the individual having poor grades and become classified as an under achiever. Due to this the dyslexic child is often labeled as lazy, low intellect and unmotivated. Eventually this affects the child's personality resulting in a low self-esteem. The Child often takes on the role of becoming the class clown, being rebellious, feeling like a misfit and keeping to themselves, difficult, refusing to attend school.

Until the early 1970's the focus was primarily on the disorders of comprehension and production of language or the aphasics. From 1970's there has been increasing interest in a closer look at the data from patients with reading disorders in order to attempt a construction of a theory as to how people normally recognize and read aloud, printed words. (Karanth, 2003:7)

1.3.1. Definitions of Dyslexia by various researchers and organizations:-

Dyslexics are not able to read properly and spell in a weird fashion. Letters on a page appeared meaningless jumble-with no more logic than alphabet spaghetti. They cannot make a connection between what they heard and what appeared on the page. (Sophy Fisher, Independent, Education. 7 November 1996) as cited in (Hulme and Snowling, 1997:1).

Discussions about dyslexia are frequently constrained within a space which is entirely defined by surface behavior like performance on reading, spelling and IQ tests and difference between them. However, tests scores are only the starting point for the scientific study of dyslexia. (Hulme and Snowling, 1997:1).

To give substance to the discussion of dyslexia, Turner says that “Dyslexia is a specific learning difficulty in which a disorder of phonological processing, frequently inherited, compromises the development of internal phonological representations. This difficulty affects, first of all at various low-level aspects of speech processing (phonological manipulation: rhyming, blending, segmenting and articulatory sequencing) and latterly the acquisition of the written language sequences, which depend upon these skills (reading more specifically phonological decoding and spelling). (Turner, 1997:10)

Margaret Snowling defined developmental dyslexia as the unexpected failure of a child to acquire written language skills. In November 1994, the Research Committee of the Orton Dyslexia Society (ODS) consolidated what appear to be a new consensus, as well as signing agreement with it, by adopting a new definition of this most common and best defined learning disability as follows:” Dyslexia is one of the several distinct learning disabilities. It is a specific language-based disorder of constitutional origin characterized by difficulties in single word decoding, usually reflecting insufficient phonological processing abilities. These difficulties in single word decoding are often unexpected in relation to age and other cognitive and academic abilities; they are not the result of generalized developmental disability or sensory impairment.” (Turner, 1997:3).

In March 1996, after extensive consultation, the Dyslexia Institute published its own revised definition of dyslexia, as follows:

“Dyslexia is a specific learning difficulty that hinders the learning of literacy skills. This problem with managing verbal codes in memory is neurological

based and tends to run in families. Other symbolic systems, such as mathematics and musical notation can also be affected”.

A comprehensive, complete definition adopted by the Orton Dyslexia Society, renamed the International Dyslexic Association, states that dyslexia is a neurologically based, often familial disorder which interferes with the acquisition and processing of language. Varying in degrees of severity, it is manifested by difficulties in receiving and expressing language, including phonological processing in reading, writing, spelling, handwriting, and sometimes in arithmetic.

There is no one dyslexic profile, no one standard set of characteristics, some experience eye hand co-ordination difficulties, while others are able to solve intricate puzzles and designs. Some seem to be in a world of their own, while others listen attentively and are very aware of their general surroundings. Some cannot decode the simplest word; while others can read almost anything but have trouble comprehending what they read.

1.3.2. Types of Dyslexia

Dyslexia is a learning disability found in children as well as in adult. There are two types of dyslexia:

- Acquired dyslexia
- Developmental dyslexia

Acquired Dyslexia:

In Acquired Dyslexia, reading and writing disorder is caused due to brain impairment such as accident, stroke, and tumor or brain disease. Writing disorder is called acquired dysgraphia.

These are the different subtypes of acquired dyslexia that have been identified and on which the models are built. They are divided into **central dyslexia** and **peripheral dyslexia**. Central dyslexia includes “Pure alexia”, “Phonological dyslexia”, “Deep dyslexia” and “Surface dyslexia” while peripheral dyslexia

includes “Visual dyslexia”, “Attentional dyslexia”, and “Neglect dyslexia”. (Obler, L.K and Gjerlow, K., Language and the brain, pg-109-121)

Pure Alexia:

Pure Alexia is a form of acquired dyslexia that was described as early as 1892, by the French neurologist Dejerine. It was called “pure” alexia because it was seen in isolation without the comprehension and production of language being affected. The only difficulty faced by the patient was a sudden and near total loss of the ability to read. It is also the only form of acquired dyslexia known in which writing and spelling is unaffected. Pure alexia has also been referred to as “word-form dyslexia” (Warrington & Shallice, 1980), and as “letter by letter reading” (Patterson & Kay, 1982), reflecting the theoretical interpretation of this condition by different researchers. Some patients evidenced ‘letter by letter’ reading that is they could not recognize words or higher units, but they could recognize individual letters. When they spelled these aloud or to themselves, (or learned to copy them on their hands to get the sensory input) they could remember what the letters spelled and therefore say the words. Clearly the problem for them was with the input one, they had problems with written but not auditory input of letter strings, resulting in the curious spared ability to read small parts of words but not whole words. By contrast, another set of dyslexics were unable to read letters but were relatively able to read whole words. They were called ‘word-form alexia’. In this sort of alexia, grammatical functors and nonsense words were more poorly read than substantives. Some patients who cannot read letters have no difficulty with numbers. These classical subtypes of reading problems reflect the hierarchical organization of orthographies. The lowest level of analysis is the letters, the next level is the words, and the highest level is the sentence. Clearly these levels only apply to written systems that use some forms of phonemes (sound) system to convert to graphemes (letters). However pure alexia has been reported in readers of syllabic and ideographic writing systems as well like that for Chinese. Pure alexia was considered to be rare but over the years several cases of pure alexia have been documented and

they not only continue to hold the interest of the Researcher but in fact have witnessed a renewed interest in the recent past.

A case reported by Hinshelwood (1902), an ophthalmologist who became interested in reading disorders describes one of his patients who was well-educated Englishman, had learned French as well as Greek and Latin. After a stroke at the age of 34, the patient was virtually unable to read English, although his reading of Latin was quite spared; that of Greek was somewhat worse, and French was only somewhat better than English.

It became clear that for pure alexia two brain lesions were required, one to the left occipital lobe so that written information into the left hemisphere could not be passed on to left hemisphere language areas and one to the back portion of the corpus callosum, so that the written information that did get in to the right hemisphere also could not be passed to the left hemisphere language areas. (Opler, L.K and Gjerlow, K., Language and the brain, pg-113)

Deep Dyslexia:

The enormous interest in the acquired dyslexia that we have seen since the 1970s was sparked by Marshall & Newcombe's publication on deep dyslexia (1966, 1973). The main characteristic of deep dyslexia is the occurrence of semantic errors in reading aloud when single words are presented, without context and without time pressure, for reading aloud. The deep dyslexic will often produce a word that is related in meaning to the stimulus word but may be quite different from it in spelling and pronunciation, for e.g., "brother" read as "father". Deep dyslexics are unable to decode words phonologically. The young child learning to read encountering new word, e.g. "said" will decode it: /sæ-ɪd/; deep dyslexics are unable to perform this task. This means they are unable to correctly read any non-words or real words that they have never encountered. However they perform some sort of whole word reading of words and as a result they make interesting semantic errors. For example, they may see the word 'orchestra' and read it aloud as 'symphony.' Patients with deep dyslexia often have difficulty in reading function words such as "and", "the", or

“or”. Morphological errors in reading occurs when a prefixed or suffixed words are read with the root word correct but prefix or suffix wrong such as “fixing” read as “fixed”. They will sometimes make errors on derivational as well as inflectional affixes, for example ‘nation’ for national, either adding or subtracting and even sometimes substituting one for another. Concreteness effect: concrete (highly-imaginable) words such as idea as rose or green are more likely to be successfully read than abstract (difficult-to-imagine) words such as idea or usual. Deep dyslexia has been documented extensively by Coltheart, Patterson & Marshall (1980, 1987), and much has been published on deep dyslexia since then (Coltheart, M. 2000b). All patients so far reported with deep dyslexia had extensive left hemisphere damage sufficient to produce aphasia (normally Broca’s aphasia) and normally a right hemiparesis. It has been proposed that deep dyslexia was unique amongst the acquired dyslexia in that given the extensive left hemisphere damage; they cannot use the left hemisphere at all for reading. Proponents of this view (Colheart 1980,1987;and Saffran, Bogyo, Schwartz & Marin 1980; 1987) suggest these patients are not reading with damaged version of the normal reading system, which is in the left hemisphere; instead their reading is carried out by the right hemisphere.

Surface Dyslexia:

Marshall & Newcombe (1973) followed up their description of deep dyslexia with an identification of two other types of dyslexia. Of this surface dyslexia is characterized by a marked difficulty in reading exception or irregular words. Irregular words are those words, in language like English, which do not follow the common pronunciation of the letters or letter groups that they are made of, for, e.g., laugh. For example they will read ‘strayigt’ for straight. In surface dyslexia these irregular words are often regularized in reading and interpreted accordingly, when the regularized form is an alternate word. For instance “Listen” may be read as “liston” and “blew” as “blue-color”. Surface dyslexics are able to decode words phonologically, but are not able to recognize whole words. They are able to read through regular spelling rules and are able to read the regularly spelled word correctly and could even read nonsense words

correctly. Surface dyslexic generally have left hemisphere lesion but within this broad lesion location it can occur as a consequence of a many different kinds of lesions. As to functional locus of lesion within the dual route model of reading, surface dyslexia is said to occur as a result of damage to the lexical-semantic route. The regularization pattern seen in surface dyslexic is attributed to reading through the non-lexical GPC route. Exceptions or irregular words, the pronunciation of which, do not follow letter-sound rules are, therefore regularized and misread. Regular words and non-words are still read correctly. Disruption of the lexical route leads to surface dyslexia, with the subject reading through the phonological route alone, consequently making errors with irregularly spelled words. Writing systems that are alphabetic in nature with a small set of graphemes often have a high proportion of irregular words as compared to syllabaries with their greater correspondence between letters and sounds. Subtypes of surface dyslexia have also been identified. Ellis, Lambon Ralph, Morris & Hunter (2000), for instance identified subtypes such as input surface dyslexia, central (semantic) dyslexia and output surface dyslexia. It is therefore not a single stable syndrome. However from the point of view of building a general model of reading the characterization of surface dyslexia as a disorder in which the indirect non-lexical route is functioning markedly better than the direct lexical route should be sufficient.

Phonological Dyslexia:

It was first described by Beauvois & Derouesne (1979) and is characterized by poor non-word reading with good word reading of both regular and irregular words. People with this problem are unable to read on the basis of ‘phonics’ rules that relate graphemes to phonemes. They can manage to read familiar words but have difficulty with new words or with simple non-sense words. While word reading is not 100% correct and some non-word could also be read, the reading of non-words is reported to be considerably poorer than that of words. So, the disorder is relative rather than absolute. Since, this is a feature that is also shared by deep dyslexic the question as to whether phonological or deep dyslexia are really two different syndromes have been raised.

Visual Dyslexia:

In addition to surface dyslexia, Marshall and Newcombe (1973), also described a condition they termed “visual dyslexia”. The reading errors made by these patients are largely or exclusively visual, that is response shares many letters with the stimulus, e.g., ‘arrangement’ for ‘argument’. Unlike the deep and surface dyslexia however there has not been much subsequent documentation of this type of dyslexia. Coltheart (1996/97) reports that these visual errors may also be seen in non-word reading where the patient reads a non-word as a similar looking word, e.g., beam for belm. An important characteristic of this type of dyslexia is that the patient often reads the letters of the word correctly but then combines it in to a visually similar word, e.g., ‘C’ ‘A’ ‘L’ ‘M’ ...”Claim”. Visual dyslexics generally face certain types of problems like sequencing difficulties, reversals of letters and numbers. For example when they try to write down names of the months, days of a week then they can mix the sequence and has problem in ordering or sequencing. They can reverse the letters like b/d, p/q, n/u basically the mirror image letters.

Neglect Dyslexia:

It is seen in brain damaged patients with unilateral neglect, often as a consequence of extensive damage to the right hemisphere. In single word reading the right side of the word may be neglected. However, Patterson & Wilson, (1990) and Haywood, (1996), have shown that a number of the patients with this form of acquired dyslexia do not show unilateral neglect other than in reading and hence it can be seen as an independent reading disorder. In these patients, processing in the left half of space is impaired only when what is being processed is a letter-string.

Attentional dyslexia:

It is characterized often by good reading of single words with a difficulty in identifying embedded words (Shallice & Warrington, 1977). They tend to mix up the letters in a word or between words. The condition is interpreted as being

due to disruption in perceptual grouping of letters and impairment in the encoding of letter positions.(Karanth,p.,2003,p.11)

Developmental Dyslexia:

It has widely been recognized that there are children who, after a few years of schooling, are consistently seen to fail at the task of reading, writing and spelling, despite normal intelligence, instruction, and opportunity to learn. No medical, cultural, or emotional reason is available to explain the *discrepancy* between their general intelligence and linguistics abilities and their level of achievements in handling written language. There is often a history of early language delay, but by age 9 or so, spoken language ability is apparently normal, whereas written language skills may remain at the level of 5 or 6 year old. This is called developmental dyslexia. It occurs in children from birth. It is genetic in nature. It can be found in normal children with no disability symptoms. They may be normal in all aspects with good IQ and normal behavior. This is detected only when child starts going to the school. They face problems in reading and writing specifically. This leads to a problem and child is not able to cope up with the studies and generally have the tendency to avoid going to the school. The dyslexic problem is becoming increasingly recognized, with many countries now setting up organizations to draw attention to the handicap and to provide special help.

Acquired vs developmental dyslexia

The several similarities between the symptoms presented by the two kind of dyslexia have led some scholars to argue that there is an underlying identity. Parallels have been proposed between developmental dyslexics and acquired deep dyslexics. For example both have problems in reading non sense words and are better in reading concrete words. However so far there is little clear evidence that children display the kinds of semantic errors that are crucial to the identity of the deep dyslexia syndrome. Similarly there have been proposals that developmental dyslexia displays a parallel with acquired surface dyslexia. However, several differences between the adult and the children's population remain in particular, the greater variability of children's performance. There is

moreover, always the possibility that the brain mechanisms that underlie reading acquisition are different from those used to maintain reading skills in later life. (Crystal, D., Pg-277)

1.3.3 Common features of dyslexia

No dyslexic child will display all of the features but can display several.

Background features

- Sight normal
- Hearing normal
- IQ near –average or above
- Health normal
- Adequate first teaching
- No previous emotional disturbance
- No gross brain damage
- No sociocultural deprivation
- No serious lack of schooling

Psycholinguistic features

- Reading, writing and spelling all below that expected for age and IQ
- Persistent or often bizarre reading and spelling errors, e.g., letters reversed or out of order (confusion of b/d, was/saw, etc.)
- Confusion when labelling left and right, and generally poor directional ability.
- Difficulties in coding symbols and sounds, examples naming letters of the alphabets.
- Difficulties in sequencing, example putting things in a series, remembering days of the week and keeping one's place.
- Poor short term memory, e.g./ remembering tables or instructions.
- A history of late language development.
- Some pronunciation difficulties, especially with long words.
- Non-fluency in speech.
- Poor auditory discrimination of speech sounds.

- Problems of visual perceptions
- Mixed handedness or confused laterality.
- Poor concepts of self.
- Sometimes good spatial skills, e.g. modal making.

(Crystal. D, Encyclopedia, pg-277)

What is Hyperlexia?

Reading retarded children sometimes develop a surprising ability to read aloud including the accurate production of quite advanced vocabulary, well beyond their level of comprehension. The ability such children have to read aloud goes beyond their other cognitive abilities. They have great difficulty for examples, associating the words they read with objects or pictures. (Crystal. D, Encyclopedia, pg-277)

1.3.4 Teaching Techniques Introduced In Schools.

At the same time, educational researchers have come up with innovative teaching strategies for children who are having trouble learning to read. New screening tests are pinpointing children at risk before they get discouraged by years of frustration and failure. Educators are trying to get the message to parents that they should be on the alert for the first signs of potential problems.

It's an urgent mission. Mass literacy is a relatively new social goal. A hundred years ago people didn't need to be good readers in order to earn a living. But in the Information Age, no one can get by without knowing how to read well and understand increasingly complex material. These skills don't come easily to about 20 per cent of children. Not all of these children are dyslexics.

Researchers now think that dyslexia represents the low end of a continuum of reading ability. The teaching strategies that help dyslexics, those most severely disabled, are also helping children who require only a little extra attention.

There are numerous techniques for teaching dyslexic children. Not all dyslexics can follow the same technique, so first we need to know the students personally and build rapport with him so that he has confidence in you and trusts you. Learners need to feel confidence to start with you. You should motivate the

learner to learn more and more and create positive thinking in his ability to do the work. There are different programs, teaching aids and software packages to teach the dyslexic students. Teaching should be multi-sensory involving looking, listening, speaking, and touching. There are different types of learners like visual learner who learns by seeing, auditory learner, who learns by listening and kinesthetic learner, learns by doing or feeling. ([http://www.dyslexiasw.com/advice/help-andamp-advice-for-teachers/..](http://www.dyslexiasw.com/advice/help-andamp-advice-for-teachers/))

Some of the teaching techniques used to teach dyslexic learner are as follows:-

1. **MSL approach:** Utilize the multi-sensory structured language approach to teach children with dyslexia. It is beneficial for all children. MSL teaches phonemics, comprehension, vocabulary, accuracy and fluency, and writing and spelling. You can receive MSL training and certification. The international Dyslexia association for multi-sensory Education provides information about training and certification required.
2. **Improving the classroom environment:** Allow the student to sit near the teacher and keep observation continuously.
3. **Allow the use of recording devices:** Tape recorders can help students to keep a record and can replay the instructions and concepts for clarification or reinforcement.
4. **Decrease the amount of copying:** Students with dyslexia needs more time to copy and take down the notes. Teachers can provide written instructions for assignment so that they focus on the actual information.
5. **Do not focus on the quality of handwriting:** Some children with dyslexia may struggle of the fine motor skills it requires to write.
6. **Repeat yourself often:** Since dyslexic children may struggle with short term memory, remember what you say. Repeat instructions, key words, and concepts.
7. **Use time wisely:** They often struggle with focusing. Take your time. Do not rush through a lecture. Give time to copy and make sure they understand before moving to other sections. Incorporate short breaks regularly. They struggle to sit long, so it will help them to regain energy.

(<http://www.wikihow.com/Teach-a-dyslexic-child>)

1.3.5 History of Dyslexia

Dyslexia was identified by Oswald Berkhan in 1881, but the term dyslexia was coined by Rudolf Berlin, who was ophthalmologist in Stuttgart. He used the term to refer to a case of a young boy who had a severe impairment in learning to read and write in spite of showing typical intellectual and physical abilities in all other aspects.

For years, people thought dyslexia was rooted in the earliest research. W. Pringle Morgan, a general practitioner from Seaford, East Sussex, England, first described dyslexia 100 years ago. In 1896 he published an article in the *British Medical Journal* about a 14 year old boy named Percy who was “quick at games and in no way inferior to other of his age” – except that he was unable to read. Because Percy and others like him had problems with written words, not with spoken language, it was assumed that the problem was visual. Dyslexia was turned over the ophthalmologists, who tried to teach dyslexic children by using oversized letters and words. This was called developmental dyslexia.

Castles and Coltheart describe phonological and surface types of developmental dyslexia (dysphonetic and dyseidetic, respectively) to classical subtypes of alexia which are classified according to the rate of errors in reading non-words. The dysphonetic and dyseidetic distinction refers to two different types mechanisms. First one relates to a speech discrimination deficit, and other relates to visual perception impairment.

1.3.6 Myths about Dyslexics

- Dyslexia is just an excuse for being dumb.
- All dyslexic people are highly intelligent.
- Dyslexia only affects boys.
- All dyslexic people are very creative
- If you are dyslexic you will never be able to read or write.

1.3.7 SIGNS AND SYMPTOMS OF DYSLEXIA:

- Difficulty in comprehending

- Difficulty in expression, written or oral
- Understanding letters phonetically or otherwise Difficulty in reading
- Inability to memorize (Sequential Problem)
- Difficulty in spelling and reading - (especially with English Phonetic as it's a mixture of different languages)
- Difficulty in doing simple mathematical problems
- Difficulty in attending to class instructions, and gets distracted too much (Attention Deficit Hyperactivity Disorder- ADD/ADHD)
- Learning any new language

1.3.7.1 Signs and symptoms – in Pre-school children

- Have difficulty matching words that rhyme.
- Has difficulty with putting objects in a sequence, such as colored beads.
- Has a shorter than average attention span.
- May have been later than normal learning to talk.
- Mixes up words such as 'up' and 'down', or 'in' & 'out'.
- Jumbles up letters in words such as 'par cark' or 'car park'
- May find it harder than other children to skip, hop, balance, and kick a ball.
- Has difficulty dressing himself.
- Finds it hard to clap in time to a rhythm.

1.3.7.2 Signs and symptoms-In a Primary school children

- Has difficulty learning to read and spell.
- Writes letters and numbers the wrong way round.
- Finds it difficult to remember sequences such as the alphabet, days of the week, months of the year, multiplication tables.
- Needs to use his fingers to work out simple calculations.
- Takes longer than others to do written work.

- Leaves out letters or jumbles up the order of letters when reading & writing: was/saw, on/no etc.
- Confuses left and right
- Has difficulty tying shoe laces, fastening buttons, tying etc.
- Seems brighter than his school work suggests.

Some children may initially have fewer problems in learning a language in school, but their problem may be aggravated as they learn more intricate parts of a language like grammar, or understanding of textual matter.

1.3.8 Causes of Dyslexia

The first thing that needs to be said is that dyslexia is not brought about by poor parenting. On the contrary, it is the concerned parents of dyslexic children who have taken the initiatives that have brought dyslexia to the forefront of the learning difficulties arena.

Individual parents have persisted in pointing out to their children's schools that something must be wrong when a child of apparently normal intelligence is failing to learn to read and write.

To be quite honest, nobody quite knows at the moment. There has been a real increase in the amount of research taking place, and a number of possibilities are beginning to emerge, but the waters are still fairly murky. The overall picture is that dyslexia can be caused by inherited factors, and/or hearing problems at an early age. There could be pre-natal, natal and post -natal causes of dyslexia.

Some of the causes are mentioned below:

1.3.8.1 Pre-natal causes –

- Hypertension / maternal stress of pregnant women
- Drug abuse
- Accidents during pregnancy
- Intake of alcohol during pregnancy.

1.3.8.2 Natal causes-

- Delayed birth cry
- Low birth weight
- Forceps delivery
- Hypoxia

1.3.8.3 Post-natal causes –

- Head injury during early years of development
- High fever.
- Epileptic attacks.

1.3.8.4 Inherited Factors

It is clear that dyslexia is very frequently found in families, and is often accompanied by left-handedness somewhere in the family. This does not mean to say that a dyslexic parent will automatically have a dyslexic child, or that a left-handed child will necessarily be dyslexic. But in the families where dyslexia has been identified, almost one-third of the children have a history of learning difficulties in their family, and more than half of the family members are left-handed.

With the technical advances that have come about in brain-scanning in recent years, a lot of research has been carried out examining the brains of dyslexic people. Bunches of cells beneath the surface of the brain have been detected which lie on the surface in the brain of a non-dyslexic person.

These groups of cells ought to have moved to the brain's surface at the time when the brain was developing in the foetus, but failed to make the journey. They are known as 'ectopic' cells (like an ectopic pregnancy, where the egg fails to reach the womb and is fertilized in the Fallopian tube).

These ectopic clusters of cells are mainly found in the left and the front of the brain - the areas which are important for reading and writing. Another area of the brain - the magno-cellular system, which deals with our ability to see

moving images - is smaller in the brains of dyslexic people. This makes reading harder, where the brain has to quickly interpret the different letters and words which the eyes see as they scan words and sentences.

With the use of EEG (electroencephalogram), where small electrodes with wires are temporarily attached to the outside of a person's head, it has been possible to see increased brain activity on the right side of the brain when a child is beginning to learn to read. Increased activity is noticeable on the left side in an advanced reader.

However, the brains of dyslexic children show an unusual variation in left- and right-side activity. Recent research has found that, whereas non-dyslexic children use the left side of their brain for language work, dyslexic children have to use the right side as well. This is not the side of the brain that is wired for language work, and, as a result, the brains of dyslexic children and adults have to work about six times harder. This may be why dyslexic children and adults become fatigued by language work and dealing with text.

Hearing problems during early age

If a child suffers frequent colds and throat infections in the first five years, the ears can be blocked from time to time so that hearing is impaired. The parents can easily be unaware of this until a doctor actually looks into the child's ear. This condition is sometimes known as 'glue ear' or 'conductive hearing loss'. If the difficulty is not noticed at an early stage, then the developing brain does not make the links between the sounds it hears.

This early learning of sounds and words is fundamental to the child's developing ability to handle language and text. If a child cannot hear clearly, it will be unable to hear the difference between words like 'pin' and 'thin', or 'fan' and 'van'. The lack of clear hearing will also delay the child's phonemic awareness - the ability to hear that words are made up of smaller sounds and syllables, like 'c-a-t', or 'in-ter-est-ing'.

A delay in phonemic awareness causes lifelong difficulties - dyslexia - if corrective action is not taken at a very early stage. The most common treatment

is the insertion of a tiny tube or grommet into the child's ear. This allows the fluid to drain off so that the child's hearing is restored. Another treatment is the removal of the tonsils, which are sometimes the cause of the repeated infections.

A combination of both

Sometimes a child has inherited genes which dispose him or her towards difficulties dealing with the printed word, and has also experienced early hearing problems. These children are often found to be quite severely dyslexic, and need a lot of support through their school and college years, as well as in the workplace.

1.4 Models of reading

According to Marshal & Newcombe (1996), as in (Karanth, 2003:3) the models known as the neuropsychological functional /cognitive models propose that reading after initial letter identification may proceed along two routes – direct lexical route and the indirect Grapheme phoneme conversion (GPC) route. The underlying assumption is that the regularly spelt words are read by the indirect route and the irregularly spelt or exceptional words are read by direct route. These models were largely developed on the basis of “alphabetic writing systems” such as English.

More recently the dual route model has been challenged by a triangular model which was initially put forward as a model of learning to read. Instead of posting separate/distinct routes of reading with neural units committed to the same, it proposes that neural network form to process the orthographic input and phonological output and that these networks on systems are connected.

Models of reading are required to account for the different subtypes of acquired dyslexia. In the dual route model surface dyslexics are said to have damage to the semantic route, and thus read only through phonological route. Conversely deep dyslexics were said to read through semantic route because the phonological route was damaged.

Intensive research in the area of reading and reading disorder for over three decades has led to theoretical, methodological and technological advances.

However there are still no clear answers to many of the questions that relate to how the human brain processes literacy skills, much less account for the complex process of reading acquisition.

1.4.1 The dual-route model of reading

One model that has developed from the Wernicke-Lichtheim anatomical-connectionist model is the dual-route model Marshall & Newcombe (1973). The dual route model of reading proposes that reading is performed by either one of possible two routes:

- a) The memorized whole-word (lexical) route
- b) The active conversion of letters-to-sounds (non-lexical) route Marshall & Newcombe (1973)

The lexical route has several components that facilitate the conversion of visual inputs (letters in a word) to phonological outputs (reading words). The lexical route is believed to involve storage of whole words called the orthographic input lexicon. It can be used to read words without performing a grapheme (letter) to phoneme (sound) conversion. Evidence for this lexical route came from the examination of individuals who acquired reading deficits following some form of brain injury, Shallice and Warrington (1975). These individuals showed a primary deficit in reading words that do not possess a one-to-one mapping of grapheme to phoneme are termed orthographically irregular words, because their graphemes do not coincide with the phonemes in the pronunciation of the words. For examples, the word 'laugh' is irregularly spelled word in English orthography as all the letters do not produce their respective sounds like 'ugh' is pronounced as /f/. In this example 'u' is not pronounced as in 'put', and 'g' is not spelled as in 'go' and 'h' is nor pronounced as in 'hut'. Instead the grapheme 'ugh' represents only one phoneme /f/. The irregular words are learned by repeated exposure and reinforcement. The repeated exposure and reinforcement develops a memory for a word's letters and its pronunciation. This memory or storage of orthographically irregular words and their pronunciation is known as an orthographic lexicon. As a result, individuals who have significant difficulty

reading irregular words show a selective impairment in the lexical route to reading. They read real words or pseudo words that follow a one-to-one mapping of grapheme to phoneme relation that is regular words better than irregular words. The non-lexical route to reading involves converting the letters of the words (graphemes) into their corresponding sounds (Phonemes). This conversion process is commonly referred to as a phonological approach to reading, because it requires the awareness of the order and identity of the speech sounds that the graphemes represent. The evidence mapping for the non-lexical route comes from individuals with an acquired selective deficit in reading pseudo-words or novel real words, Shallice & Warrington (1975). Pseudo-words are meaningless words that possess a one-to-one between graphemes and phonemes relationship. If the non-lexical route is intact, then even novel pseudo-words are easily read by blending the sounds represented by the graphemes. Non lexical reading is not dependent upon a memory of the word's correct pronunciation, learnt from prior experience with the word as a whole. Therefore, the term non-lexical reading indicates a reading route that is not dependent on storage of mental lexicon of previously learnt whole word. One non-lexical task, with pseudo word reading, is a consistently strong predictor of reading achievement and correlates with measures of phonological awareness.

1.4.2 The single-route model of reading

A single-route model of reading has also been proposed. This model contends that while lexical and non-lexical processing does occur during reading, these processes are supported by a single computational mechanism that differs fundamentally from a dual route conceptualization. Thus, there are no rules that govern graphemes to phonemes coding (such as the letter /c/ expresses the sound /s/ if immediately followed by a letter (e, i or y), and there is no storage of word forms in a lexicon. Instead, four processors facilitate reading: orthographic, phonological, semantic and contextual. The processes are joined through the series of units and these connections can be strengthening by exposure, facilitating faster word recognition without a lexicon of words. Similar to the nervous system, this network is believed to have both excitatory

and inhibitory connections. However, tests of this computing model found to have limited success with accurately reading pseudo-words and some orthographically irregular words Coltheart (1981). Also words that have been accurately decoded by single-route model are limited to monosyllable words that are formed from a selected group of English letters, Coltheart (1981).

1.4.3 The balance model of reading

In contrast to the neuro-scientific investigations and the lesion based dual-route model, developmental models propose a different account of the reading system. The balance model, Bakker (1990) proposes that developmental dyslexia is the direct result of a failure to establish cerebral dominance. Support for the balance model comes from Bakker (1990) report that proficient young readers perform symmetrically on dichotic (involving or relating to the simultaneous stimulation of the right and left ear by different sounds) listening tasks. On the other hand, proficient older readers show asymmetrical performance on these tasks. These data are interpreted to indicate that normal readers show increasing lateralization for processing language as they mature. Additionally, Bakker (1990) found that children with developmental dyslexia showed a persistent deficit in cerebral dominance (a lack of lateralisation for language), as measured by dichotic listening. Bakker contends that early reading development involves the perceptual analysis of text while later stages of proficient reading rely on the semantic analysis of text. Thus, Bakker believes his model accounts for two types of developmental dyslexia, P-type and L-type.

The P-type dyslexic show an over-reliance on a perceptual synthesis approach to reading (right hemisphere dominant) described as reading slowly with many fragmentation errors. Bakker(1990).

The L-type dyslexic is believed to rely on left-hemisphere processes (perceptual analysis) and is characterized as reading hastily and inaccurately

As a result, Bakker's hypothesis is that deficient cerebral dominance impairs the language and reading skills of individuals with developmental dyslexia.

1.5 Role of orthography in reading and writing process

Much of the data on which the models have been built and address themselves by have hitherto come from users of the complex/opaque alphabetic scripts of the western world. Scripts like English with a small set of graphemes representing a larger number of phonemes are often highly irregular by virtue of the lack of adequate graphemic phonemic correspondence. A substantial amount of data-based research in support of these psycholinguistic models of reading has been built over the last 2-3 decades. The data so far has largely been from “alphabetic scripts” particularly opaque alphabetic scripts like English and French, though it has been recognized that the dyslexia’s in other kinds of scripts may be different owing to their differential reliance upon one or the other of the routes included in the universal model. Questions about the universal applicability of these models have been raised given that the scripts of the world differ in terms of the extent to which they depend on the rules for processing. There is, as yet, inadequate documentation of the acquired dyslexics in the relatively transparent alphabetic scripts such as Italian and German and the non-alphabetic scripts such as the ideographic, syllabic and alpha-syllabic scripts.

It is our contention that the database for the study of reading and its disorders needs to be widened extensively to include the entire range of writing systems in the world before we can arrive at a universal model of reading. The study of the acquired dyslexia in biliterate/biscriptals or readers of two different writing systems would also help arrive at a better understanding of the complex issue involved in readings, its acquisition, its teaching, its disorders and their management.

1.5.1. Studies of Dyslexia in General and in Bilingual Children:-

During the last couple of decades there has been an increase in the documentation of learning disability and reading disability in particular among Indian children.

A recent survey on learning disabilities in Indian children from the state of Kerala, (where Malayalam is spoken) by Suresh & Swapna (2003), using a broad definition of LD indicated an incidence of about 10% in a large unselected population. However these figures do not represent reading difficulty alone. (Karanth, 2003, pg. 100-101)

1.5.1.1. Case Studies done on bilingual children by earlier researchers:

Wydell and Butterworth (1999) and Wydell (2003), find support for the granularity – transparency hypotheses in the differential reading impairments of AS on English-Japanese bilingual, who while hailing from an English speaking background, nevertheless had severe difficulties in reading English as compared to his near normal reading in Kana and Kanji. This dissociation in his reading skills is seen as being predicted by the hypothesis of granularity dimension, since the grain unit for Kanji is at the whole word or whole character level. Wydell concludes that the differential pattern of reading errors in AS indicates on interaction between a cognitive deficit and the specific demands of the orthography to be learned, rather than a general deficit, such as a visual deficit which will apply to any orthography.

Nag Arulmani (2003), describes the reading Performa of two biscriptal dyslexic from India, K, the 1st child, performed poorly on a phoneme substitution task in Kannada and English, the two language he was learning to read and write. Tamil was his native language, which he did not know how to read and write, raising the question of whether his difficulty in the phonological task was influenced by a visual strategy that was the consequence of the orthographic exposure. Tamil was reported to be far superior to that of Kannada and English and in view of the fact that a single phonetic task (Phoneme substitution) was used on word lists that were not matched for complexity across the three languages. These results are difficult to be interpreted.

Second child A, a developmental dyslexic reported was tested on a battery of tests consisting of several phoneme and syllable manipulation tasks in both Kannada & English. The result suggested a “core deficit” in phonological skills

when compared to age matched controls in both languages. But in English it was greater than in reading Kannada (Karanth,2003: 61).

Studies of reading difficulties in children learning to read Kannada are rare. However, two recent studies (Raman, 1993, Purushotama 1994) have highlighted the difficulties that are particular to the acquisition of reading in Kannada. Raman (1993) investigated the incidence and nature of dyslexia in children studying in the 3rd and 4th grade with Kannada as their medium of instruction. She took a population of 550 children from 11 schools representing both government and private schools in urban and rural areas. These 550 children were identified as either poor or good readers by the school teachers were screened through an extensive exclusionary procedure including sensory visual and auditory tests, intelligence, motivation and regularity in school. Of the 550 children 57 were identified as being poor readers with no other associated factors. Of these 14 were identified as dyslexic and the other 43 as non-dyslexic poor readers. The dyslexics and non-dyslexic poor readers differed primarily in the extent to which they had reading difficulties or reading retardation with the discrepancy between age and scores being less in the latter (Karanth, 2003:101).

A report on Hindi-English bilingual dyslexics has been published by Gupta (2002). Gupta notes the difference in the types of errors made by JS in the two scripts. In English she found more numbers of errors on irregular words, while the errors in Hindi involved the reading of the maatraa i.e. the vowel attached to the consonants. Once again, it appears that it is the irregular features which contribute to the reading difficulty and the severity of the reading difficulty appears to be linked to the amount of irregularity in the script. These case studies were first published in “Developmental Dyslexia in bilingual - biliterates”, Reading and Writing: An Interdisciplinary Journal 4:297-306, 1992.

1.6 Error Analysis

The present research is based on the methods of error analysis of L1 and L2 errors produced by the dyslexic students at reading and writing level in Hindi

and English. The theory of error analysis is one of the important components of my data analyses; therefore I will discuss this theory in detail.

“Whenever a language is learnt or acquired one is faced with the problem of errors. Errors are an inevitable feature of learning. They are not problems to be overcome or evils to be eradicated. They in fact are part of learning and reveal the strategies that learners use to learn a language. They provide valuable insight into the language learning process.” - Pit Corder

Approaches to error analysis

As Jean D’Souza (1977) points out that in the fifties and early sixties errors were looked upon as evils which had to be eradicated. It was believed that if the teacher taught well and drilled the patterns of the new language efficiently, there was no reason for the learners to make any errors at all.

As more and more studies have been undertaken it has been proved that learners’ errors show evidence of a system. The learners try to evolve a language system of their own on the basis of the exposure they receive. They constantly try to bring their system in line with the system of the language they are exposed to. In so doing they formulate and discard hypotheses. According to Strevens (1969), regular pattern of errors could be observed and the learners were seen to progress through this pattern. It was a sign of achievement in learning. With this change in attitude, the emphasis of error analysis has also changed.

As errors began to be considered as specific indications of the learning process, the emphasis of error analysis changed from the ‘product’ to the ‘process’ behind it. That is in the early sixties the main concentration was on the errors themselves. Later the emphasis shifted to the process or systems behind the errors.

It was realized that the learners evolve a system for themselves which is much simpler than the system of language being learnt by them. They seemed to ignore certain redundancies revise some rules if necessary and simplify their learning task. But they were also found to change this system as per the

increasing exposure to the language they were learning. Hence errors can be looked upon as a developmental phenomenon providing evidence regarding the rules and categories used by the learners at a particular time.

The process is given importance because it throws light on how the language is learnt. The study of errors also helps us to infer what the nature of learners' knowledge is at that point of time in their learning career and what more has to be learnt. As Corder (1973) says "By describing and classifying his errors in linguistic terms we build up a picture of the features of language which are causing him learning problems".

This would in turn help us to produce materials which can help the learners when and where needed. At the same time it would not interfere too much in their learning process. For this a systematic analysis of the learners', errors should be undertaken.

Stages of Error Analysis

Error Analysis is carried out in three successive stages. (Pit Corder, 1973)

1. Recognition of Errors
2. Description of Errors
3. Explanation of Errors

A thorough understanding of these three stages along with possible measures to overcome them is necessary for a proper analysis of the errors.

1. Recognition of Errors

To recognize an error one should first of all know what is meant by the term error'. Pit Corder uses the term "Erroneous" to mean those utterances which are either superficially deviant or inappropriate in terms of the target language grammar. He distinguishes between mistakes lapses and errors. They correspond to what he calls Pre-systematic, Post-systematic and Systematic errors.

- i. Pre-systematic errors are those committed by the learners while he or she is trying to come to grips with a new point.

ii. Post-systematic errors occur when one temporarily forgets a point that has been previously understood.

iii. Systematic errors are those which occur when the learner has formed inaccurate hypothesis about the target language (i.e. the language that he is learning).

Even native speakers utterances are full of slips of the tongue and lapses. These are supposed to increase under conditions of stress, indecision and fatigue. If this is the case with native speakers, second language learners are sure to encounter these problems perhaps to a greater degree. In such cases the teacher may not always be able to distinguish such lapses from errors.

Pit Corder points out: "Recognition of error is thus crucially dependent upon correct interpretation of the learners' intentions". He talks about two types of utterances:

The two types of utterances mentioned by Pit Corder are as follows:

(1) Overtly erroneous -Superficially deviant

(2) Covertly erroneous - Superficially well-formed but not meaning what the learner intended to mean.

To arrive at knowledge of what the learner intended to say one can ask the learner to explain in his mother tongue what he wanted to say. An interpretation based on this is called 'authoritative interpretation'. Then the utterances are reconstructed keeping in mind what the native speaker would have said to convey that message in that context. This is called an 'authoritative reconstruction'.

In cases where one does not have access to the learner what is called a 'plausible interpretation' and a 'plausible reconstruction' could be made. This is done by studying the surface structure of the text-sentence in conjunction with the information derived from its context. Then the utterances are reconstructed to convey what the learner could possibly have intended to mean to identify errors. The original utterances are compared with their plausible or authoritative reconstructions. Once the recognition has taken place, description could begin.

2. Description of Errors

In this step one tries to show the learners how they have failed to realize the intended message. There are problems which prevent proper description as the researcher needs an extremely good insight into the learner's mind. Mc. Donough (1981) remarks that it should not be supposed that all learners take the same route to the same error. 'Nor should it be assumed that one learner may not at different times produce the same error for different reasons'.

But Pit Corder feels this is irrelevant for our object in error analysis is to explain errors linguistically and psychologically in order to help the learner to learn." He suggests that we should look for errors that occur repeatedly so that we can observe the rule that the learner may be using and try to describe it.

This way only systematic error is taken into consideration. This is a difficult task because individual learners may be highly inconsistent in their errors. Corder agrees that inconsistency is more characteristic of errors than systematically. Once the errors are described properly explanation of errors can begin.

3. Explanation of Errors

Explanation is still largely speculative because of our limited knowledge of the psychological and neurological process involved in language learning. The same error could be looked at from various points of view. For example a learner's mother tongue has only one way of referring to future time while the target language has three ways of referring to the same. Here the learner has problems and commits errors. In this case it is difficult to decide whether the error was caused by mother tongue interference or because of the confusion of the rules of the target language.

According to David Lott (1983) mother tongue does not actually interfere though it does not give any guide to the learner. Nickel(1971) takes a wider view and considers the above example as an interference error. But he says in such cases we should distinguish between direct and indirect interference Dulay

and Burt (1974) define interference as the automatic transfer of the structure of the target language due to habit.

Pit Corder (1973) refers to three types of errors. These are: (1) transfer errors (2) analogical errors and (3) teaching-induced errors. Selinker (1974) suggests five processes which are more or less similar to that suggested by Pit Corder. But in addition includes strategies of second language learning and strategies of second language communication to explain the nature of errors. Once we have decided to give an explanation from a particular point of view. We can start classifying the errors. But there are a number of problems in classification too.

1.7 Overview

The thesis is organized into five chapters:

1. Introduction and literature review
2. Research Methodology
3. Case Studies
4. Result and discussion
5. Summary and conclusion

The following next chapter is on research methodology. It has a discussion on the various types of research methods. Cross-sectional research method was used in data collection. Tools and techniques used to prepare questionnaire is also discussed. The criteria for subjects' selections are also discussed.

Chapter three is case studies of 20 dyslexic students. All the 20 case studies are discussed in a particular format. Beginning with the short history of the dyslexic case and then moving towards the assessment of the dyslexic subject. Total number of errors produced in Reading, Writing and Spelling in Hindi and English are represented in a table form and a comparison is made with the normal subject. The five types of errors which are addition, deletion, substitution, metathesis and reversal types of errors are also discussed. Each dyslexic case is compared with its chronological age matched normal control case and finally concluding remarks are reported in a form of general remarks.

Chapter four is result and discussion. Main findings are discussed. Different types of errors produced are presented in this chapter. Maximum and minimum

numbers of errors in Hindi as well as English reading, writing and spelling are presented. Different types of errors like substitution, addition, deletion, metathesis and reversal are also discussed with examples.

Chapter five is summary and conclusion. It briefly describes all the chapters and discusses the main findings of the analysis. It also discusses for future projections and limitations of this research.

CHAPTER-II

RESEARCH METHODOLOGY

2.0 INTRODUCTION

The title of this research is “Investigating Linguistic errors at word level produced by bilingual dyslexics learning Hindi and English”. The research is conducted in the city of Delhi. The data is collected from the schools of Delhi and the age group is between 6-15 years. The subjects selected for this research are mostly Hindi speakers learning Hindi and English in the schools of Delhi. Some of the subjects selected have more than one language as their mother tongue, for example, Hindi and Punjabi. All the subjects selected are dyslexics. They study in the special section of the mainstream school. They are taught by special educators and teacher

As already stated in the introductory chapter some of the research questions are as follows:

- Whether orthography plays an important role in word recognition process?
- Does the mother tongue or first language affects the acquisition of second language and are the types of errors produced related or are completely different from the first language?
- We know that different languages follow different cognitive routes of reading according to the complexities of the scripts. We will be able to cross check the above statement through the types of errors produced in reading, writing and spelling of Hindi and English.
- Will the regular and irregular spelled words in the script contribute to the complexities of word recognition process? Will there be more number of errors in reading irregular form of words as compared to regular form of words?
- Will there be less number of errors in more frequently used words as compared to less frequently used words irrespective of their complexities in word recognition process? Is it the frequency of usage of the word responsible for number of errors produced?

- Does the length of the word also play a role in word recognition process? Will there be less number of errors produced in one syllable or two syllable words as compared to three or four syllable words?

The present research is based on cross-sectional and empirical research methodology. The data was collected from the schools of Delhi where they have a special section for all types of special children. These students were identified with their disability by the experts and medical advisors. The students with different disabilities sit in the same class so at first instant I conducted test for the whole class. Then the selections of only dyslexic cases were done and separate tests were conducted for the research. The subjects were visited twice or thrice for few weeks, and the data was collected through Questionnaire and interview methods. Separate Questionnaires were prepared for English and Hindi languages. Separate tests were conducted for reading, writing and spelling. Separate tests for drawing and Mathematics were also conducted.

The present chapter begins with types of research methodology.

2.1. **The types of research methods**

- (i) **Conceptual vs. Empirical:** Conceptual research is that related to some abstract idea(s) or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones. On the other hand, empirical research relies on experience or observation alone, often without due regard for system and theory. It is data-based research, coming up with conclusions which are capable of being verified by observation or experiment. We can also call it as experimental type of research. In such a research it is necessary to get at facts first-hand, at their source, and actively to go about doing certain things to stimulate the production of desired information. In such a research, the researcher must first provide himself with a working hypothesis or guess as to the probable results. He then works to get enough facts (data) to prove or disprove his hypothesis. He then sets up experimental designs which he thinks will manipulate the persons or the materials concerned so as to bring forth the desired information. Such research is thus characterised by the experimenter's control over the variables under study and his deliberate manipulation of one of

them to study its effects. Empirical research is appropriate when proof is sought that certain variables affect other variables in some way. Evidence gathered through experiments or empirical studies is today considered to be the most powerful support possible for a given hypothesis.

- (ii) **Cross-sectional and Longitudinal research:** In this type of research time factor plays an important role in collecting data. In cross-sectional studies it is one-time visit to a subject for data collection to conduct the research. Data is collected at a given point from a group of people only once and is examined by comparative studies among them. In longitudinal research the researcher visits the subject more than once at regular intervals to observe the progress from initial to final point.

This research is cross-sectional and Empirical. The subjects were visited once for a weeks' time and data was collected through Questionnaire method. Separate Questionnaire was prepared for English and Hindi Language. Separate tests were conducted on Reading skills as well as on writing skills.

- (iii) **Quantitative vs. Qualitative:** Quantitative research is based on the measurement of quantity or amount. It is applicable to phenomena that can be expressed in terms of quantity. Qualitative research, on the other hand, is concerned with qualitative phenomenon, i.e., phenomena relating to or involving quality or kind. For instance, when we are interested in investigating the reasons for human behaviour (i.e., why people think or do certain things), we quite often talk of 'Motivation Research', an important type of qualitative research. This type of research aims at discovering the underlying motives and desires, using in depth interviews for the purpose. Other techniques of such research are word association tests, sentence completion tests, story completion tests and similar other projective techniques. Attitude or opinion research i.e., research designed to find out how people feel or what they think about a particular subject or institution is also qualitative research. Qualitative research is especially important in the behavioural sciences where the aim is to discover the underlying motives of human behaviour. Through such research we can analyse the various factors which motivate people to behave in a particular manner or which make people like or dislike a particular thing. It may be stated,

however, that to apply qualitative research in practice is relatively a difficult job and therefore, while doing such research, one should seek guidance from experimental psychologists.

- (iv) **Descriptive vs. Analytical:** Descriptive research includes surveys and fact-finding enquiries of different kinds. The major purpose of descriptive research is description of the state of affairs as it exists at present. In social science and business research we quite often use the term Ex post facto research for descriptive research studies. The main characteristic of this method is that the researcher has no control over the variables; he can only report what has happened or what is happening. Most ex post facto research projects are used for descriptive studies in which the researcher seeks to measure such items as, for example, frequency of shopping, preferences of people, or similar data. Ex post facto studies also include attempts by researchers to discover causes even when they cannot control the variables. The methods of research utilized in descriptive research are survey methods of all kinds, including comparative and correlational methods. In analytical research, on the other hand, the researcher has to use facts or information already available, and analyse these to make a critical evaluation of the material.
- (v) **Applied vs. Fundamental:** Research can either be applied (or action) research or fundamental (to basic or pure) research. Applied research aims at finding a solution for an immediate problem facing a society or an industrial/business organisation, whereas fundamental research is mainly concerned with generalisations and with the formulation of a theory. “Gathering knowledge for knowledge’s sake is termed ‘pure’ or ‘basic’ research.” Research concerning some natural phenomenon or relating to pure mathematics are examples of fundamental research. Similarly, research studies, concerning human behaviour carried on with a view to make generalisations about human behaviour, are also examples of fundamental research, but research aimed at certain conclusions (say, a solution) facing a concrete social or business problem is an example of applied research. Research to identify social, economic or political trends that may affect a particular institution or the copy research (research to find out

whether certain communications will be read and understood) or the marketing research or evaluation research are examples of applied research. Thus, the central aim of applied research is to discover a solution for some pressing practical problem, whereas basic research is directed towards finding information that has a broad base of applications and thus, adds to the already existing organized body of scientific knowledge.

2.2 Aims and Objectives of the present study and specific research questions

The present study investigates the Linguistic errors produced by bilingual Dyslexics at word level in Hindi and English. The scope of this study is to identify the types of errors produced by bilingual dyslexics and look into its cognitive process. The purpose of this research is to identify the types of errors and compare it with the normal children to know what are major types of errors produced and can be specified to dyslexics only.

2.2.1) To analyze and describe the errors produced by bilingual dyslexics at word level in Hindi and English both in comprehension and production.

2.2.2) Classify and Tabulate the Errors as

- Phonetic vs phonological reading errors,
- Graphic vs graphological writing errors.

2.2.2) Each of these errors will be further classified as types of errors as follows

- Substitution
- Deletion
- Addition
- Metathesis/Reversal and
- Others or unrelated types of errors.

The inventory of errors thus obtained will be analyzed to understand the basic differences in learning Hindi and English by Bilingual dyslexics. Based on the detailed comparison of the errors in Hindi and English it will be possible to explain the following:

- Whether the errors are more or less in transparent alpha-syllabic scripts or opaque alphabetic scripts,
- Whether there are more or less errors in regular or irregular forms of script in the two languages,
- Whether the errors will be more or less in native language, Hindi or second language, English.
- What kind of errors are more in Hindi and what kind of errors are more in English, and why?

2.2.4) Specific research questions

- Are the numbers of errors produced by dyslexics more as compared to control group?
- Whether the errors produced by dyslexics are more in Hindi or English?
- To identify the types of errors like deletion, substitution, addition or metathesis.
- To examine the maximum and minimum number of errors produced in all this types of errors.
- Number of errors produced in English will be compared with that of Hindi to examine the role of orthography?
- To examine the role of transparency and opacity criteria of orthography in language learning.
- To examine the role of regularly and irregularly spelled words in producing more or less number of errors in language learning. (Regularly spelled words are those which are pronounced the way it is written. For example-‘sit’, ‘put’ but irregularly spelled words are not pronounced the way it is written, for example-laugh, some, eat, listen.) English as compared to Hindi is opaque language. English has more number of irregular forms of words. Hindi is more like transparent language and has more regular spelt words.
- To examine the role of frequently used words. Is the number of errors less in frequently used words as compared to less frequently used words?
- Whether the length of the word plays any role in word recognition process? Will there be more number of errors in longer words as compared to smaller words?

- Will there be more numbers of errors in bi-syllable or tri-syllable words as compared to mono –syllable words?
- Will there be more number of errors in complex and compound words as compared to simple words?
- Are all these factors involved in language learning related to orthography alone?
- Does the cognitive process involved in reading and writing follows some different routes depending on the complexities of orthographies in word recognition?

The present research will investigate all these aspects of language learning process in reading, writing and spellings through the comparative study of errors produced by dyslexic and control groups in two different orthographies that is Hindi and English. The error analysis tests will be conducted and comparative study will be done among Hindi and English. It will also try to retrieve the word recognition process from the types of errors produced by bilingual dyslexics. This research will examine and identify the different types of errors produced at word level i.e. Substitution, addition, deletion, metathesis, reversal of letters and any unrelated errors if found.

The findings of case studies done on bilingual/biscriptal dyslexics show that it could be the irregular features which contribute to the reading difficulty. The severity of the reading difficulty appears to be linked to the amount of irregularity in the script among other factors. Earlier studies (Wydell and Butterworth, 1999), Gupta (2002), Karanth (2003), Suresh and Swapna (2003), Wydell (2003) on bilingual dyslexics shows that

- a) Opaque vs. transparent script may be one of the criteria for the maximum and minimum reading errors, where scripts like English and French which are opaque alphabetic scripts, contribute to maximum error production while transparent alphasyllabic scripts like Indian languages such as Hindi will contribute in producing less reading difficulty.
- b) “A bilingual learner makes less errors in his/her native language as compared to his second language”. These and such other hypotheses regarding dyslexia will be examined.

2.3 **Sampling procedures:**

Children in the age group of 6-15 years will be observed. The choice of subjects will be from both the educational as well as the clinical set up. **Random sample** will be 30-40 and select sample will be 15-20 bilingual dyslexic children. Both boys and girls will be taken for observation. For a preliminary survey the following two centers were approached:

Educare, New Delhi.

Vasant Valley, New Delhi.

2.3.1. **Random sample: Select sample**

Further selection would identify individual cases for studies. This would be in terms of general prognosis and other parameters. These children would be bi-/multilingual speakers. Since the tests are confined to the Delhi region most of the children would be either Hindi (L1) or English (L2) speakers. The children will be from either sex, preferably a comparable number from male and female categories.

Hence the required parameters are the following:

1. Age
2. Bi-/Multilingual
3. Gender
4. Background
History, if any, of
 - i) Therapeutic or
 - ii) Medical Intervention
5. Schooling
 - i) Normal Mainstream schools or
 - ii) Special/integrated school

2.3.2. Elicitation of the Data

Data will be collected through questionnaire method, observation and regular classroom work given to the child and tests designed specifically for the purpose. Each child will be examined separately by conducting separate test both in Hindi and English through questionnaire method and short interview more like conversation as well as class assignments. Some of the standardized tests like PPVT(Peabody picture vocabulary test); Boston naming test; RAN(Rapid automatized test for colors, numbers and letters); Phonological (e.g. name as many things as you can that begin with 'f'); and semantic (e.g. name as many animals as you can). Verbal fluency measures as well as reading tests. Questionnaire will be based of these standardized tests and if necessary modifications will be made in tests according to the requirements. A small conversation could be conducted between the subject and the researcher in the presence of their teacher if required. If possible, meeting with the parents could be arranged which will be helpful in investigating child's behavior.

Further data analysis will be done to find the errors both in spoken as well as written language. Comparison of errors among Hindi and English will be done.

Tools and instruments specially developed for the present study based on the previous research methods, approaches and standardized tests see section below.

2.3. Tools and instruments for the present study

Separate questionnaire was prepared for both Hindi and English language. Total eight tests were conducted, they are as follows.

- 1) English reading test
- 2) English writing test
- 3) English spelling test
- 4) Hindi reading test
- 5) Hindi writing test
- 6) Hindi spelling test

- 7) Mathematics test and
 - 8) Drawing test
- English Test includes word list containing 136 words, one rhyme containing 60 words and a paragraph containing 64 words. The word list contains most frequently used simple and complex words. They contain both regular and irregular words. Total number of words is 260. Same questionnaire was used for English reading, writing and spelling tests.
 - Hindi test includes word list of 145 words and 15 sentences including 81 words. The word list contains most frequently used words which are simple and complex. It also includes the names of months and days. The total number of words is 226. Same questionnaire was used for English reading, writing and spelling tests.
 - Mathematics test includes simple sums like addition, subtraction, multiplication and division. Two sets of paper are set. First includes simple sums containing 15 problems meant for younger ones and other containing 39 problems for older students
 - Drawing test includes shapes like circle, square etc. Two sets of paper are set. One includes single shapes and second one contains two shapes together like circle inside the triangle. Set 1 has 19 questions. Set 2 contains 10 questions. Numeral writing was also included in the math tests.

2.4 An Overview

Some linguistic concepts that underlie reading success at the word level include print awareness or understanding that print conveys meaning; graphic awareness or knowing that the word is composed of certain letters; and the understanding and application of grapheme/phoneme correspondences. Dyslexic students often lack basic phonological awareness or phonological processing ability. That is, these individuals are not able to use effectively basic sound units (phonemes) to access the sound sequence of words.

The complexity of the reading task itself requires that the more basic reading processes involved in word identification, such as letter and word identification, occur with little effort and with little strain on short term memory capacity.

Effective word identification requires that the student with dyslexia develop a combination of strategies that includes: using phoneme-grapheme correspondences/ rules: focusing on syntactic structures/syllables/sentence patterns: and determining meaning through context/analogy/picture clues/text gist. The assessment of word recognition skills and other academic/social areas should involve gathering data from multiple sources to include parents, interviews, observation, behavior ratings etc.

Choice and selection of test

Procedures for data elicitation, data tabulation and analysis specifically relating to word retrieval and word recognition abilities of the learners include sight word recognition which is a direct access actually because this does not require any prior phonological processing. By direct access, we also mean that decoding of the word is done by instant recognition of the word also the recognition of word as visual objects takes place which is similar to the way we recognize common visual objects in the world such as cars, chairs, and tables. In addition, the method of indirect access has been implemented to give a broad outlook to the decoding of words. When a word is unfamiliar, we use an “indirect” method using our understanding of letter-sound correspondences, or phonological coding, to “sound out” the new word. Direct access is the faster, more preferred method and does not require phonological mediation. The slower indirect route requires phonological processing and is used when fewer words are recognized automatically.

The test includes

- **‘Trigger word’ list** (sight word recognition of trigger words): the list contains trigger word list which are shown to the learner to recognize and retrieve to the minimum accuracy. There are 200 English words that cause problem for most dyslexics. They are in the dyslexic’s speaking vocabulary, but the dyslexic cannot form mental images or pictures of the meaning. That means the average dyslexic uses more than two hundred words in speech with which he or she cannot really think. These little words –seemingly the simplest words in the language- are the stimuli or triggers for the symptoms of dyslexia. Trigger

words have abstract meanings, and often a number of different meanings. They trip up dyslexics because they do not represent visual objects or action. They also happen to be the words which occur most frequently in everyday speech and writing.

- **Objects sight words:** Words of everyday use they include names of the objects which are commonly used words and action words. This is to ensure that the learner is familiar with the general objects that he/she uses or sees day to day and is actually able to recognize the naming of it in print.
- **Color sight words:** colors (words) have been listed and the reader is expected to recognize each color without the assistance of the colors painted. This test tries to show the awareness of the learner in terms of recognition of color sight-words.
- **Sentences and Paragraphs:** This is to spot the level of word recognizing in clusters. To analyze and tabulate the errors produced at sentence level as well as paragraph.
- **Names of months and days:** To observe their sequencing capacity.

Existing Testing Tools and Procedures

Dyslexic condition can range from severe to moderate to mild. Just like any other physical illness such as pneumonia, the more severe ill child takes longer to recover and milder less. The same is true with dyslexia.

To be intelligent and develop more quickly in learning new things in school is an important character to progress. There are children who are more intelligent learns new concepts and vocabulary faster. There are children who are slow learner and hence needs additional help. In order to help dyslexic children, teacher in-charge has to first motivate the child to learn and progress. Dyslexic children can easily get frustrated by his performance and achieve low grades.

It is better to identify the problem as early as possible so that the remediation works faster and before the child reaches the level of frustration.

There are many assessment procedures to test the types of errors produced by dyslexics.

There are important question regarding the validity of many procedures used to identify and diagnose a handicap. Bilingual children who are limited English proficient (LEP) and those who speak other dialects may not respond to verbal section of a standardized test because they have difficulty in recognizing “Standard English”. Thus there is a possibility of misjudging the responses of minority group. (Adler, 1981)

A process being used frequently is the three stage assessment methodology that includes

- 1) An oral language proficiency test
- 2) Teacher observations and ratings of their students language abilities and
- 3) An ethnography of the child’s language.

Erickson’s (1981) ethnographic techniques use videotapes, cassettes or tapes of voice recorders and field notes to document interaction that occurs in classroom.

Carrasco (1979), Erickson (1981) and Cazden(1972), Duran (1981), Laosa (1977) and Santiago (1980) have used variations of the ethnographic approach in different bilingual settings and suggest this types of research is more sensitive to teacher pupil dynamics. Finally, the cultural biases reflected by middle and upper class values should be re-examined in terms of teacher training and the curriculum available to the students.

Bilingual-bicultural educators favor a multi-process assessment procedure for children of limited English proficiency (LEP) students. This procedure consists of:

- 1) Observation (formal/informal)
- 2) Interview (formal/informal)
- 3) Testing and
- 4) Diagnostic teaching.

Compton (1980) explains that this types of assessment contains all of the significant variables affecting the learning process of a child, for example, the home, the classroom, the school counsellor, other. To date no official guidelines

have been developed to assist practitioners in determining what constitutes the delay, deviation or difference in the language of the child.

Interactive model of reading

In decoding a text in English we have a number of sources of information available.

These are briefly as follows:

- Visual cues – the marks on the page
- Orthographic cues- the arrangement and grouping of letters
- Syntactic cues- the grammatical patterning of the text
- Semantic cues-the meaning of the text and the readers previous knowledge of what is or is not likely to occur, including knowledge and understanding of the cultural context of what is read. (Anderson, 1984, p-154).

Although it is convenient in this context to separate out the cue system, they clearly overlap and work together for the reader. The order in which they are presented is also one of convenience and in no way is intended to suggest either the acceptance of a “bottom up” model of reading, where one builds up from the smaller units of language to the larger units of ‘meaning’, or a rejection of a “Top down” model of reading. It is intended to present an interactive model of reading where all the cue systems available may be used in any order and in any combination.

Types of difficulties may be experienced in learning to read and write by linguistically competent speakers.

Using visual cues: The reader has to learn to respond to and discriminate between the shapes of individual letters, both in upper and lower case and in a number of typographical variations. Poor visual memory is a major cause of spelling difficulty. Both visual perception and visual memory may be assisted by exploring shapes through tracing, drawing, writing and handling letter shapes. Poor motor control may slow down this process. Letter orientation may also create difficulties for readers in the early stages. They have learned that objects remain the same no matter how they are placed, but they then find that

letters change according to their orientation, e.g, b, d, p, q. Reading and writing in English involves moving from left to right along the line and from top to bottom of the page.

Using orthographic cues: In order to make use of orthographic cues it is necessary normally to be able to discriminate between the phonemes of the language and then to match sound to written symbol. However, there are approximately 44 phonemes in English and only 26 letters and the relationship between them is by no means simple. Ability to discriminate between phonemes and to match with graphemes will be related to hearing and willing to listen and observe as well as experience of listening to spoken language and seeing written language. As written language differs from spoken language it is particularly important that those in the early stages of learning to read have as many opportunities as possible to ‘the language of the books’ being read aloud.

Using syntactic cues: If we are dependent on visual and orthography cues alone, reading would be a much slower and more tedious business than it is. Our knowledge of the syntactic patterning of language enable us to sample from the text and predict with fair certainty the types of word or group of words that is likely to occur in a particular setting and thus require only a brief glance for confirmation. Lack of knowledge of this syntactic patterning or inability to apply such knowledge may slow down reading speeding considerably and in turn put a larger load on memory.

Using semantic cues: Knowledge of semantics also enables the reader to predict and sample his/her way through a text. For example, in the following sentence, from knowledge of syntax one would predict that the missing word is a noun:

The cat climbed up the _____.

From the knowledge of semantics, including knowledge of cats, the uncertainty of the missing word can be reduced to a handful of nouns such as: fence, tree, wall, curtains. It is only when one is very confident in the use of language that these bounds may be stretched to their limits for special purposes such as imagery or humour. (Miller,1984, P-154)

Children who lack phonological awareness and have too much trouble with word recognition do not find the reading experience rewarding. According to Stanovich, "when word recognition process demand too much cognitive capacity, fewer cognitive resources are left to allocate to higher level processes of text integration and comprehension" (1994:281)

The development of a foundation for word recognition is dependent upon the knowledge of sounds, which form spoken words and grapheme –phoneme correspondences. This ability is limited or lacking in dyslexics. When discussing word recognition skill with dyslexic students, there emerge two schools of thought:

- 1) Traditional phonic approach, based on the Bottom-up model of reading, which stresses the learning of phoneme-grapheme correspondences to the point of automaticity. Readers should start from the bottom with sounds/letters and go up to the top (comprehension). Hence students are taught sound correspondences before progressing to words and stories. Immediate and accurate recognition of sounds/words are considered necessary prerequisites to comprehension proficiency.
- 2) Whole language approach, based on the Top-Down Model of reading. It places less emphasis on phonic instructions and main focus is on reading as meaning-based process. The Top-Down Model is also known as inside out and propagates that higher level cognitive process such as understanding the idea and reading for meaning should be stressed more than lower level word recognition skills, such as decoding.

Methods used for Remediation of dyslexia

Spren (1982) reported on follow up studies of outcomes of remediation intervention and found that more severe dyslexics were "more reading retarded at follow- up than at referral". His report shows minimal effect of intervention, except for students with higher innate abilities and those trained in private schools or clinics. The public schools seem to be unable to effect sufficient remediation for the disabled readers. Spren conclude that children with reading disabilities do not catch up using present remedial interventions in the public

schools. Rourke (1975) retested normal and disabled readers after four years interval and found the normal readers making more than four years growth while disabled readers had made less than two years growth. The implication here is that even with learning disabled readers. Remediation methods can be classified as non-systematic intervention, diagnostic perspective teaching and direct instruction. Yssekdykek and Mirkin (1981) researched the effectiveness of these methods and determined that direct instruction was the most successful with non-systematic being the least effective.

Most current methods used for remediation of dyslexia are:

- Diagnostic-prescriptive teaching and
- Direct instruction.

They include a multisensory approach to language arts, teaching to the diagnosed strength of modality, training perception, overreaching the skills of reading, teaching to identified criterion tasks, and the use of programs for a unitary disorder, preprogrammed task analysis methods, neurological impress methods, and re-teaching the basal reader one more time.

Diagnostic-prescriptive teaching methods for dyslexics require a neuropsychological orientation toward the study of deficits in underlying process, and educational orientation toward the analysis of tasks for remedial teaching strategies. Wong and Torgweson (1979) found the combination of task analytic and processing oriented approaches serve best in designing effective remediation programs. Understanding of the underlying information processing abilities of attention and memory is explained by Calfee (1981) as being critical in designing remediation that by passes a processing deficit, or using a processing strength. They advocate an integration of these two approaches be incorporated in future progress in remediation design, beginning with an analysis of the task, moving on to component skills, and then a development of diagnostic tests to assess the process required to learn the skills. The system designed in this project incorporated both the task analysis for word recognition and identification and the processing deficit perimeters for the individual dyslexic's pattern.

This chapter will be followed by chapter three. A detail case study of 20 bilingual dyslexic children will be discussed and compared with the control group. The age group is between 6-15 years, both boys and girls are included. It will discuss the types of errors produced by the dyslexic children and a comparative study is done with the normal chronologically aged matched control group.

It will be followed by chapter four. Chapter four is result and discussion. Finally concluding with chapter five which is summary and conclusion.

CHAPTER- III

CASE STUDIES

3.0 INTRODUCTION

The aim of the present research is “to investigate linguistic errors produced at word level by bilingual dyslexics learning Hindi and English in the schools of Delhi”. A cross-sectional and empirical research was conducted on 20 bilingual dyslexics and 20 normal chronologically age (CA) matched control groups from both the gender. Each dyslexic case was compared with the normal CA matched control case. The test was conducted both in Hindi and English language separately. The questionnaire contained a word list, sentences, rhymes and a paragraph.

This study will identify and examine the types of errors produced in reading, writing, spellings, mathematics and drawing in bilingual dyslexic cases learning Hindi and English in the schools of Delhi. Some of the students had more than one language as their first language. All the students had Hindi as their first language and English as second language.

As we all know that Infant does not *learn* language but *acquire* them. Language acquisition takes place in children from very early age. Children goes through different stages of language acquisition processes, beginning from cooing, crying, babbling, pre-linguistic and linguistic stages .Finally Children are able to understand and communicate fluently in that language. Listening and speaking occurs first in first language but reading and writing begins later. When the child has already mastered the first language/s and recognizes the world through the means of his mother tongue. The child is able to relate the sound produced for the names of certain object with the real object. It means that the child is now capable of communicating through the means of a language.

Dyslexic children may have some trouble in speech. When it comes to learning a language through the means of reading and writing than Dyslexic children faces lots of problems. They are not able to relate sound and symbol i.e. grapheme-phoneme relationship as per the language orthographies complexities. The letters appears like a puzzle for them sometimes. They face lots of difficulties in reading and writing. When it comes to second language learning it becomes much more difficult. In learning second language, reading and writing begins together with listening and speaking. Hence we can say that in learning both Hindi and English, reading and writing takes place almost at the same time.

The present research will investigate the linguistic errors produced at word level by bilingual dyslexics learning Hindi as a first language and English as a second language. The age group is between 6-15 years. Dyslexic children are compared with normal chronologically aged (CA) matched control group. The tests include **reading**, **writing** and **spelling** in both Hindi and English language. Separate test for drawing and mathematics are also conducted. Therefore all together eight tests were conducted.

The content of every case study presented here includes:

- 1) English reading test
 - 2) English writing test
 - 3) English spelling test
 - 4) Hindi reading test
 - 5) Hindi writing test
 - 6) Hindi spelling test
 - 7) Mathematics test and
 - 8) Drawing test
- **English Test** includes word list containing 136 words, one rhyme containing 60 words and a paragraph containing 64 words. The word list contains most frequently used simple and complex words. They contain both regular and irregular words. Total number of words is 260.

- **Hindi test** includes word list of 145 words and 15 sentences including 81 words. The word list contains most frequently used words which are simple and complex. It also includes the names of months and days. The total number of words is 226.
- **Mathematics test** includes simple problems like addition, subtraction, multiplication and division. Two sets of paper are set. First includes simple sums containing 15 problems meant for younger ones and other containing 39 problems for older students
- **Drawing test** included shapes like circle, square etc. Two sets of paper are set. One includes single shapes and second one contains two shapes together like circle inside the triangle. Set 1 has 19 questions. Set 2 contains 10 questions. Data has been collected from 50 special need children with various disorders. They include dyslexic, slow learner, ADD, ADHD and autistic children ranging from the age group of 6 to 15 years. Participants who were only dyslexics were included for further tests. Data was also collected from 20 normal chronologically matched aged control group for comparison.

Tests conducted:

English and Hindi writing tests were conducted on 50 special need children. Math and drawing tests were also conducted on all 50 participants. Reading and Spelling tests were not conducted on 30 participants. Therefore case studies discussed in this chapter include 20 dyslexic participants and 20 normal chronologically aged matched control group for comparison.

The present research will examine the nature of reading process and the extent of types of errors produced by dyslexic students. It will also examine the role of mother tongue and its interference in the second language learning. Will there be less number of errors in Hindi as compared to English. Does orthography plays an important role in reading process. How does the mental lexicon stores and accesses the words. How do we retrieve words from different languages in case of bilingual? Is the process of second language learning different from first language learning? Many researchers have already constructed different models for language learning process. This research will verify the same.

The main objective of this research is to examine the different types of errors produced by dyslexic students and the difficulty they face during language learning.

The researchers have given dual route model for reading process which says they follow either semantic route or phonological route. Sometimes even both the routes can be used simultaneously. It is said that in the case of dyslexia one of the routes are damaged which causes problem in word recognition and retrieval process.

Format for the presentation of the 20 case studies

The data was collected from 20 dyslexic children and 20 normal (CA) matched controlled group. Tabulation of the individual data vice-a-versa the normal control was conducted for further analysis. Errors were identified and tabulated. The percentage of errors and correct responses were also calculated. Further classification of errors was done into five types of errors. Each case study is discussed separately beginning from the age group of six to the age of fifteen in ascending order. First the profile of the case is discussed and is followed by the assessment of the case study. A comparative chart of errors is presented for each case study. Then comparative study is done with the control case. Finally concluding remarks are presented in a general way.

Classification of errors into five categories:-

Further analysis of errors was done into five categories for **reading, writing and spelling** tests. The tests included reading, copying and dictation both in Hindi and English.

After identifying and tabulating the errors as

- 1) Phonetic vs. phonological reading errors and
- 2) Graphic vs graphological writing errors.

Each of these types of errors was further classified as errors of

1. **Substitution**
2. **Deletion**
3. **Addition**

4. Metathesis and reversal

5. Others

The inventory of errors thus obtained was analyzed to understand the basic differences in learning Hindi and English by Bilingual dyslexics. Based on the detailed comparison of the errors produced in Hindi and English, it will be possible to explain the following:

- Whether the errors are more or less in transparent alphasyllabic scripts or opaque alphabetic scripts,
- Whether there is more number of errors in irregular forms of the words in the scripts of the two languages as compared to regular forms of the words. Irregular words are those words, in language like English, which do not follow the common pronunciation of the letters or letter groups they are made of, for example, 'laugh'.
- Whether the errors will be more or less in native language, Hindi or second language, English.
- What kind of errors are more in Hindi and what kind of errors are more in English, and why?

Case study of 20 dyslexic subjects in comparison with 20 CA (Chronological Age) matched control group are discussed below in section 3.1 to 3.20

The participants are from the age groups of 6-15 years. This study includes participants in almost all age group except for 14 years. They are from both the gender. There are 15 boys and 5 girls. The range of age starts from 6 years and goes till 15 years. There are 20 dyslexic students and 20 chronological aged (CA) matched control children.

Total eight tests were conducted.

The English and Hindi tests included reading, writing and spelling tests. Separate tests were conducted for math and drawing. Numeral writing was also conducted along with math test.

Total number of words in English test was 260. Reading, writing and spelling tests included the same question paper containing same number of words.

Total number of words in Hindi test was **226**. Reading, writing and spelling tests included the same question paper containing same number of words.

Total number of question in Math test for two sets was **15 and 39** respectively.

Total number of question in drawing test for two sets was **19 and 10**.

Each case has been assigned a code to keep the informant's information anonymous. Along with their code name, their age and gender has been given.

The normal case has been assigned "C" to represent control group for example- Dyslexic case- AB, 6, M (coded name, age, gender)

Normal case-AR, 6, M, C (coded name, age, gender, control)

CASE STUDIES

3.1 AB, 6, M and AR, 6, M, C

General profile of the case

He is a 6 year old boy. He was very energetic and fun loving by nature. His mother tongue was Hindi and was diagnosed as dyslexic. He had a sound problem. He was showing poor performance in the mainstream school. He hardly used to sit quietly in the class. After diagnosing as dyslexic he was sent to the special section for special training. He had little knowledge of English writing. His mother tongue was Hindi and was fluent speaker of Hindi. He was not at all interested in writing Hindi. He hated reading and writing. It was difficult to control him without his teacher. It was really difficult to collect data from him. He did not cooperate on the first day of my visit so I just thought to interact in general. On my second visit he did cooperate and I could conduct the tests. He only attempted English writing tests. The English writing test paper also included the drawing test paper at the back. As soon as he received the test paper he started turning pages .He showed some interest in the drawing test paper and that's how he started the test. He attempted drawing test first and then attempted English test paper. He attempted only one page. He did not complete the test. He took lots of time to write the test. He did not attempt reading and spelling test. He did not attempt the Hindi test at all.

Table No-1

Comparative chart of total number of errors produced by Dyslexic and control case

	AB,6,M				AR,6,M, C			
English Test	No. of errors	%	correct response	%	No. of errors	%	correct response	%
Reading	N.A		N.A.		03	1.1%	10	3.8 %
Writing	13	5%	27	10.4%	02	0.7%	134	51.5 %
Spelling	N.A		N.A.		04	1.5%	05	1.9 %
Hindi Test								
Reading	N.A.		N.A.		02	0.88%	143	63.3 %
Writing	N.A.		N.A.		12	5.3%	133	58.8 %
Spelling	N.A		N.A.		5	2.2%	15	6.6 %
Drawing Test	05	26 %	14	74%	00	0%	19	100 %
Math test	N.A.		N.A.		2	13%	6	40%

Assessment of case study 1

The dyslexic child attempted drawing test and English writing tests only.

- It was found that he was not good in drawing. He had 5 correct responses out of 19 in drawing test. The shapes he drew were too small as compared to the given figure. He attempted to draw a circle, a triangle and a square.
- He took lots of time to write one page of English writing test.
- There were 13 errors in English writing test out of 40 which he attempted. The correct responses were 27 words.
- He had problems in writing 'u' and 'n'. Instead of drawing curve lines he drew straight lines retaining the shape.
- He substitutes or mixes 'e' with 'c', 'u' with 'w' and 'y' with 'v' very often. For example- 'Sugar' is written as 'Swgar'. He does not realize the

difference between consonant sound and vowel sound in this example which makes it a non-word.

- His writing was clear but spacing of letters in the words was more than required.

Comparison of dyslexic with CA control case

The major difference found was that the control case was not distractive at all. He was cooperative and was interested in giving the tests. He attempted all the 8 tests. The time taken was much less than the dyslexic case.

Results of the control case-

- The number of errors produced in English writing was 2 out of 136.
 - Nose- Noss : substitution of 'e' with 's'
 - Elephant-Elep : deletion of last syllable.
- The number of errors produced in Hindi writing was 12 out of 145.

There were 8 deletions, 2 substitutions and 2 additions.

For example-: **Deletion of 'a'**

soɕna-	soɕən	/to think/
bhura-	bhur	/brown/
sadh-	sədhu	/Saint/

Deletion of 'u' and 'U'

jun-	jən	/June/
jUlai-	jəlai	/July/

Mostly substitution of long vowel to short vowel or vice versa occurred.

- The number of errors produced in Hindi spelling was 5 out of 15.
One was substitution and the second one was reversal of half 'c'
təbla-dəbla t/d
bəɕɕa- bəjɕa ɕ/j
- The number of errors produced in Hindi reading was 2 out of 143.

For example- ghora=ghəra substituted 'o' with 'ə'

brɪhəspətɪvar= bihəspətɪvar Deletion of /r/ in 'brɪ' with bi

The above error of deletion shows that the child has not yet learned the three different forms of half /r/ usage. The half /r/ has three

different forms as grapheme which is denoted by three different diacritic marks. For example in /surya/, /pragya/ and /krishi/.

- No error was found in drawing test.
- The number of errors produced in English reading was 3 out of 10.

For example- wash- vush
cry – keər
violet- vıolet

Substitution of /a/ to /u/ in wash. In the word ,“cry“ the consonant cluster is substituted by inserting /ə/ sound and deleting the last sound /aɪ/. It shows some of the reading process in children at the age of 6 that pronouncing the consonant cluster is not yet mastered but still learning.

- The total number of errors produced in English spelling test was 4 out of 9.

The substitution type of error was observed. For example:-

Words- learner's response

Sun- Sum n/m

Moon- Moom n/m

General remarks

From the above assessment it could be concluded that number of errors produced by dyslexic child was more than the control case. The types of errors found were more of substitution types than deletion or addition. An error of metathesis was also observed. This case is important for research as it gives us the basic information about the signs and symptoms as well as the types of errors produced by dyslexic as well as control child at the early age. This is an age when you can actually make an observation about the performance of the child. Since this is the starting point it helps one to check out any problem if the child is facing. Sooner the better will be the result if diagnosed earlier before repeated failure occurs. This is a good time to check out your child's behaviour and performance in the school. Do not ignore or wait for further deterioration if

found any. It is better to take immediate action. It might not always be any disorder but simply ignorance. It is better to keep sharp observation on the performance of the child. Do not panic if too much negative results are coming but should give extra time and care to improve.

3.2 AC, 6, M and SK, 6, M, C

General profile of the case

He is a 6 years old boy who was diagnosed as dyslexic. His mother tongue was Hindi. The symptoms which brought him to attend special school were poor performance in the class. He was far behind his classmates when he was in the mainstream school. He was considered as weak student and very distractive. It was very difficult to control him without his teacher. He was not a cooperative child. It was really difficult to conduct the tests. I had to visit 2-3 times to collect data from him. On my first visit he refused to read or write. I decided to just have a general discussion to know his likes and dislikes. He was so distractive that it was difficult to hold a conversation also. He was moving around and playing in the classroom with his fellow classmate who was also a dyslexic. The classroom in which I was conducting the test was empty with no other students around. Most probably they were moving around because of the big space around as there were no other children other than his fellow mate. Finally my next visit was successful. He agreed for the tests. He wrote English writing tests and drawing test. He was interested in drawing rather than in reading or writing. He was very slow in writing and attempted few words only. He did not attempt any of the Hindi tests. He tried to read but could not read any word. It was troubling him too much so he refused to take any other tests. It was very difficult for him to recognize the whole word. When I asked him to spell it out he could recognize few letters but with lots of confusion and took too long to respond. He attempted only 8 words of the first page which contained 44 words from the word list. He did not maintain the order of sequence in copying the English words. He attempted those words he liked. He was interested more in

colouring. He attempted drawing test and was very happy to colour the figures. Colouring was not part of the test. He insisted on colouring so I allowed him. He was good at drawing and colouring.

Table No-2

Comparative chart of total number of errors produced by Dyslexic and control case

	AC,6,M				SK,6,M,C			
English Test	No.of errors	%	correct response	%	No.of errors	%	correct response	%
Reading	N.A		N.A.		14	5.4%	122	46.9%
Writing	3	1.1%	5	1.9%	04	1.5%	256	98.5%
Spelling	N.A		N.A.		31	12%	229	88%
Hindi Test								
Reading	N.A.		N.A.		01	0.4%	144	63.7%
Writing	N.A.		N.A.		01	0.4%	144	63.7%
Spelling	N.A		N.A.		40	17.7 %	146	64.6%
Drawing Test	02	12%	17	88%	00	0%	19	100%
Maths test	N.A.		N.A.		3	20%	6	40%

Assessment of case study 2

He attempted drawing test and English writing test only.

- Drawing test- He had 17 correct out of 19 questions. He had 2 wrong answers which will be considered very normal. The score will be graded as 'A' according to his age. The shapes he drew were of proportionate size as compared to the given shapes. It was neither too big nor too small.
- English writing test-He attempted only 8 words. 5 were correct and 3 were wrong.
- First one was 'Black' where he made substitution of the last syllable but retained the first syllable. The answer was 'Blawn' which is a non-word.
- The second error was reversal of letter 'D' in 'Dog'. The curve of D was placed at the left side instead of right.

- The third error was mixing of lower case with upper case in writing 'Silver'.

Silver-SiLVer

Comparison of dyslexic with CA control case

The major difference found was that the control case was not distractive at all. He was cooperative and was interested in giving the tests. He attempted all the 8 tests. The time taken was much less than the dyslexic case.

Results of the control case-

- The number of errors produced in English writing was 4 out of 260.
- The number of errors produced in Hindi writing was 1 out of 226.
- No error was found in drawing test. Rest the list is given above.

General remarks

From the above assessment it is concluded that the dyslexic student could not complete the tests and was not ready to attempt it. He wanted to be away from reading and writing work. It clearly showed that disorder itself is so serious that it is difficult for the child to read and write as a result he is continuously trying to avoid it. As compared to the control case we can see that the child is not trying to avoid reading and writing. Since the dyslexic child could not complete the tests and not much data could be extracted it was difficult to make comparison of errors produced by dyslexic child with the control child. The dyslexic child had difficulty in copying as well as drawing. In control child the types of errors found was more of substitution than deletion or addition. An error of letter reversal was also observed.

3.3 DM, 7, M and AB, 7, M, C

General profile of the case

He is the eldest among siblings and has one younger sister. His mother tongue is Hindi. He is an intelligent boy. He is friendly natured and hardworking. He mixes up quickly with the peer groups as well as with the others. He is also very serious about his studies. His writing is clear and does not take too long to

complete the work. He was detected as Dyslexic. He has problems in reading and writing. He attempted all the tests. He almost seems like normal child. This is really surprising that a child with all these so many matching character with normal child was detected as dyslexic. So now the question arises on what basis the child was identified as dyslexic? The answer lies in his learning capabilities. He had problems in reading and writing. Similar looking letters were difficult for him to identify. For example 'a' and 'o', 'l' and 't', 'w' and 'u'. Reading in English was very tough for him.

Table No-3

Comparative chart of total number of errors produced by Dyslexic and control case

	DM,7,M			AB,7,M,C				
English test	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	52	20%	84	32%	12	5%	248	95%
Writing	28	10%	232	90%	0	0%	136	52%
Spelling	44	16%	92	35%	17	6.5%	8	3%
Hindi test								
Reading	8	3.5%	127	56%	0	0%	226	100%
Writing	13	6%	204	90%	7	3%	95	42%
Spelling	17	7.5%	128	56.6%	5	2.2%	15	6.6%
Drawing	02	10%	17	90%	0	0%	19	100%
Math	02	13%	13	87%	0	0%	15	100%

Assessment of case study 3

- I) Total number of errors produced in copying English Word list, poem and paragraph was 28 errors. The number of error was 20 substitution error types.

For example-

black- block a/o

ball- boll a/o

lotus- totus l/t

flower- flouer w/u

Mostly 'a' is substituted by 'o' and 'w' with 'u'

- 2) Total number of errors produced in dictation of English Word list, poem and paragraph was 42 errors. The number of error was more of deletion type. There were 22 substitution errors. There were 24 deletion error and 9 addition errors.

Examples-

Substitution types of errors

Words	Response	Types of errors
Milk-	nil	M/n
sugar-	shogr	s/sh, u/o
chair-	chear	ai/ea
orange-	orinch	a/i, ge/ch

Deletion error

Coffee-	Cofe	f,e
Golden-	Glben	o, reversal of d

Addition error

Blue-	Bluea	a
Brown-	Browin	i
Skip-	Sikip	i
see-	seea	a

3) Hindi writing test=11 errors

Most of the errors were substitution types of errors. Mostly the mastras were substituted, which were either substitute the long vowel with short vowel or short vowel to long vowel. Consonant is substituted by consonant.

For Example-

Words	Response	Substitution
-------	----------	--------------

1. həsna - hərna s/r
2. ku:ʃna – kUʃna u:/U
3. kUtta – ku:tta U/u:
4. ga:ɾɪ - gəɾɪ a:/ə

4) Hindi Reading test = 8 errors

Hindi reading had the minimum number of errors produced.

5) Hindi dictation test- 17 errors

6) English reading test-56 errors. This was the maximum number of errors produced. 32 alone were substitution errors. Most of the errors were substitution of vowel rather than consonant. For example- ‘boat’ read as ‘bat’

Words Response Substitution

Pot Put o/u

Bottle Bittle o/i

Deletion type of error

Leaf Laf e

Stair Star i

Some problematic areas in reading English words

In English the sounds of the vowel changes in different words and are complex in several situation. They do not form consistency throughout but has lots of variation in sounding out in different environment. For example-the sound of ‘ea’ in

ea = ear, hear, rear /iə/

ea= search, learn /ə/

ea= reach, beach, read /i/

ea= dead, head /æ/

A beginner learner will try to form some rules to follow the sounds and will try to remember the words, but as he will proceed further with more new words he

will meet with more challenges. In the next step he starts storing them as word picture. Since English has many irregular words they are learnt as a whole word. Those which are regular are read out through phonological route. But when the same combination of vowel has so many variation in sounding out, the possibility of reading error is possible at the beginning due to the phonological route followed. But surprisingly learner learning second language like English masters all these complexities very easily.

As we can see that dyslexic children are struggling with these complexities and goes through a difficult phase. On the other hand it is also observed that in languages like Hindi where such complexities are minimalized becomes more easier and faster to capture and remember.

Comparison of dyslexic with CA control case

The control group is of the same age and does quite well in English reading as compared to the dyslexic child. I can make an observation here that the cognitive process which takes place in language learning follows dual route models. Since one of the routes are damaged in the dyslexic child the weight of language learning increases. The child is trying to store the written language as much as he could but in this case it slows down the learning process.

The normal case produced 1 error in reading Hindi and 12 error in reading English.

For example- Hindi reading has 1 error

Word	Response
-------------	-----------------

brihəspətivar	.brihəspətivar ,deletion of r
---------------	-------------------------------

English reading- 12 errors

Violet-	/violet/	Substitution error- aio/io
bronze-	/bronz/	o/ɔ
laugh-	/lənc/	af/ənc

General remarks

By the age of seven years the child becomes more curious to read and write as now his knowledge about world is widening through experiences and through different languages. Getting into more of reading and writing becomes more exciting for them but unfortunately it does not come to 10-20% of the school going children as they are likely to have some learning disability like dyslexia. In the above case we can see that it becomes very clear that the dyslexic child has done quite well and has tried to attempt as much as possible. He was the only dyslexic whom I found very serious about his studies. In writing test he wrote one word three times. He never felt tired or exhausted while doing the test. His behaviour was very responsible type. The difference is detected in his learning capability. He had lots of problem in reading English as compared to Hindi.

3.4 GK, 8, F and GA, 8, F, C

General profile of the case

She is 8 years old girl and is the youngest among siblings. Her mother tongue is Hindi and Punjabi. She was the third sibling. She was diagnosed as dyslexic. She was normal build with great enthusiastic to chat. She had no problem with getting along with her friends and was of cheerful nature. She liked singing. She also liked colouring but hated to read. She was attending special school since she was 6 years old. By now she was able to read and write. She had lots of problems in reading and writing. Letter reversal was found at many places. She could spell the word but could not pronounce correctly. It seems that she was not much interested as it was a big struggle for her in writing and as soon as she got chance, she jumped from one page to the other page and wanted to attempt the drawing test first and was more interested in colouring. While reading she had problems with half consonants in Hindi and also with consonant clusters.

Table No-4

Comparative chart of total number of errors produced by Dyslexic and control case

English test	GK,8,F			GA,8,F,C				
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	16	6.2%	120	46%	3	1%	257	99%
Writing	18	6.9%	186	71.5%	5	2%	255	98%
Spelling	29	11.1%	107	41%	9	3%	251	97%
Hindi test								
Reading	5	2.2%	130	57.5%	8	4%	218	96%
Writing	3	1.3%	213	94.2%	6	3%	220	97%
Spelling	49	21.6%	96	42.4%	49	22%	177	78%
Drawing	02	10%	17	90%	1	5%	18	95%
Math	01	7%	05	33%	1	7%	14	93%

Assessment of case study 4

- Mostly vowel substitution was seen in writing English words. There was very few consonant substitution found like 'k' by 't' and 'g' by 'a'.
- Total number of errors produced in *Copying English* word list and Poem was 13+5=18 errors

Some of the samples are given below in English writing test.

1. Red rad 'e' substituted by 'a'
2. Yellow Yellow 'o' substituted by 'a'
3. Brown brawn 'o' substituted by 'a'
4. Orange Orange 'a' substituted by 'e'
5. Son san 'o' substituted by 'a'
6. Skip Stip 'k' substituted by 't'
7. Rectangle rectanalc 'g' by 'a' and 'e' by 'c'

- There was only 1 deletion and 1 reversal case found.
 - 1) Multiply=Mutiplied, deletion of 'l'
 - 2) Square=Spquare, reversal of 'q'.
- No addition error was found.

- Total number of errors produced in English dictation word list was 28 errors.
- Substitution type of error was found more as compared to deletion or addition.

Total number of Substitution in English dictation was 15 errors

S. No.	Word List	Learner's response	Phoneme substitution
1.	Red	Rad	e/a
2.	Bronze	Bones	z/s
3.	Month	mane	o/a
4.	Stair	care	st/c
5.	Wash	Eosh	W/E
6.	Love	Eove	l/E
7.	Pot	Pen	ot/en
8.	Bottle	Boat	ottle/oat
9.	Pin	Ein	P/E
10.	Bat	Bale	t/le
11.	Pant	Pent	a/e
12.	Greed	Gart	reed/art
13.	Shoes	she	oes/e
14.	Lotus	latr	us/r
15.	paint	pin	aint/in

- From the above data we can observe that there are not only phoneme substitution but also syllable substitution.
- In most of the cases the initial letter is retained and the rest of the word has an error.
- We can also find 3 words where initial letters are changed. The letters 'W', 'L', and 'P' were replaced by 'E'. But the final syllable was retained. This is one interesting case I have found.
- These kind of initial letter changes are rarely seen.

Total number of Deletion errors was 6.

S. No.	Word List	Learner's response	Phoneme Deleted
1.	Tea	te	a
2.	Table	tabl	e
3.	Color	Rar	co, 'l' substituted by 'R'
4.	Green	Rin	G, ee/i
5.	Black	Balk	c, 'a' inserted between 'Bl'(consonant cluster separated)
6.	Month	mane	th

- In the above data we can observe many phonological errors. The child is using the sound heard when spoken. He is not able to follow the complexity of the script were the spellings of the irregular forms of words do not follow the grapheme-phoneme relation but the spelling is assigned which becomes the standard form and is followed by the learner. For example- Tea /ti/ and the response becomes /te/.They are mostly phonological errors.

Total number of Addition types of errors found, was 0 errors.

Total number of Metathesis types of errors found, were 3 errors

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	Star	Sart	t,r
2.	Black	Balk	l,a
3.	Greed	Gart	ree/ar

- In the above data we can observe that in most of the cases consonant cluster in the initial position was broken down and sound /a/ was inserted. For example: 'St', 'Bl', 'Gr' all consonant clusters are broken down. This is a systematic type of error which shows that the child has problem in consonant clusters.

Total number of errors produced in Copying Hindi word list = 3 errors

- **Number of Substitution = 2 error**
gobhi-gebhi o/e substitution error
baja-bana j/n substitution error
- **Number of deletion 0**
- **number of addition=1**
pəɖna= pəɖnna

Total number of errors produced in Hindi dictation= 49 errors.

- Substiution of vowel as well as consonants was be seen in this spelling test.
Few examples are as follows-

Error of substitution types:

words	responses	substitutions
kagəj	kakəs	j/s
kəbutər	kəbUtər	u/U
dɪn	din	ɪ/i
ələg	ələk	g/k

Error of Deletion types:

Words	Response	deletion
gend	ged	n
rəssi	rəsi	s
gUbbara	gUbara	b
kutta	kuta	t

The above example shows that half letters were deleted. Letters like /s/, /b/, /t/, and /n/ are omitted.

Error of Addition types:

Words	Response	addition
ghəɾa	ghaɾa	a
jəhaj	jəhaja	a

- Mostly /a/ is added.

Error of Metathesis types:

Words	Response	interchanges
phul	phəlu	u
həra	har	a

- Although Hindi language is considered to be a transparent language so there will be less difficulty in reading but when it comes to writing the most difficult part is to retain the short and long vowel marker which is called 'Maatras',

- which is added to the consonant letter to form a syllable. The 'Maatras' can be added at all four sides of the consonant i.e. right, left, up and down.
- A normal child also faces such difficulties while learning but after taking few lessons they are able to recognize the difference. This is a normal process of getting confused between long and short vowel marker.
 - Dyslexic children not only produce such errors but can sometimes completely delete the vowel marker or add extra vowel marker.

Comparison of dyslexic with CA control case

As we can see from the comparative chart that the performance of control case is much better in all the English tests but almost equivalent in Hindi test. Mostly the types of errors produced are substitution types in both the cases.

Errors produced by control case

In English writing-5 errors

Word list	Response	Error type
Coffee	CoFFee	ff/FF, substitution error, mixing of upper and lower cases.
Stair	STair	t/T, substitution error, again mixes two cases.
Dress	Drees	e/s, substitution error
Drink	Brink	D/B, Mixing with D and B, reversal type

In English reading test-3 errors

Word list	Response	Error type
Son	sɔn	ə/ɔ, Substitution type
Know	kenəʊ	ke, addition type.
Method	methɔd	ə/ɔ, substitution type.

In English dictation test-10 errors

Word list	Response	Error type
Golden	Gloden	interchanging, metathesis type.
Violet	Voilet	Same as above
Cross	Croce	ss/ce, substitution error
Square	Squire	deletion of /a/
Rectangle	Retange	deletion of /c/ and /l/
Addition	Additon	deletion of /i/
Subtraction retaining only one	Subrtion	deletion of second syllable letter, /r/.
Heavy	hevy	deletion of vowel /a/
Bronze	Browns	substitution error nze/wns

- Most of the errors are phonological errors as in the example of 'heavy' and 'bronze'.
- There are also orthographic errors seen were reversal and interchange of letters take place.

General remarks

In the above given chart the maximum number of errors produced is in Hindi spelling by both the groups. The dyslexic has 42.4% correct spelling while the normal subject has 78% correct spelling. The dyslexic child had 6.2% of English reading errors whereas control child had only 1% of reading errors. In case of dyslexic there are more of substitution types of errors and in control case it is deletion types of errors. Mixing of upper case with lowercase can be seen in both the cases. The dyslexic subject has more number of errors in reading English as compared to Hindi. The normal subject has more Hindi reading errors as compared to English reading. There were more deletion types of errors in Hindi reading. The dyslexic child has more substitution types of errors.

3.5 DV, 9, M and AV, 9, M, C

General profile of the case

- He is 8 years old boy. His mother tongue was Hindi. He was detected as dyslexic. He had delayed speech. He started talking only after three years. Parents had visited and consulted many doctors and had his ear checked thoroughly. The doctors said he did not have any problem with hearing as his ears were fine. In their opinion the child had a delayed speech in which the child speaks little late but once the child starts talking then there is no speech problem. After the child started learning to read and write the problem once again occurred and the child faced the problems in reading and writing. At the age of 6 he was sent to the special school and was taught with special instruction. He was right hander with normal intelligence but little behind his peers.

Table No: 5

Comparative chart of total number of errors produced by Dyslexic and control case

English test	DV,9,M				AV,9,M			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	42	16%	158	60.7%	03	1%	257	99%
Writing	06	2%	254	98%	03	1%	257	99%
Spelling	115	44%	145	56%	45	17%	215	83%
Hindi test								
Reading	08	4%	218	96%	00	0%	226	100%
Writing	24	11%	202	89%	9	4%	217	96%
Spelling	79	35%	147	65%	64	28%	162	72%
Drawing	02	10%	17	89%	01	5%	18	95%
Math	02	13%	13	87%	0	0%	15	100%

Assessment of case study 5

- Maximum error produced was in English dictation test. Most of the errors seen are phonological errors and also some orthographic errors.
- Error produced in English reading was more than Hindi reading.
- Minimum error was produced in both English and Hindi writing test.

Total number of Errors produced in Copying English word list = 6 errors

Number of substitution = 3 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	Pink	Bink	P/B
2.	Some	son	m/n
3.	Know	knou	w/u

Number of Deletion = 2 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	silver	siler	v
2.	Give	Giv	e

Number of Addition = 0

Number of Metathesis – 1

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	Two	Tow	wo/ow

English Spelling

Total number of errors produced in Dictation of English test = 105 errors

Number of Substitution = 43 errors

S. No.	Word List	Substitution	Phoneme/ Syllable Substitution
1.	Brush	Bes	rush/es
2.	Paint	pat	aint/at
3.	Violet	well	whole word
4.	Silver	cever	si/ce
5.	some	sum	ome/um
6.	Lily	lile	y/e
7.	Flower	flov	wer/vr
8.	Write	Rit	deletion of 'W' and 'e'

S. No.	Word List	Substitution	Phoneme/ Syllable Substitution
9.	Correct	crat	orrect/rat
10	Eyes	ls	eye/l
11	Mouth	moth	outh/oth,
12	Teeth	thi	T/th, ee/i
13	Face	fas	ce/s
14	Monkey	monck	key/ck
15	Donkey	Donc	key/c
16	Own	on	wn/n
17	ten	tan	e/a
18	sum	son	um/on
19	Multiply	melfpply	t reversal f,u/e
20	Subtraction	suotrsn	b/o,action/sn
21	Divide	Devd	i/e,ide/d
22	Give	Gtd	ive/td

- In Hindi test minimum error was produced in Copying Hindi.
- Maximum number of errors produced was in Hindi spelling.
- In Hindi reading test most of the errors are substitution type for example:

choṭa-ṭoṭa ch/c

bhaag-baag bh/b

əḷəg-əḷək g/k

Comparison of dyslexic with CA control case:

The control case had 0% of errors in Hindi reading which was minimum number of errors and 28% errors in Hindi spelling which was maximum number of errors. The number of errors produced in English reading was 3 errors.

For examples:

Errors produced in English reading – 3 errors

Far - /feər/

Some - /sʊm/

Greed - /grin/

Errors produced in Hindi reading – 0 errors

Errors produced in Hindi writing – 9 errors

Examples-

jəngəl-/jəgənl/ 'substitution of n'

pisna-/pisən/ 'deletion of a'

Errors produced in Hindi spelling – 64 errors

Few Examples-

jəngəl- jəgəl, deletion of 'n'

juta- jUta, substitution of long 'u' with short 'U'.

gubbara- gubara, deletion of half consonant 'b'

Errors produced in English spelling- 45 errors

For examples:

Shirt- cet, substitution of initial syllable 'shir'

Elephant-Elephent, substitution of 'a' to 'e'

correct- corrt, Deletion of vowel and consonant of second syllable.

wrong- wrorng, addition of 'r'.

The maximum numbers of errors was of substitution type and mostly were of phonological types. Addition and deletion of vowel and consonant phonemes as well as syllables could also be seen.

The types of error which was found in the control case could also be seen in the dyslexic case only the percentage of errors differed. There was less number of errors found in normal case as compared to dyslexic case. Since the types of errors had similarities one can account that this is the area of difficulty and a subject of research. This can also throw some light on the routes of reading followed by both the groups. It can reflect on the orthographic complexities leading to difficulties in learning spellings and hence orthographic errors produced.

General remarks

This case study gives some insight into the reading process followed by the two different groups. We can observe that the control case has very less errors as compared to the dyslexic case in reading Hindi and English. The maximum error was found in Hindi spelling and in English Spelling. In Hindi spelling the maximum error was of substitution type. The short and long vowel sound has maximum substitution in Hindi. In English mostly the irregular words are spelled incorrectly. The dyslexic case has more errors in reading English words as compared to Hindi words. English reading of dyslexic case had 21% of errors and only 4% of Hindi reading errors. This focuses on two things. Firstly, less number of errors is produced in the mother tongue. Secondly, it could be the complexities of the script which allows to applying the GPC rule. The above data shows that the errors produced by the normal child is also more in English reading as compared to Hindi reading, although it is only 1% and 0%. Still we can arrive to somewhat conclusion that the irregular forms of words do create difficulties in learning to read. Therefore the script plays an important role in learning language.

3.6 AD, 9, M and AM, 9, M, C

General profile of the case

This is 9 years old boy who was identified as dyslexic. At the time of pregnancy, mother was suffering from hypertension. The child was born with full term Caesarean delivery. All developmental milestones were acquired on time except for his speech development. The child had a delayed speech problem. He started speaking only after three years. Child was neglected by the mother during initial stages of his development as she was under stress due to personal reasons. No family history of Dyslexia was known. Child's speech was unclear during initial stages. A kind of cluttering at words was observed at four to five years of age. He had problems in writing and reading. After he was

identified and admitted to a special school he started improving and was able to read and write.

Table No-6
Comparative chart of total number of errors produced by dyslexic and control case

English test	AD,9 ,M				AM,9, M,C			
	No.o f errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	10	3.8%	126	48.4%	4	2%	256	98%
Writing	5	2.1%	125	48%	2	1%	258	99%
Spelling	15	5.7%	245	94%	5	2%	255	98%
Hindi tests								
Reading	7	3%	33	14.6%	3	1%	223	99%
Writing	8	3.5%	35	15.4%	16	7%	210	93%
Spelling	10	4.4%	135	59.7%	25	11 %	201	89%
Drawing	0	0%	19	100%	0	0%	19	100%
Math	0	0%	15	100%	0	0%	15	100%

Assessment of case study 6

The child attempted all the tests. He produced more number of errors in English reading as compared to Hindi reading. The results of writing tests showed that the child had more errors in writing Hindi than English. He had more number of errors in English spelling test as compared to Hindi. Mostly the errors were of substitution types. In English tests mostly vowel substitution was seen as compared to Hindi were consonant and vowel substitution both were found.

In English Reading tests -11 errors

For example:

Words- learner’s response, error type

Stair- s̄tar, substitution of /eə/ to /a/

Laugh- lɔŋg, substitution error, /af/ to /ɔŋg/

Leaf- laf, substitution of /i/ to /a/

Read- red, substitution of /i/ to /e/

Some- somi, addition of /i/

cry- kai, deletion of /r/

- The above examples show that the words which have irregular forms are difficult to read. The child is trying to read through phonological route only and finds difficult to follow semantic route.
- The word 'some' is read through phonological route, i.e. following grapheme-phoneme correspondence rule and therefore the child reads out all the letters present in the word.
- In the word 'cry' the child deletes the consonant cluster and inserts 'a'. This has to be checked with more errors whether the child has problem with consonant clusters.

In reading Hindi the number of errors produced was 7 errors.

Few examples are given below:

Words-	Response	Types of errors
geŋd-	geŋ	substitution of /d/ to /t/and deletion of /ŋ/
dost-	dorət	substitution of /s/ to /r/
gay-	gəya	interchange of 'a'
seb-	səb	deletion of 'e'
baja-	bəjar	interchange of vowel 'a' and addition of 'r'

- The child has problem in recognizing or basically identifying the difference between slightly similar looking words. For example half's' resembles 'r' partially in the script of Hindi and the child confuses between these two letters whose sounds are completely different. Child has similar kind of confusion between /d/ and/t/.

- The child is confused about the difference between the vowel sounds if attached to the other consonant. He recognizes the symbol for /a/ but while reading he attaches it with other consonant and reads the initial sound in isolation.
- This type of interchange of vowel marker can change the meaning completely. This is not consciously recognized by the learner.
- Deletion of Maatras can be seen frequently mostly at the initial position like in /seb/ (apple) read as /səb/ (everyone)

In English writing not many errors are seen-5 errors

Words	Response	Types of errors
Silver	Selver	substitution of /i/ to /e/
Correct	Corrict	substitution of /e/ to /i/
Face	face	substitution of capital /F/ to small /f/
Sum	Sun	substitution of /m/ to /n/
Two	Towo	addition of /o/

- The above examples shows that there is a confusion between /i/ and /e/, and /m/ and /n/.

In Hindi writing number of errors produced was 8 errors.

Mostly there were substitution errors.

Examples:

Words	learner's response	Types of error
kəbutər	kəvutər	substitution of /b/ to /v/
ghəɾa	ghəɖa	substitution of /ɾ/ to /ɖ/
bɛɽna	bɔɽna	substitution of /ɛ/ to /ɔ/

- The above example shows that the child substitute's consonants which resembles in the symbol and is not able to understand the difference produced in meaning created from such errors.
- There is also substitution of vowels as a result non-word is created.
- Deletion of /ŋ/ in 'jəŋgəl' is also observed.
- Deletion of half /r/ in kUrsi is also found.

- As we can observe that child has problem in recognizing and differentiating those letters who has resembles in its symbol but are completely different in their sounds.
- Deletion of half consonants like anuswar (ं) the sound /ŋ/and raif (्रि) the sound/r/.

Errors produced in English spelling-16 errors

Mostly substitution types of errors are observed.

For examples-

Words	Response
Cry	kry
Laugh	laf
Was	wos
Leaf	lif

- The above examples clearly show that there are phonological errors and the child is applying GPC rule in writing most of the words specially the words which has an irregular forms of writing.
- This also sheds some light on the cognitive process of understanding the word and representing it in the written form. The words are not just words; they are meaningful units representing something unique and are presented through signs and symbols. The relation between words and things are stored in our mind, they are recognized in a written form as words.
- The learner may be following only one route for connecting the sounds with its symbol and not able to follow the semantic route or the whole word recognition process.

The number of errors produced in Hindi spelling-10 errors

Mostly substitution types of errors are observed.

For examples-

Words	Response	Substitution error
gobhi	gobi	/bh/ to /b/
bəhən	vəhən	/b/ to /v/
roṭi	roṭɪ	/i/ to /ɪ/
rani	ranɪ	/i/ to /ɪ/

- In the above examples we can see that consonant substitutions can be seen, for example /bh/ to /b/, and /b/ to /v/. The voiced becomes voiceless.
- Substitution of long vowel to short vowel can also be observed.
- Deletion of consonant phonemes in the overall types of errors can also be seen but they are few in numbers. For example in /lalci/ becomes /laɪ/.

Comparison of dyslexic with CA control case

The number of errors produced by the control case was less than the dyslexic case in reading tests. The type of errors produced was more of substitution types. The maximum number of errors produced was in Hindi dictation. The minimum number of error produced was in Hindi reading. Some samples from the total number of errors produced are as follows:

There were 4 errors in English reading

For example

Words	Response	Types of errors
Greed	grɪd	substitution of /i/ to /ɪ/
Listen	lɪstən	addition of /t/
Worship	vɔrkʃɪp	addition of /k/
Chanting	chatting	deletion of /n/

- Since the number of errors in substitution type is only one, we cannot make any generalization.
- Similarly the sounds of /t/ in 'listen' are silent but he adds the sound as he did not know the meaning of the word when I enquired about it. So it clearly shows the normal processing of the two routes when the word is unknown to us or new to us.

- Deletion of /n/ in chanting was due to its frequency of usage in everyday life. Nowadays the word 'Chatting' is more frequent than chanting therefore the occurrence of such error also shows that the type of error also depends on the frequency of usage.

There are 3 errors in Hindi reading test

For example:

Words	Response	Types of errors
səməjhna	səmjhana	addition error
tolna	tɔlna	substitution error
sadhu	sudha,sadhu	metathesis but corrected in next chance

- There are addition and substitution types of errors. The addition type can have a reason of frequently occurring word or it can just be a minor error.
- It gives us one clear view that the frequency of usage has an important role in word recognition theory.
- At first instant the frequently occurring word strikes first when it has a similar shape. If we are reading in a sentence or a context than we can back track and read the correct word to understand the meaning of word in the context. But when the word is in isolation then such errors can occur.

The number of error produced in English writing was 2 and Hindi writing 16.

He made 5 errors in English spelling and 25 errors in Hindi spelling.

He has more problems in writing then reading. More errors can be seen in Hindi writing and spelling. Mostly the types of errors seen are substitution types. Maximum errors are produced in a long and short vowel marking. Very few consonants substitution can be seen in writing Hindi.

General remarks

The above chart shows that the dyslexic child has more percentage of errors in Hindi then English. The control case has less percentage of errors in both English and Hindi as compared to the dyslexic case. The types of errors were more of substitution types in both the cases. One important observation made

was that through the types of errors produced in both the cases tells us something about the reading process and the routes they follow to read the words. Another point observed was the frequency of usage has an important role to play in word recognition processes.

3.7 TN, 9, M and HS, 9, M, C

General profile of the case

He is 9 year old dyslexic. His mother tongue is Hindi. He is a hard working boy and is able to sit for long to finish the task given to him. He had a delayed speech problem. He started talking at the age of three. He was suffering from learning disorder and really went through a difficult time. He had to struggle a lot during his initial learning period and later when he was identified as dyslexic he was send to the special remedial classes which proved to be quite helpful for him. He was showing a good response and was eager to learn. He is an attentive child and wants to be equally good as his peer group. He had problems in reading and writing.

Table No-7

Comparative chart of the total number of errors produced by dyslexic and control case

English test	TN,9,M				HS,9,M			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	32	12.3%	228	87.7%	1	0.38%	259	99.6%
Writing	21	8%	239	91.9%	8	3%	252	97%
Spelling	112	43%	148	57%	50	19%	210	80.7%
Hindi tests								
Reading	16	7%	210	93%	1	0.44%	225	99.6%
Writing	8	3.5%	218	96.5%	2	0.88%	224	99.1%
Spelling	62	27.4%	164	72.5%	9	4%	217	96%
Drawing	02	10.5%	17	89%	2	0%	17	89%
Math	0	0%	15	100%	0	0%	15	100%

Assessment of case study 7

He attempted all the tests. He performed better in Hindi as compared to English. The number of errors produced was more of substitution types. Maximum error was observed in English spelling test. In English writing test it was observed that substitution types of errors were more. It was also noticed that the child did not only substituted the vowel but also consonants like /k/ for /p/ and /b/ for /k/, and /h/ for /k/. In some instances the child substituted /n/ for /m/ and /s/ for /n/. In another instance it was also noticed that the child substituted /c/ for /g/. It is hard to come to some type of conclusion as they are not reversal types. Putting some input could be something which strikes me is that the child might be confused with the curve line and the straight line and interchanges it in case of /k/ selection for /p/ and /b/.

Total number of errors produced in English writing is 22.

Total substitution is 17 errors.

Some of the examples are as follows:

Word list	learner's response	substitution error
Pink	Kink	P/K
Black	Blach	k/h
Wash	Wask	h/k
Shirt	Shiet	r/e
Donkey	Donbey	k/b
Great	creat	G/c

There was one reversal case also for example

Dad Bad D/B

Total number of errors produced in English Dictation was 112 errors.

Most of the errors were of phonological types. Mostly vowel substitution could be observed. Total number of substitution errors was 73. Some of the examples are as follows.

Word List	Learner's response	substitution errors
Sky	Skia	y/ia

Orange	Orenj	ange/enj
Stair	Staer	i/e
Wash	Wosh	a/o
Cross	Kross	C/K
Face	Fase	c/s
Coffee	Kofe	C/K

Deletion Types of errors=43 errors

Brought	Brot	ugh
Wrong	Rong	W
Monkey	Monke	y

Addition types of errors=11 errors

Water	Warter	r
Sugar	Shuger	h
Method	Metherd	r

- Most of the errors produced are in the spelling of the irregular words which the child has regularized in the existing word list.

Total number of errors produced in English reading test= 32 errors

Maximum number of errors observed was in substitution types of errors.

Total number of substitution types of errors was 29 errors.

Some of the examples are as follows:

Word list	learner's response	substitution errors
Sky	/ski/	ai/i
Bronze	/brɔnzi/	ə/i
Laugh	/lag/	f/g
Nine	/nini/	ai/i

- The above examples make very clear that the child has enormous difficulty with the irregular words and the child is using the phonological route always to read the irregular words.
- The child has difficulty in following semantic route most of the time. It seems that child has knowledge of phonemes as a phonemic unit but makes an error with the reading of irregular words.

Total number of errors produced in Hindi writing was 8 errors.

Substitution type of errors was 5. Some of the examples is as follows:

word list	learner's response	substitution error
Uṭa:na	Uṭa:va	n/v
dhona	dhova	n/v
puchāna	pUchāna	u/U

Number of addition-2

rāssi	rrssi	r
sadhu	sadhua	a

- As we can see from above example that not much error is produced in writing Hindi. The only error is that the child is not writing clearly the letter /n/ and looks like /v/.
- The child changes the long /u/ to short /u/ which is a very common type of error produced. In fact in this language these types of errors are produced by beginners.
- In addition type of error since all the three consonant letters have half similar structure the dyslexic child has problem in distinguishing them sharply.

Total number of errors produced in dictation of Hindi words=62 errors

Maximum errors are of substitution types =38

Some examples are as following:

Wordlist	learner's response	substitution error
phul	phUl	u/U
kəbutər	kəbUtər	u/U
bhura	bUra	bh/b, u/U

- Most of the errors are of short and long vowel. One might not find difficulty while reading but can make spelling errors.
- We can also observe the consonant substitution in the dictation test. Like /bh/ becomes /b/, /jh/ becomes /j/. These are voiced sound substituted by voiceless sound.
- The half consonants are substituted by full consonants. For example in /gUbbara/ and /bīli/ /b/ and /l/ are deleted.
- In deletion type of errors mostly the half consonants are deleted.
- The /n/ sound which is used as dots (anuswar) places above the consonants are also deleted.
- the /ŋ/ sound written as half curve with a dot inside known as chandrabindu is also sometimes deleted.
- In addition types of errors mostly half consonants are substituted by whole consonants. For example /kUrsi/ becomes /kUrəsi/ and /marɕ/ becomes /marəɕ/. Also /rəssi/ becomes /rəsəsi/.

Total number of errors produced in reading Hindi word list was 16 errors.

Number of substitution -7 errors

Some examples are as follows:

dhona-	nona	dh/n
pəkəɽna-	pəɽhna	kəɽ/ɽh

Number of deletion-3 errors

dopəhər- dohər p
 pəɖhna pə ɖhna

Number of addition-6 errors

jənvəri- jənvəri ε

Number of metathesis -1 errors

ələg- əgəl ləg/gəl

Comparison of dyslexic with CA control case

The number of errors produced by the control case was less than the dyslexic case in all the tests. The minimum number of errors produced was in Hindi and English reading tests. The type of error produced was more of unrelated types of errors. The results of the reading tests showed only one error each in Hindi and English reading tests. The maximum error produced was in English dictation test. There were 30 unrelated errors.

Total number of errors produced in English dictation was 50 errors.

The number of substitution error was 13 errors.

Some of the examples are as follows:

Word list	learner's response	substitution
Son	Sen	o/e
Black	Bolek	a/e
Yellow	Yllwe	ow/we
Sugar	Shar	s/sh
Evening	Every	ning/ry

Metathesis types of errors was 2 errors

Milk	Mlik	il/li
Table	Talbe	bl/lb

Deletion types of errors was 5 errors

Tea	Te	a
Green	Gree	n
Yellow	Yllwe	e
White	White	i
Great	Grat	e

Unrelated types of errors was 30 errors

Star	Surt
Food	Fha
Coffee	Kamt
Brush	Bam
Paint	Aus

Total number of errors produced in Hindi dictation was 9 errors.

Total number of errors produced in Hindi writing was 2 errors.

Total number of errors produced in English writing was 8 errors.

General remarks

As we can clearly see from the above table that the overall performance of a control case is better than the dyslexic case. The maximum number of errors produced by the dyslexic student is in English spelling and minimum in Hindi writing. As compared to the reading errors the dyslexic student has 12% in English whereas control has only 0.4%. Similarly in Hindi reading the dyslexic student has 7% whereas the control has only 0.4%. Maximum types of errors are of substitution types as compared to addition or subtraction. If we compare the overall performance of both the students it is not that bad except for the English spelling test of dyslexic which goes down to only 57%. This is an area detected problematic and to find out the reason we can refer to the types of error produced. We also see something in common for both the cases that the control has also got maximum errors in the same category. It gives some insight to identify the real problematic area in general. As both the students have the maximum error at English spelling level it means that the error is related to language or the orthography and not alone responsible due to the disorder present.

3.8 PB, 10, F and AN, 10, F, C

General profile of the case

She is 10 year old girl who is very slow in writing. She is a severe dyslexic. She takes long time to finish the work. Her mother tongue is Hindi and Punjabi. Most of the time, she is not able to complete her work. She has lots of problems in reading and writing. Letter reversal was observed. She reverses /p/ even while writing her name and writes /q/ instead of /p/. She attends a special school where she is taught by the special educator and finds things much better now as compared to her early times. She was detected as dyslexic when she was 7 years old. She had little speech problem also. Most of the time, she ignored reading activity. She was fond of colouring. She did not like to do any writing activity. She was fond of eating. She was little healthier as compared to her classmates. She spoke less and did not show much interest in studying.

Table No-8

Comparative chart of the total number of errors produced by dyslexic and control case

English test	PB,10,F				AN,10,F,C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	0	0%	0	0%	0	0%	260	100%
Writing	1	0.51%	195	99.48%	0	0%	260	100%
Spelling	2	100%	0	0%	1	0.38%	259	99.6%
Hindi tests								
Reading	2	33.3%	4	66.6%	1	0.44%	225	99.6%
Writing	4	12%	29	87%	1	0.44%	225	99.6%
Spelling	17	11.7%	128	88.2%	2	0.88%	224	99.2%
Drawing	09	47%	10	53%	0	0%	19	100%
Math	0	0%	15	100%	0	0%	15	100%

Assessment of case study 8

The student had a severe form of dyslexia. She was not able to read and took long time to respond. She attempted the other tests but could not finish it. She

was struggling to write and at times she wanted to run away. Since there was no time limit, we told her to relax and do the work at her convenient. She attempted the writing and spelling tests. Although, she did not completed the tests but attempted quite a lot. She did better in Hindi writing and spelling as compared to English. English was completely a puzzle for her. She could not read a single word. She attempted two words for dictation that also was wrong. She was able to copy and got many right.

Comparison of dyslexic with CA control case

The normal case did extremely well. She scored 100% in most of the tests except few were she scored 99%. She completed her test in a very short period of time. She attempted all the tests and was fluent in reading and writing. If I compare both the cases here, it shows clearly that the dyslexic child has performed very poorly. Something which is noticeable is that the dyslexic child is able to somewhat read and write Hindi more correctly as compared to English.

General remarks

The results of these two cases show that the dyslexic child has difficulties in reading English as compared to Hindi. She had more difficulty in writing English as compared to Hindi. The control case shows no difficulty in reading English. Hindi reading had one error which she corrected after two reminders. The word was /sUkhana/, which was read as /sUkhna/.It was deletion error. There were two spelling errors in Hindi. One was substitution type and other was deletion type. They are as followings:

Word list	learner's response	types of errors
pućna	pUćna	substitution
əprel	əpel	deletion

There were no addition errors. The normal child did not produce any metathesis or letter reversal case. The dyslexic case had a letter reversal problem. she wrote /q/ for /p/.

3.9 AK,10, M and PK,10, M,C

General profile of the case

He is a 10 year old boy. He is a slow learner. He takes lots of time to complete his work. He had problem in reading and writing. He attempted all the tests. He was a cheerful and talkative child. He was interested in studying. He was attending a special school for last two years .He was detected as a slow learner very late. He took lots of time to read and write.

Table No-9

Comparative chart of total numbers of errors produced by dyslexic and control case

English test	AK,10,M				PK,10,M,C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	2	0.8%	134	51.5%	16	6%	244	94%
Writing	10	3.8%	186	71%	4	1.5%	256	98.5%
Spelling	2	0.8%	40	15%	44	17%	216	83%
Hindi tests								
Reading	1	0.7%	39	17%	0	0%	226	100%
Writing	10	4.4%	216	95.5%	4	1.8%	222	98.2%
Spelling	2	0.8%	143	63%	6	2.6%	220	97.3%
Drawing	7	37%	12	63%	0	0%	19	100%
Math	0	0%	15	100%	2	13%	13	87%

Assessment of case study 9

The above chart gives the detail data of the number of errors produced by the slow learner. Not much error can be seen in reading English and Hindi. The maximum error is produced in copying both Hindi and English.

- l) Total Number of errors produced in **Copying English** word list = 10 errors
 - Mostly substitution error is seen in copying English word list. /k/ is substituted by /b/, /a/ by /u/ or /o/. Following are the samples provided.
- 1) Number of Substitution = 09 errors

S. No.	Word List	Substitution	Phoneme Substituted
1.	Water	Wuter	a/u
2.	Pink	Pinb	k/b

3.	Black	Block	a/o
4.	Orange	Oronge	a/o
5.	Skip	Sbip	k/b
6.	Monkey	Monbey	k/b
7.	Donkey	Donbey	k/b
8.	Cat	Cot	a/o
9.	Take	Tabl	ke/bl

2) **Number of Deletion = 1 error**

S. No.	Word List	Deletion	Phoneme Deletion
1.	Square	Squar	e

3) Number of Addition = 0 error

4) Number of Metathesis = 0 error

ii) Total number of errors produced in **Copying Hindi** word list – 10 errors

➤ In Hindi copying mostly substitution errors were produced. Example- /g/ by /m/, /t/ by /n/. Following are the examples:

1) Number of Substitution = 7 error

S. No.	Word List	Substitution	Phoneme Substitution
1.	कागज	कामज	ग/म
2.	जंगल	जगंल	जं/ज, ग/गं
3.	गधा	मधा	ग/म
4.	अलग	अलम	ग/म
5.	गाड़ी	माड़ी	ग/म
6.	रात	रान	त/न
7.	गेंद	मेंद	ग/म

2) Number of Deletion = 2 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	पपीता	पपीत	ा
2.	सुखाना	सुखान	ा

3) Number of Addition – 0 errors

4) Number of Metathesis = 1 error

S. No.	Word List	Metathesis	Phoneme interchanged
1.	कलम	कमल	लम/मल

IV) Total number of errors produced in Hindi dictation of word list = 2 errors

1) Number of Substitution = 1 error

S. No.	Word List	Substitution	Phoneme substitution
1.	गाड़ी	गेरी	गा/गे, ड़/र

2) Number of Deletion = 1 error

S. No.	Word List	deletion	Phoneme Deleted
1.	बाजा	बाज	ɽ

3) Number of Addition = 0

4) Number of Metathesis = 0

As the above example provides information that there are specific letters which are systematically substituted everywhere found in the word list both in Hindi and English. It shows that there is some kind of consistency in the error produced. It is possible that the student has adopted that writing style where small /k/ looks like small /b/ if written in cursive. But to the audience it appears like small/b/. This is only one example. This child basically has problem in distinguishing those letters which has some similarities in shape. He continuously makes same type of errors. This child reads at slow rate.

Comparison of slow learner case with control case

The normal subject attempted all the tests in reading, writing and spelling. He is very active child. He is more interested in sports. In this case we can see that the normal child has more number of errors as compared to the slow learner subject. This configuration does not mean that the performance of the slow learner was better. In this case the slow learner could not attempt all. The percentage of errors gives us the exact information. When we compare the percentage of correct response we can make out that the performance of the normal child was better than the slow learner.

- The maximum number of errors produced by the normal child was in English spelling test. Mostly it was of substitution type.
- There was no error produced in Hindi reading.
- Hindi spelling test had less number of errors as compared to English spelling. In Hindi it was mostly substitution type.
- The short and long vowel signs are basically interchanged.
- Mostly substitution types of errors were seen in English reading.
- The time taken by the control was 20% of the time taken by the slow learner.
- In reading tests, the normal child makes no errors in Hindi but in English 6% of error was observed. Mainly the irregular words were read wrongly.

For example:- 'ball' read as 'bɛ:l'.

The letter 'a' spelled as in 'aeroplane' like 'ɛ'. /ɛ:rople:n/

'Saw' read as /se/,

'Pot' as /puʈ/,

'God' as /gUd/

'Son' as /sun/

'Laugh' as /lanɔg/

'Cross' as /kros/

'Know' as /kon/

From the above examples we can observe that in most of the cases he is only using phonological route. He is not using the semantic route even for these frequently used words. These are some of the areas where we have irregularly spelled words, although frequently used words but when it comes to print form it creates problem for second language learner.

- Most of the time it is *substitution types* of errors.
- Errors produced mostly *in irregularly spelled words*.
- Most of the reading errors are in second language i.e. English.
- Spelling errors are produced mostly in English spelling.
- In Hindi writing one reversal of letter was found by the control group./t/ reversed in Hindi as /p/.

त / प

तरबूज/परबूज

- The total number of errors in Hindi copying was 4 by the control case. 2 substitutions, 1 addition and 1 reversal were found.
- There were no errors in drawing test. He got all the shapes perfect.
- There were 2 errors in maths test

General Remarks

The types of errors produced by the slow learner are of mostly of substitution type. There was also addition and deletion types of errors but few in numbers. Only 1 metathesis case was found. No reversal of letters was seen. He did not complete the tests which he attempted. He took lots of time but also had problem in reading and writing. The normal case completed all the tests which he attempted. The maximum number of errors produced was in English spelling. He also had errors in Reading English. He was fluent in Hindi. He did not have any error in reading Hindi. He had 4 errors in Hindi writing. Surprisingly 1 reversal of letter was also seen in Hindi writing.

3.10 AR, 11, M and AS, 11, M, C

General profile of the case

He is 11 year old boy, identified as dyslexic. He has been attending the special school from the age of 6 approximately. During his childhood he was very active boy. He was not able to read and write like his peer group when he was in pre-school. He could not sit quietly and do his work instead showed extra energy to move around, to play etc. He had problem in learning alphabets in order. He also showed problem in sequencing. Since he was not able to cope up with the class and showed poor performance in the studies. His presence in the class at times caused lots of disturbance for other students also. He can be termed as talkative child in my view if we do not consider any disorder. Since his studies were suffering and could not help, it became unavoidable to take him for treatment. It is always better to examine all aspects of possibilities and do

the required necessity. At present he has progressed a lot and is able to read and write both Hindi and English language. He attempted all the tests.

Table No-10

Comparative chart of total number of errors produced by Dyslexic and control case

English test	AR,11,M				AS,11,M,C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	7	2.6%	129	49.6%	00	0%	260	100%
Writing	11	5.9%	185	60.7%	00	0%	260	100%
Spelling	0	0%	136	52.3%	01	0.4%	259	99.6%
Hindi tests								
Reading	1	0.4%	134	59.2%	1	0.4%	225	99.6%
Writing	4	1.7%	26	11.5%	1	0.4%	225	99.6%
Spelling	2	0.8%	224	99.2%	2	0.8%	224	99.2%
Drawing	03	16%	04	21%	0	0%	19	100%
Math	0	0%	15	100%	0	0%	15	100%

Assessment of case study 10

He attempted all the tests. He had 7 errors in English reading and 1 error in Hindi reading. He had maximum number of errors in English writing and minimum in English spelling.

I) Total number of errors produced in Copying English word list = 14 errors

1) Number of Substitution = 6 errors

S. No.	Word List	Learner's response	Phoneme substitution
1.	Red	Ped	R/P
2.	Lily	lilv	y/v
3.	Hair	Halr	i/l
4.	Air	Hir	A/H
5.	Aeroplane	Heroplanc	A/H, e/c
6.	Square	svuare	q/v

➤ Most of the errors are of substitution types. Most of the errors seen has to do with the shape of similar kind of letter, like R/P, A/H,y/v, i/l

2) Number of Deletion = 3 errors

S. No.	Word List	Learner's response	Phoneme deletion
1.	Bronze	broze	n
2.	Great	Geat	r
3.	Zero	Zro	e

3) **Number of Addition = 2 errors**

S. No.	Word List	Learner's response	Phoneme Addition
1.	God	Good	o
2.	Circle	Circcle	c

4) **Number of Metathesis = 0**

➤ **Total Number of errors produced in Copying Hindi word list = 4 errors**

1) Number of Substitution = 0 errors

2) Number of Deletion = 3 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	कुसी	कुसी	
2.	कुत्ता	कुता	र
3.	गुब्बारा	गुबारा	ब

➤ Mostly the deletion of half consonants can be seen. This is one area where learners face difficulty while learning as a beginner.

3) **Number of Addition = 1 errors**

S. No.	Word List	Addition	Phoneme addition
1.	बिल्ली	बिलली	ल

4) **Number of Metathesis = 0 errors**

➤ **Total number of errors produced in English dictation of word list = 0**

➤ **Total number of errors produced in Hindi dictation = 2**

➤ **Total number of errors produced in Reading English word list = 7 errors**

1) Number of Substitution = 7 errors

S. No.	Word List	Learner's response	Phoneme substitution
1.	moon	mɔn	u/ɔ
2.	Tea	tɛ	i/ɛ
3.	Coffee	sʈori	
4.	sugar	sʈori	
5.	color	kuɖ	
6.	Brush	riɖ	
7.	Red	riɖ	

2) Number of Deletion = 0

3) Number of Addition = 0

4) Number of Metathesis = 0

➤ **Total number of errors produced in reading Hindi word list = 1 errors**

1) **Number of Substitution=1 error**

S. No.	Word List	Learner's response	Phoneme substitution
1.	गुब्बारा	गुलाब	ब्बारा/लाब

- In English reading mostly substitution types of errors can be seen. Some are unrelated errors where the dyslexic child picks up any letter from the word and creates new word using it. Some are completely unrelated words.
- In Hindi reading only one error was seen which retains the initial syllable but substitutes the rest of the following syllable. The child changes the word with another word which begins with the same syllable. It is also possible to include that the frequently used word is replaced. It also reflects on the semantic route used to read this word.
- Since Hindi has an alpha syllabic orthographic, it is believed that most of the time it is read through the phonological route. But this particular error shows that once the word or the lexical item is learned it can follow different routes to read another word beginning with the same syllable.

- In reading alphabetic language like English once the lexical item is learned there are three phases that children passes through, are the logographic phase, the alphabetic phase and finally the orthographic phase. This theory was proposed by Frith(1985).
- Children usually follow a strategy to remember the word. Firstly, it remembers the initial letter and shape off the rest of the word. Secondly, it learns by heart and does not concentrate on the spelling of the word. Finally, this word is used frequently in the mind.
- Producing error, when meets with another word, beginning with the same letter. Generally this is possible only when the child has not learned all the grapheme-phoneme relation of that word.
- For dyslexic child, the strategy might be the same but might be missing out any phase in between, while learning.

Comparison of dyslexic with the control case

The control case had maximum error in Hindi dictation. He had 2 errors. He did not have any error in English reading and English writing. He had one error in English spelling. They are listed below.

- 1) Hindi writing had 1 error. It was substitution error. Long vowel was substituted by short vowel.

The word /**puchna**/ was written as /**pUchna**/.Substitution of /u/ to /U/.

- 2) Hindi reading had one error.It was of deletion type.

/**sUkhana**/ was read as /**sukhna**/.

- 3) Hindi spelling had two errors. One was deletion and other was substitution.

The word /**puchna**/ was written as /**pUchna**/.Substitution of /u/ to /U/.

The word /**əprəl**/ was written as /**əpəl**/,deletion of /r/.

- 4) English dictation had one error.

/**fish**/- /**fich**/, substitution error.

As compared to dyslexic case we observe that the control case has less number of errors. The types of errors produced by the normal case do not reveal any kind of strategy followed to remember the words. He does not have any unrelated errors as compared to the dyslexic case.

General remarks

The two cases, one dyslexic and other normal case of same age differs so much in the types of errors produced that at some point we are able to understand the basic norms and strategies followed to learn and remember the words. The similarity occurs when both the cases has deletion error. The dyslexic case had unrelated errors which becomes a source of information to understand what kind of strategy the child is trying to use and why? Is it mainly because of the disorder, he is not able to follow the normal path or is the orthography which is creating problem?

3.11 ST,11, F and AH,11,F, C

General profile of the case

She is a fifth class student. She has been attending special school for four years. She was detected as dyslexic when she was seven years old. She has intensively progressed after attending the special school. She writes fast as compared to other dyslexic students. She had little speech problem. She has more problems with writing as compared to reading. Initially, she was not able to sequence the alphabetic ordering and combining letters into words was the most difficult task for her. She struggled hard to learn to read and write. At present with the help of the special educator and her parents support she is performing well. She is in fifth class but her level is of third class. She is friendly natured girl and easily makes friends. She is well behaved when working in a group. She attempted all the tests.

Table No-11

Comparative chart of the total number of errors produced by the dyslexic and the control case

English test	ST,11,F				AH,11, F,C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	3	1.2%	133	51.5%	1	0.4%	259	99.6%
Writing	31	11.9%	229	88%	3	1.2%	257	98.8%
Spelling	54	20.7 %	82	31.5%	1	0.4%	259	99.6%

Hindi tests								
Reading	2	0.8%	133	58.8%	00	0%	226	100%
Writing	25	11%	201	88.9%	00	0%	226	100%
Spelling	53	23.4%	173	76.5%	15	6.6%	211	93.3%
Drawing	06	31.5%	13	68.4%	0	0%	19	100%
Math	08	53%	07	46%	0	0%	15	100%

Assessment of case study 11

She attempted all the tests. She had more numbers of errors in writing as compared to reading. Hindi spelling had the maximum number of errors and Hindi reading had the minimum numbers of errors. In English, the maximum number of errors produced was in spelling and minimum in reading. She had three reading errors in English and two in Hindi reading. A substitution type of error was produced more.

- The types of errors produced in writing English was mostly of substitution type. For example:

Words	learner's response	type of error
Sugar	Suger	substitution of /a/ to/e/
Pen	Pan	/e/to/a/
Some	Sone	m/n
Hand	HAnd	a/A

- As we can see from some of the given examples above that not only vowel is substituted but consonants are also substituted.
- Interchange of upper and lower case can also be observed.
- Here are some of the phonemes which were substituted: a/e, e/a, o/a, a/A, n/D, l/P, e/o, D/P, and m/n.
- Deletion error in English writing was 7. Some of the samples are given below:

Words	Learner's response	type of error
Subtraction	Subtracion	deletion of /t/.
There	Tere	deletion of /h/.
Hard	Had	deletion of /r/.

- Total number of errors produced in English dictation was 54. Maximum error was of substitution types. Some of the samples are given below:

Words	learner's response	types of errors
Coffee	Coffy	Substitution of ee/y
Brush	Bruch	substitution of s/c
Shirt	ceck	substitution
Bad	Bag	reversal type
Dad	BaG	reversal type
Some	Sum	substitution
Heavy	Havy	deletion type
Stair	Stare	substitution type
Music	Mushic	addition type

- The dyslexic child produced almost all types of errors and homophones really suffered like /some/ and /stair/.
- In substitution types of errors, mostly phonological errors are produced. For example: the sound of 'ee' became 'y', 'sh' became 'c' as in /brush/ and /shirt/.
- Reversal of mirror image letters is also produced. For example: /D/ to /B/, and /g/ to /D/.
- The addition types of errors are produced which is mostly phonological types. For example: /music/ to /mushic/

Total number of errors produced in Hindi dictation was 53 errors. Maximum numbers of errors are of substitution types. There are many deletion errors also. Addition and reversal types were also observed. Some samples are given below for illustration purpose.

Words	learner's response	types of errors
फूल	फुल	substitution types
लिखना	लीखना	substitution types
बकरी	वकरी	substitution types
कुर्सी	कुसी	deletion type
पहनना	पहना	deletion type

- In most of the words, substitution of long vowel diacritic mark is substituted by short vowel, whether it is long ‘u’ or long ‘i’. Similarly short vowel is substituted by long vowel. This type of error is also common among normal children.
- Hindi being shallow orthography, less number of reading problems occurs. The orthography has ‘maatraas’ which are basically a diacritic marks representing vowel sounds which combines with consonants to build syllable. Most of the ‘maatraas’ for representing same sound but in long and short form has similar shape except that they are placed in opposite way. For example: short ‘i’ will be placed at left side of the consonants and long ‘i’ at right side. So, often this error is seen unless you learn the correct pronunciation of the word.
- This kind of orthography has more spelling error as compared to reading error. The transparency in the script which follows the grapheme-phoneme correspondence rule makes reading process much more convenient as compared to the deep orthography script.
- In the above case we observe that the phoneme ‘b’ is substituted by another phoneme ‘v’. Bilabial becomes labio-dental as well as plosives becomes fricative. In this case both are voiced.

Total number of errors produced in Reading test of English word list =3 errors

Number of Substitution – 3 errors

S.No	Word List	Substitution	Phoneme Substitution
1.	Son	Sɔn	o/ɔ
2.	Laugh	laŋg	f/ŋg
3.	God	Gud	ɔ/u

- In English reading only substitution types of error is produced. They are mainly of phonological types. The child has problems with the irregular spelled words.

Total number of errors produced in Reading test of Hindi word list =2 errors

Number of Substitution=0

Number of Deletion=2

S.No	Word List	Deletion	Phoneme deletion
1.	सेब	सब	
2.	कबुतर	कबतर	,

Number of Addition=0

Number of Metathesis=0

- In Hindi reading only 2 errors are produced. Both are of deletion types. Deletion of the *Matraas* (the vowels attached to the consonants to form syllable) are one common error found in dyslexics.

Comparison of dyslexic with control case

The control case had very few errors in writing as compared to dyslexic case.

She had **3** errors in English writing and **0** errors in Hindi writing.

- She had **1** error in English reading and **0** errors in Hindi reading. /own/ was read as /one/.
- She had **1** error in English spelling and 15 errors in Hindi spelling.
The error produced in English spelling is as follows: 1 error /Violet-/Voilet/, this is interchanging type of error.
Maximum type of error in Hindi spelling was of substitution types. Addition and deletion types were very few.
- She had no errors in Drawing and Math.
- The type of errors produced in Hindi spelling was mostly of substitution types. Only one –one addition and deletion type were seen. For example:-

नहाना- नाहना addition type /a/

पहनना-पहना deletion type /n/

आलू-आलु substitution type /u/ to /U/

बकरी-बकड़ी substitution type /r/ to /r̥/

- Mostly substitution types of errors were produced. Not only vowels but consonants and half consonants were also substituted.
- In reading Hindi the normal case did not had any error.

General remarks

The dyslexic case had more numbers of errors as compared to the normal case. Most of the errors were produced in spelling test of both Hindi and English. Most of the errors were of phonological types. The errors produced by the dyslexic case were mostly of substitution types. The results show that substitution of vowels, consonants, upper and lower cases as well as half consonants were produced. In some of the tests interchanging of letters were also found. Letter reversal and metathesis was mostly produced by dyslexic case. The normal case did not have any letter reversal cases. The dyslexic case had reversal of /d/ to /p/ in English and /c/ and /j/ reversal in Hindi i.e.

च/ज reversal.

At this age the students should not make such letter reversal errors. This might be due to the disorder that the child is facing. So it was not found in the normal case.

3.12 **AM,11,F and KH,11,F,C**

General profile of the case

She is a 11 year old girl whose mother tongue is Hindi and Punjabi. She is a left hander. She is the eldest among two siblings. She has been attending the special school for four years. She had some speech problem in her early days. She was not able to read or write when she was six years old. She had problem in learning alphabet in sequence. She used to reverse the letters after several reminders. She was not able to connect the letters in the word to the sound of the word. She still has some problems in reading and writing. She has lots of phonological problems in reading English. She still reverses letters. Not only that she has confusion with the sounds of the letters reversed. For example in Hindi /t/ and /p/ are reversed in reading aloud too. Her writing is clear but little big in size.

Table No-12

Comparative chart of the total number of errors produced by the dyslexic and the control case

English test	AM,11,F				KH,11,F,C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	15	5.7%	121	46.5%	26	10%	234	90%
Writing	14	5.3%	244	93.8%	3	1.2%	257	98.8%
Spelling	24	9.2 %	112	43%	17	6.5%	243	93.4%
Hindi tests								
Reading	5	2.2%	35	15.5%	02	0.8%	224	99.2%
Writing	18	7.9%	208	92%	00	0%	226	100%
Spelling	122	53.9%	104	46%	9	3.9%	217	96%
Drawing	07	37%	12	63%	0	0%	19	100%
Math	07	47%	08	53%	0	0%	15	100%

Assessment of case study 12

She attempted all the tests. Maximum error produced was in Hindi spelling. Minimum error produced was in Hindi reading. Most of the errors were of substitution types. She scored good in writing Hindi and English both. In English, maximum error produced was in spelling. Most of the errors were phonological errors. She took lots of time in reading words. She was not much interested in reading aloud. Some of the samples in reading Hindi are given below:

तोता-पापा reversal types of errors /t/ to /p/

सोना- सेना substitution types of error /o/ to /e/

छोड़ना- छेड़ना substitution types of error /o/ to /e/

सोचना- सेचना substitution types of error /o/ to /e/

धोना-धेना substitution types of error /o/ to /e/

At the age of eleven, if the child is still reversing the letter and reading the reversed letter, it is something not of the common errors.

- Mostly /o/ becomes /e/ in all the above cases. It is a systematic type of error produced continuously without realising the change in the meaning of the word.

- She has 15 errors in reading English word list. Most of the errors are of substitution types.
- They are of phonological types and certain phonemes are substituted which can have multiple sounds in different words. For example:-
 - sky-ski
 - coffee-sofi
 - bronze-bronzi
 - some-somi
- Most of the words are irregularly spelled words in English. They are read in a regular form. It seems that the dyslexic case is not able to read the irregularly spelled word as a whole word. It seems that most of the time she is only following the phonological route to read.
- She has problem using the semantic route while reading the words in English.
- While copying English she had 14 errors. She substituted /e/ with /c/ most of the time. She had deletion errors after substitution. Hardly any addition error was seen. /color/ was written as /colo/, this is deletion type of error.
- In English dictation total 24 errors were produced. Most of them were phonological types of errors. Some were unrelated types of error. There were maximum substitution types of errors. For example:-
 - Tea-Ty
 - Milk-Moky
 - Sugar-Shaugya
 - Laugh-Lff
 - Cry-Kury
- In English dictation test, mostly substitution types of errors were produced. Substituting letters like /c/ to /k/ as in ,cry‘, and /t/ to /d/ as in ,‘elephant‘.
 - Cry-Kary
 - Elephant-Elephand

Comparison of dyslexic case with control case

The dyslexic case had more number of errors as compared to the control case. The control case had maximum error in English reading. It had zero error in

Hindi writing. As compared to the dyslexic case in English reading, the control had 90% correct response and 10% error. The dyslexic had only 47% correct response. The percentage of reading error was 6%, total number of errors were 15. Most of errors were of substitution types. Deletion and addition type of error were also produced.

- In English reading, the types of errors produced by the control case are given below:

far-feər substitution types /a/ to /eə/

know-kenəʊ addition types /ke/

saw-se substitution types /ɔ/ to /e/

- In Hindi reading, the types of errors produced by control case was of substitution and deletion types. Only two errors were produced. They are as follows:

उठाना- उठना deletion type

भाई -भैया substitution type

Rest of the words were correct in reading Hindi.

General remarks

The types of errors produced by both the cases were mostly of substitution types. In this case study, the dyslexic child produces unrelated types of errors. Most of the errors are of phonological types. Reversal of letters can also be observed that too in Hindi. Many deletion and addition types of errors can be observed. There are few metathesis types of errors too. In Hindi substitution of long vowel into short vowel can be seen, deletion of half consonant was also found as well as addition of half consonants can also be seen.

3.13 MK, 11,M and AP,11,M,C

General profile of the case

During his childhood he had delayed speech. He was not able to cope up with the work given in the class. He took lots of time to read and write. He had problem in learning alphabets in sequential order. He had problems with right and left. He was then sent to attend a special school where teachers were

training him with all possible means. Gradually he started reading and writing. He had lots of problem in reading. He always wanted to avoid reading and writing work. His writing was slow. His writing was bigger than normal size but was clear. He had severe problem in connecting grapheme-phoneme relation. He generally read the letters in isolation omitting all the diacritic marks at many times.

Table No-13

Comparative chart of the total number of errors produced by the dyslexic and the control case

English test	MK,11,M				AU,11,M, C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	20	7.6 %	116	44.6%	01	0.4%	225	99.6%
Writing	8	3%	66	25.3%	0	0%	260	100%
Spelling	5	1.9 %	131	50%	4	1.5%	256	98.4%
Hindi tests								
Reading	19	8.4 %	116	51.3%	01	0.4%	225	99.6%
Writing	02	0.8 %	16	7.0%	05	2.2%	221	97.7%
Spelling	3	1.3 %	142	62.8%	21	3.9%	205	90.7%
Drawing	03	16%	16	84%	0	0%	19	100%
Math	01	7%	14	93%	0	0%	15	100%

Assessment of case study 13

He attempted all the tests. Maximum number of errors was produced in reading English and minimum in writing Hindi. As a whole he had more number of errors in English as compared to Hindi. Most of the errors were of substitution types. He had 20 errors in reading English. Some of them are given below:

Total number of errors produced in Reading test of English word list=20 errors

S. No.	Word List	Learner's Response	Types of errors
1.	correct	soreɹ	substitution
2.	stair	sɹar	substitution
3.	laugh	laug	substitution
4.	good	gɔd	substitution

S. No.	Word List	Learner's Response	Types of errors
5.	fair	far	substitution
6.	shirt	ʃiʃ	substitution
7.	shine	ʃin	substitution
8.	some	somi	addition
9.	wrong	vrɔŋg	addition
10.	own	ɔvən	substitution
11	rose	rosi	substitution

- Most of the errors are of substitution types, Mostly phonemes like /e/ changes to /ɛ/, and /ə/ to /i/. Some times /a:i/ to /i/.
- Addition of the sounds of silent letters are added like in /know/, /wrong/, /listen/, /some/ the sounds like /k/, /v/, /ʃ/ and /i/ are added.
- The phoneme /c/ as in , 'correct' is read as /s/, relating the letter names with the sound.
- Most of the errors produced were of phonological types of errors.

There were total 19 errors produced in reading Hindi. Most of the errors were of deletion and addition types. Some of them were of interchanging types also.

- Deletion of Matraas and reading only the letters in isolation. For example: /phul/ as /phəl/, /seb/ as /səb/, /baja/ as /bəj/.
- Addition of Matraas and letters in a word were not needed. For example: /ek/ as /ɛnək/, /kəl/ as /kələm/, /bəhən/ as / bahər/.
- Interchanging or changing of Matraas from the previous position to the final position. For example: /kəbuter/ as /kəbteru/.
- Reversal of letters were also observed in few words. For example: /pəpita/ as /pəti/

In English spelling test total number of errors produced was 5 only.

- All of them were of phonological types. For example:

S. No.	Word List	Learner's Response	Types of errors
1.	tea	ti	substitution
2.	coffee	kofi	substitution
3.	shirt	shart	substitution
4.	leaf	lif	substitution
5.	rose	roz	substitution

- All of them are of substitution types. Here, mostly the phonemes are substituted as follows: /ea/ as /i/, /c/ as /k/, /ee/ as /i/, /irt/ as /art/, /se/ as //z/.

- Not only phonemes are substituted but syllables are also substituted as in ,‘shirt‘.
- Gemminates are also substituted by single phonemes as in ,‘coffee‘ ./ff/ as /f/.

Total number of errors produced in Dictation of Hindi word list =3 errors

S. No.	Word List	Learner's response	Transcription of word list	Transcription of Learner's response
1.	चल	जल	cəl	jəl
2.	राजा	राजी, राजि	raja	raji/raji
3.	रोटी	रुटी	roʈi	rUʈi

- Reversal of letters can be seen. The phonemes which have mirror image are substituted, for example: /c/ as /j/.
- Reversal of letter was not always as in /raja/ the phoneme /j/ was not reversed but was substituted by /ji/.
- Substitution of error could be seen which is mostly phonological type, as in /roti/, /o/ becomes /u/.

In English writing there were total 8 errors found.

- Most of them were of substitution types. Substitution of /o/ as /a/was found in most of the words. For example: /God/ as /Gad/, Rose/ as /Rase/.
- The rest of the words did not have any error except that, /rr/ was substituted by /ss/ as in /dress/ as/ drerr/.
- In general I have observed that many children write /s/ in cursive which might look like / r/ also.

The total number of errors in writing Hindi was 2 errors.

- The errors produced were of deletion types. Mostly the deletion of half consonants was produced.

S. No.	Word List	Learner's response	Transcription of word List	Transcription of learner's response
1.	जंगल	जगल	jəŋgəl	jəgəl
2.	बिल्ली	बिली	billi	bili

Comparison of dyslexic case with control case

The control case attempted all the tests. He took very less time to complete the tests as compared to the dyslexic case. He had less number of errors as compared to the dyslexic case.

The control case had only one error each in both Hindi and English reading.

- In English, /Monkey/ was read as /mɒnki/. This is a substitution type of error.
- In Hindi, /shukrəvar/ was read as /shukərvar/. This is basically addition of shwa sound between the consonant clusters. Insertion of /ə/.
/शुक्रवार/- /शुकरवार/, insertion of shwa sound.

In English spelling test there were 4 errors by the control case.

- Most of them were of phonological types. Two substitution and two addition types of errors were found. They are as follows:

Word-	learner's response	Types of error
Shirt-	Shurt	substitution, /i/ as /u/
Saw-	Sow	substitution, /a/ as /o/
Write-	Rwrite	addition, /R/
Rectangle-	Rectangler	addition, /r/

In Hindi spelling test there were total 21 errors by the control case.

- Most of the errors were of substitution types. Mostly the short vowel was substituted by long vowel and vice versa. For example: /u/ as /U/, /o/ as /ɔ/, etc.
- There were also deletion types of errors, like deletion of *anuswar*, *half consonants* and *consonants*.
- Some of the errors were similar to dyslexic case, like, deletion of *anuswar* and *half consonant* specially /r/. But something like deletion of all vowel sign were not found in control case.

The control case did not have any error in English copying.

In Hindi copying 5 errors were produced.

- Most of the errors were of substitution and deletion type.

General remarks

According to the data analysis, it was found that dyslexic case had more number of error then control case. Dyslexic case had more errors in English then Hindi but control case had more errors in Hindi as compared to English. Mostly substitution types of errors were produced by both the cases. Deletion and addition types were few. Letter reversal was found in dyslexic case whereas no letter reversal was seen in control case. In case of Hindi both had deletion of half consonant /r/ and nasal sound (anuswar). Dyslexic had a different type of deletion error where he deleted all the Matraas and read only the individual phonemes without matraas (diacritic marks used to write the vowels with the consonants to make a syllable).

3.14 SS,11,M and AS,11,M, C

General profile of the case

During his childhood he had speech problem.He was very quite and shy.His continous failure in learning alphabets in sequence troubled him lot in proceeding ahead.He took lot of time to learn to read and write. He had problems with right and left.He was then send to attend a special school.The teachers were training him with all possible means.Finally he was trained in reading and writing. He had lots of problem in reading. He always wanted to avoid reading and writing work. His writing was bigger than normal size. He had severe problem with the sound and the letter recognition. He had mostly substitution errors as compared to addition or deletion.

Table No-14

Comparative chart of the total number of errors produced by the dyslexic and the control case

English test	SS,11,M				AS,11,M,C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	9	3.4%	1	0.4%	5	1.9%	255	98%
Writing	14	5.3%	122	46.9%	1	0.4%	259	99.6%
Spelling	2	0.7 %	6	2.3%	6	2.3%	254	97.6%
Hindi								

tests								
Reading	2	0.8%	4	1.7%	2	0.8%	224	99.2%
Writing	16	7%	24	10.6%	00	0%	226	100%
Spelling	2	0.8%	8	3.5%	14	6.1%	212	93.8%
Drawing	0	0%	19	100%	0	0%	19	100%
Math	0	0%	15	100%	0	0%	15	100%

Assessment of case study 14

He attempted all the questions but could not complete it. He had severe problem in reading. He took lot of time to read. He was able to do the writing work. He performed very poor in reading. In reading English, he had 9 errors and only 1 correct. Most of the errors were of phonological types. There were mostly substitution types of errors. In Hindi reading, it was mostly substitution and deletion type.

- In Hindi writing, he had substituted / f to /p/, /g/ to /m/, /ch/ to /dh/ and /gh/ to /dh/.
- In English writing, mostly he substituted /a/ to /q/ and /n/ to /h/.
- In English reading, he substituted phonemes like /ə/ to /u/ as in 'sun'.
- In reading Hindi, he substituted phoneme /s/ to /r/ as in /sona/.

Comparison of dyslexic case with control case

The control case attempted all the tests. He took very less time to complete the tests as compared to the dyslexic case. He completed all the test. He had less number of errors as compared to the dyslexic case.

- More number of errors were produced in reading English as compared to Hindi. There were 5 errors in Reading English and 2 errors in reading Hindi.
- **In English reading**, it has phonological types of errors. Substitution and deletion types were also found. Some grammatical errors was also found. For example:

Words	learner's response	error type
/hear/	/heər/	substitution, /i/ as /e/
/became/	/become/	substitution, /e/ as /ə/
/friends/	/friend/	deletion of /s/
/wants/	/want/	deletion of /s/
/chanting/	/chating/	deletion of /n/

- **In Hindi reading**, substitution type of errors were produced. They are as follows:

घर -घड़

तोलना -तौलना

- **In English spelling**, there were 6 errors. Mostly it was substitution type. There was one deletion as well as one addition types of errors.

- They were mostly phonological errors. For example:

Words	learner's response	error type
Month	Mounth	addition of /n/
Ball	Boll	substitution of /a/ to /o/
Aeroplane	Aeroplain	substitution of /ane/ to /ain/
Rectangle	Rectangal	substitution of /e/ to /a/
Heavy	Havy	deletion of /e/
Bronze	Brouns	substitution of /z/ to /s/ as well as addition of /u/

- **In Hindi spelling**, total number of errors were 14. Most of them were of substitution types.

- There was one deletion type also. Deletion of chandrabinu was found.

- Substitution of /g/ to /k/, /u/ to /U/, /i/ to /I/, etc were found.

- There were no errors produced in **Hindi copying**.

- There was one error in **English copying**. It was of addition type. It is given below: /worship/ as /workship/, addition of /k/.

The control case completed all the tests and scored more than 95% overall. The dyslexic case could not reach even 50% overall. The dyslexic case had severe problem in reading and writing. Most of the errors produced was of phonological types by both the groups.

General remark

The dyslexic case had severe problem in reading and writing. He took hours to read a single line. It was very tiring job for him and just wanted to get rid of it. Although, he co-operated and kept sitting until he was asked to leave. He struggled a lot with the process of reading both in Hindi and

English. He was unable to read the irregularly spelled word in English. He recognised the letters individually but could not read them in combination. He was somehow able to read in Hindi. Most of the errors were of substitution types. The control case had less number of errors as compared to the dyslexic case. He had mostly substitution as well as addition and deletion types of errors. The control case also had few phonological errors as well as grammatical errors.

3.15 GG,12,M and AP,12,M,C

General profile of the case

He was a very jolly natured boy. He was too talkative. He always raised questions. He was fond of new things and wanted to know about each and everything in detail. He loved making friends and most of the time he made others laugh. He was well built. He could hold anybody's attention. He sings well. He has problems with reading and writing. He has problems reading irregularly spelled words most of the times and tries to read them through phonological process. He attends a special school. He has problems in sequencing. He has problem in right and left.

Table No-15

Comparative chart of the total number of errors produced by the dyslexic and the control case

English test	GG,12,M				AP.12.M,C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	21	8%	115	44.2%	01	0.4%	259	99.6%
Writing	3	1.1%	257	98.8%	1	0.4%	259	99.6%
Spelling	65	25 %	195	75%	2	0.8%	258	99.2%
Hindi tests								
Reading	12	5.3%	123	54.4%	02	0.8%	224	99.1%
Writing	03	1.3%	223	98.6%	00	0%	226	100%
Spelling	100	44.2 %	126	55.7%	12	5.3%	214	94.6%
Drawing	3	16%	16	84%	0	0%	19	100%
Math	0	0%	9	60%	0	0%	15	100%

Assessment of case study 15

He attempted all the tests. He had maximum number of errors in Hindi spelling. Minimum error in writing Hindi and English. He produced more number of errors in English reading as compared to Hindi reading.

- **In English reading** tests he had total 21 errors. He had mostly substitution and addition errors. He also had deletion and metathesis errors.
- Substitution of vowels as well as consonants were found. For example: /ea/ to /a/ and /g/ to /p/.
- Addition of silent letters were seen. In others, addition of either consonants were seen. for example: /know/ read as /kenə/ and /Pant/ read as /Plant/.
- **In Hindi Reading** tests total number of errors were 12. Mostly substitution and deletion of phonemes were seen. For example: /kagəz/ read as /kaju/, /kutta/ as /kuta/ and /kurta/, /rona/ as /rani/. There were mostly semantic errors.
- **In English spelling**, total number of errors were 65. Both phonological and semantic errors were found. Most of the time it began with the same phoneme but ended in completely different word. For example: /lily/ as /lef/, /lotus/ as /loster/.
- **In Hindi spelling**, there were total 100 errors. Mostly substitution types of errors were seen. For example: /u/ as /U/, /j/ as /d/, /o/ as /e/, /t/ as /ʈ/ and many.
- **In English and Hindi writing** 3 errors were produced. They were mostly reversal and interchanging types of errors.
- Reversal of small /t/ was seen as small /f/ in /ten/.
- Interchanging of phonemes were observed. Like- /serving/ as /sevring/, /three/ as /t^hree/
- In Hindi copying, substitution of phoneme /g/ as /m/, addition of full consonant instead of half consonant and deletion of anuswar was found.

Comparison of dyslexic case with control case

The control case attempted all the tests. He took very less time to complete the tests as compared to the dyslexic case. He completed all the tests. He had less number of errors as compared to the dyslexic case. Maximum error was in

Hindi spelling and minimum in Hindi writing. He had 1 error in English reading and 2 error in Hindi reading.

- The error produced in reading English was of substitution type. /violet/ as /vIolet/.
- In Hindi reading, deletion error was found. /pəhənnə/ as /pəhna/, and /pəkana/ as /pəkna/.
- In Hindi spelling, substitution types of errors were mostly found. Like substitution of /u/ as /u/, /e/ as /ε/, /o/ as /u/, etc.
- In English spelling, substitution types of errors were seen.

General remarks

Dyslexic case had more number of errors as compared to the control case. The dyslexic case had more number of errors in English reading as compared to Hindi reading. Most of the errors were of substitution types. Addition and deletion was also found. Reversal of letters were also observed. Very few metathesis could also be seen. In reading English, he had lots of problems in reading irregularly spelled words. The control case did not show any such problem in reading. No reversal of letters were seen in the control case. Dyslexic case had maximum number of errors in Spelling test of both Hindi and English. Many words in English had phonological errors.

3.16 AN,12,M and AA,12,M,C

General profile of the case

He is a 12 year old dyslexic boy. His mother tongue is Hindi and Punjabi. He was a single child. He was very distractible and very moody. It was very hard to control him when he had just started his school at the age of 4. The teachers had to give full attention to him in the class. His performance was extremely poor. He could not sit for longer period of time and hence was distracted from his studies. It was resulting in poor performance in the class. Parents could not understand the problem during his initial period of learning. He was consulted with a child specialist but still could not be detected with any disability. He was a normal child with no physical ailment and was practicing a healthy life. It was

not so easy for his parents to know about his disorders. His problem was not detected at initial stage but was suggested to consult special educators for teaching purpose. He used to distract the whole class as a result he was suggested to attend special school. At the age of six he was send to the special school. He still has problems in reading and writing.

Table No-16

Comparative chart of the total number of errors produced by the dyslexic and the control case

English test	AN,12, M				AA,12,M, C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	55	21.1%	81	31.1%	01	0.4%	259	99.6%
Writing	11	4.2%	249	95.7%	3	1.1%	257	98.8%
Spelling	3	1.1 %	17	6.5%	1	0.4%	259	99.2%
Hindi tests								
Reading	2	0.7%	133	58.8%	00	0%	226	100%
Writing	0	0%	226	98.2%	00	0%	226	100%
Spelling	41	19.4%	104	46%	05	2.2%	221	97.7%
Drawing	0	0%	5	26%	0	0%	19	100%
Math	02	13%	13	87%	0	0%	15	100%

Assessment of case study 16

He attempted all the tests. His performance was better in Hindi then English.He had lots of problem in reading and writing English.He had lots of phonological errors in English reading. He wanted to avoid English spelling test and finally attempted only 20 words. Maximum number of errors was seen in English reading.He had 55 errors in English reading.

Total number of errors produced in reading test of English word list was 55 errors. Mostly substitution types of errors were produced. For example:

S. No.	Word List	Learner's response	types of errors
1.	sugar	surəj	syllable interchanged, g/j
2.	color	kələɾ	ə/ɔ, substitution
3.	brush	bruʃ	ə/u
4.	paint	pənt	e/ɛ
5.	violet	vaiɾ	v/w

S. No.	Word List	Learner's response	types of errors
6.	son	sɔn	ə/ɔ
7.	pot	ʈop	metathesis/reversal
8	Know	kenəʊ	Addition of /ke/

- Mostly substitution of vowels was observed in irregularly spelled words. Like: - e/ə, iu/u, ai/i, e/i, ε/i, ɔ/a, etc.
- Very few consonant substitution was seen, like-r/l only.
- Few metatheses were also found. Like- pot/top, sugar/surəj.
- Addition as well as deletion types of errors of both consonants and vowels were found.
- Deletion of syllables was also observed as in /multiply/, /ply/ was deleted.

Total number of errors in Hindi Dictation was 41 errors. All types of errors were seen. Few examples are given below:

S. No.	Word List	Learner's response	substitution/deletion/addition errors
1.	कबूतर	कूतरी	क/कू
2.	रस्सी	रीसी	र/री
3.	समझना	समजना	झ/ज
4.	पूछना	पुछना	, / ु
5.	नीला	नीचा	ला/चा
6.	नाव	नोओ	ना/नो, व/ओ

- Substitution of consonants and vowels can be seen.
- Deletion of half consonants can also be found.
- Additions of vowels as well as consonants were present.
- Several deletion types of errors could be found.
- Substitution of anuswar as /n/ consonant was seen in /genɖ/ as /gend/.

In English writing test, total of 11 errors were produced.

- There were 8 substitution types, 1 deletion and 2 addition types of errors.
- Substitution of consonants and vowels were found. For example:- a/o, p/P, r/R, u/ei, t/b,T/i, t/T .
- The upper and lower cases were also substituted in some cases.
- Deletion of /e/ in Donkey was seen.

- Addition of /e/ and /o/ was found in 'cry' and 'write' as 'cery' and 'worite'

There was no error found in Hindi copying.

Comparison of dyslexic with control case

Control case attempted all the tests. He had less number of errors as compared to dyslexic case.

- He had one error in English reading and zero error in Hindi reading. It was substitution type of error; /violet/ was read as /violeɪt/.
- He had 3 errors in English writing and one error in spelling.
- Maximum number of error was produced in Hindi spelling. There were 5 errors in Hindi Spelling and zero error in Hindi writing. Most of them were of substitution types, like substitution of short vowel to long vowel.

General remarks

The dyslexic case had more number of errors as compared to the control case. Dyslexic child had maximum number of errors in reading English. He had more numbers of errors in reading than writing. Mostly phonological types of errors were found. He had maximum substitution types of errors. Addition and deletion types of errors were also present. Very few metatheses types of errors were found. He had problems in reading irregular words in English. The control case did not have any such problems in reading and writing

3.17 DH,13,M and SN, 13, M,C

General profile of the case

He was very active boy, eager to learn new things and good at drawings. He had delayed speech problem. He started speaking only after three years. The parents had consulted many doctors and got his ear thoroughly checked. He did not have hearing problem. Doctors advised them to wait for some time and everything will be normal. Doctors said that once he starts talking there will be no problem as many children have delayed speech but once they start speaking everything becomes fine. There is nothing to worry as his hearing is ok. Parents trusted them and waited till he started speaking. Once he started speaking he was fluent in speech. When he attended school he had problem in learning Alphabets

in sequence, had problem with learning reading and writing. Reversal of letters were often produced.

Table No-17

Comparative chart of the total number of errors produced by the dyslexic and the control case

English test	DH,13,M			SN,13, M,C				
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	23	8.8 %	237	91%	0	0%	260	100 %
Writing	7	2.6 %	253	97%	4	1.5%	256	98.5%
Spelling	21	8%	135	60%	1	0.4 %	259	0.4%
Hindi tests								
Reading	2	0.8 %	224	99%	00	0%	226	100%
Writing	16	7%	224	92.9%	2	0.8%	210	99%
Spelling	57	25.2 %	169	74.8%	23	10%	203	90%
Drawing	1	5%	18	95%	0	0%	19	100%
Math	0	0%	15	100%	0	0%	15	100%

Assessment of case study 17

Dyslexic child had more number of errors as compared to the control case. Maximum number of errors were produced in Hindi spelling tests. There were more number of errors in reading English than Hindi. Minimum error was seen in Hindi reading. There were two errors in reading Hindi, but he had less number of errors in copying English than Hindi. Most of the errors were of phonological types. There were more number of substitution types of errors, vowel and consonants both were included. Letter reversal was also found.

In Hindi spelling mostly substitution types of errors were seen. Some of them are given below:

S. No.	Word List	Learner's response	Phoneme substitution
1.	पपीता	पपिता	पि/फ
2.	फूल	फुल	ड

S. No.	Word List	Learner's response	Phoneme substitution
3.	कुर्सी	कोरसी	कु/को
4.	कबूतर	कबुतर	, /ु
5.	तोता	जोता	त/ज
6.	मेज	मैज	/ै

- Mostly substitution types of errors were produced. There are 46 substitution types of errors.
- Substitution of long vowel by short vowel was normally observed, like: -
/u/ as /U/, /i/ as /I/, /e/ as /ε/.
- Other type of substitution was /U/ to /o/. That is complete change in the vowel sound, as in /kUrsi/ becomes /korəsi/.
- Substitution of half consonant with full consonant.
- Substitution of consonant by another consonant, like /t/ to /j/.
- There were few deletion as well as addition types of errors also.
- Mostly half consonants are deleted as given below.

1.	बिल्ली	बिली	ल
2.	कुत्ता	कुता	त
3.	गुब्बारा	गौबारा	ब
4.	रस्सी	रसी	स्

Addition type of error

1.	कुर्सी	कोरसी	र
2.	बहन	बहैन	
3.	पतला	पताला	।

- Addition of /ε/ and /a/ was found. In /bɛhən/, it looks like phonological error as this is one of the words in Hindi which is irregularly spelled word. It is hardly pronounced as /bəhən/.

- **In English reading**, substitution types of errors were found mostly. They were phonological types of errors. Irregular words were difficult to pronounce hence resulting in phonological types of errors.
- Addition and deletion types of errors were also present. Addition of silent letters in words was articulated, like /know/ was read as /kenəʊ/.
- In English copying, mostly addition and substitution types of errors were seen. For example: / Tony/ as /Toony/, /Tony's/ as /Toonies/, /the big ball/ as /a big ball/, / one's/ as /once/

Comparison of dyslexic case with control case

Dyslexic case had more number of errors as compared to control case. He had reading problems in English more. He was able to read Hindi well. His performance in reading and writing was far behind the control case. All types of errors were seen in the dyslexic case. Mostly phonological errors were found. He had problems in reading irregular words. Generally he followed grapheme – phoneme route to read. Word which was most frequently used and has been repeatedly learned from nursery was somehow stored in his long term memory. His short term memory was active most of the time.

Control case had very few errors as compared to the dyslexic case. He had substitution types of errors mostly.

- He had no errors in reading English and Hindi.
- Maximum errors were produced in Hindi spelling.
- Mostly they were substitution types of errors. Substitution of short vowel to long vowel like /U/ as /u/, /o/ as /ɔ, /e/ as /ε/.

General remarks

Dyslexic child had lots of reading problems in English as compared to control case. Both the cases had Hindi spelling problems like substitution of long vowel to short vowel. This shows that they follow the same route in writing Hindi. But there were other types of errors produced by dyslexic child, like: letter reversal which separates their route of learning language.

3.18 TS,13,M and KK, 13,M,C

General profile of the case

He was detected as dyslexic when he was seven years old. He was not able to catch up in the class like his other classmates when he was in nursery. Parents observed that he used to forget alphabets quite often and had to revise several times. His poor performance in the class and difficulty to read and write brought attention to the teachers. He had a normal intelligence and was no different from his peer group in other activities. His writing was not clear and used to write bigger than normal size in the class notebook.

Table No-18

Comparative chart of the total number of errors produced by the dyslexic and the control case

English test	TS,13, M				KK,13, M,C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	20	7.7%	79	30%	2	0.8%	258	99.2%
Writing	21	8%	239	91%	0	0%	260	100%
Spelling	71	27%	108	41.5%	1	0.4%	259	99.6%
Hindi tests								
Reading	5	2.2%	221	97.7%	1	0.4%	225	99.5%
Writing	37	16.4%	189	83.6%	0	0%	226	100%
Spelling	47	20.7%	179	79.2%	3	1.3%	223	98.6%
Drawing	3	16%	16	84%	0	0%	19	100%
Math	2	13%	13	87%	1	7%	14	93%

Assessment of case study 18

TS,13,M had more number of errors in English as compared to Hindi.

- Maximum number of errors were present in English spelling.
- Minimum number of errors were present in Hindi reading.
- He had more number of errors in Reading English than Hindi.
- Most of the errors were of substitution types.

- In Hindi spelling also unrelated types of errors were found. Like-
पानी- बीली
गुब्बारा-गुपब
- It shows that the child is following some process to retrieve these words but finally retrieves non-words.

Comparison of dyslexic case with normal case

Normal case had very less number of errors than dyslexic case. He did not produce any unrelated errors. No letter reversal was found. There were no errors in English and Hindi copying. More error was in reading English than Hindi. There were two errors in reading English and one error in reading Hindi. Maximum error was in Hindi spelling.

General remarks

The dyslexic case has large amount of errors as compared to the normal case. He had mostly substitution types of errors both in Hindi and English. Deletion and addition types of errors were also found. Letter reversal was found both in Hindi and English. Surprisingly unrelated errors were also found both in Hindi and English.

3.19 SS,15,F and AP, 15, F, C

General profile of the case

She is 15 year old girl. Her mother tongue is Hindi. She is the eldest child and has one younger brother. She is a student of class eighth. She has almost succeeded in learning both the languages in Hindi and English. Her handwriting was good. She writes clear and fast. She writes in cursive handwriting. She was detected as dyslexic when she was 7 years old. She had lots of problem in reading and writing. Her poor performance in the class continuously brought attention to the parents. She was shifted to the special section and given training by special educators and respective teachers. She still reverses letters but very less and has problems in reading and writing.

Table No-19

Comparative chart of the total number of errors produced by the dyslexic and the control case

English test	SS,15,F				AP,15,F, C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	10	3.8%	250	96.1%	0	0%	260	100%
Writing	4	1.5%	256	98.5%	4	1.5%	256	98.5%
Spelling	31	12%	229	88%	3	1.1%	257	98.8%
Hindi tests								
Reading	4	1.8%	222	98.2%	0	0%	226	100%
Writing	5	2.2%	221	97.7%	0	0%	226	100%
Spelling	3	1.3%	223	98.6%	2	0.8%	224	99%
Drawing	0	0%	19	100%	0	0%	19	100%
Math	2	13%	13	87%	0	0%	15	100%

Assessment of case study 19

She has maximum number of errors in English as compared to Hindi. She had maximum numbers of errors in English spelling. Total of 31 errors was found. Most of the errors were phonological types, like-

Words	Learner's response	Types of errors
Duty	dəʃi	u/ə substitution
Else	elzi	s/zi
Loyal	loyal	ə/a
Horse	haus	ɔ/au
France	frɛnc	a/e
German	gɛrman	j/g
Parade	pəraʃi	ə/i

Most of the errors were of phonological types.

In English spelling test, most of the errors were of substitution types. Addition and deletion types were also found. Reversal of letter was also seen. For example:-

/pink/ as /piuk/

/drink/ as /driuk/ n/u reversal

Addition and deletion types are as follows:-

/Wrong/ as /Rong/, deletion of /W/

/Four/ as /Foure/, addition of /e/

/Hair/ as /Heair/, addition of /e/

In Hindi reading, addition, deletion and metatheses types of errors were seen.

/pəɖna/ as /pəɖana/, addition of /a/

/ləɽki/ as /ləkɽi/, metathesis

In Hindi Spelling, 3 errors were seen. They were mostly phonological errors.

Comparison of Dyslexic case with normal case

The normal case had less errors than dyslexic case. She had no errors in reading Hindi and English. No letter reversal was found in the case of normal subject. In English copying there were 4 errors. There were 2 substitution and 2 deletion types of errors. They are given below :

Words	Learner's response	types of errors
Sugar	Suger	substitution, a/e
Own	Owe	substitution, n/e
small	mall	deletion of s
serving	servig	deletion of n

There was no error in Hindi copying.

In English dictation there were 3 errors. There were two substitution types and one deletion types. They are given below:

Square-Squar, deletion type

Hear- Hair, substitution types

became- become, substitution type.

No letter reversal was found. The deletion type could be phonological type or it could be just a minor mistake. The rest of the words were correct and not much problem could be seen. Dyslexic case had lots of spelling errors and most of them were of phonological types. Reversal of letters were also seen.

General Remarks

As we can see that at the age of fifteen when a person is supposed to be sure about what she is reading and writing we can see that a dyslexic subject has 31 errors in English spelling where as normal case had only 3 errors in English spelling. Most of the error types were of substitution types. Mostly phonological types of errors were seen. A normal case has few English copying errors which are mostly substitution types. Similarity between both the cases was that their handwriting was clear and matured.

3.20 AJ,15,M and RR,15,M,C

General profile of the case

He is a 15-year-old boy who was detected as dyslexic at the age of seven. He was a very energetic boy and good in sports but he was not able to read the way it was taught in the class. Due to his poor performance in learning language and in the reading and writing activity, his teacher suggested to consult the psychologist. He was attending a mainstream school at that time. After he was detected as dyslexic he was sent to the special section to study. At the initial stage he had a problem in learning Alphabets and most of the time reversal of letters were found. He had a problem in word identification and used to misread. He used to write very slowly at initial stages. At the age of 15 he has very little problem in reading and writing and doing perfect.

Table No-20

Comparative chart of the total number of errors produced by the dyslexic and the control case

English test	AJ,15, M				RR,15,M, C			
	No.of errors	%	No.of correct response	%	No.of errors	%	No.of correct response	%
Reading	1	0.4%	259	99.6%	0	0%	260	100%
Writing	2	0.8%	258	99.2%	0	0%	260	100%
Spelling	5	1.9%	136	52%	3	1.1%	257	98.8%
Hindi tests								
Reading	0	0%	226	100%	0	0%	226	100%
Writing	2	0.85	224	99.2%	0	0%	226	100%
Spelling	6	2.6%	220	97%	0	0%	226	100%
Drawing	0	0%	19	100%	0	0%	19	100%
Math	0	0%	15	100%	0	0%	15	100%

Assessment of case study 20

Dyslexic subject had more number of errors than the normal subject. Although he did not have many errors but very few. Maximum error was seen in Hindi spelling. He had more errors in reading English than Hindi. The normal subject did not have any reading errors either in English or Hindi. He had three errors in English spelling only. He gained 100% in rest of the tests.

Dyslexic case had five errors in English dictation. They are given below:

Words	learner's response	Types of errors
Pen	Pain	substitution, e/ai
Violet	Vilet	deletion of o
Ball	Boll	substitution, a/o
Elephant	Elephat	deletion of n
stole	stoll	substitution, e/l

Errors in Hindi spelling was 6. They are given below:

Words	Learner's response	Types of errors
चिड़िया	चीड़िया	substitution of /l/ to /i/
खरगोश	खरगोस	substitution of /j/ to /s/
पीला	पिला	substitution of /i/ to //
नीला	निला	substitution of /i/ to //
शाम	साम	substitution of /j/ to /s/
पपीता	पपिता	substitution of /i/ to //

- Most of the errors are of substitution types. Mostly Short vowel is substituted by long vowel and long vowel with short vowel. Example /i/ to /I/ and /I/ to /i/.
- Other substitution type was of /ʃ/ to /s/.

Comparison of Dyslexic case with normal case

The normal case had less errors than dyslexic case. He had only 3 errors in English spelling. He did not have any error in other tests. The errors are given below:

Words	learner's response	error type
Rectangle	Rectagle	deletion of /n/
Tony	Tone	Substitution of /y/ to /e/
reaching	reching	deletion of /a/

- Mostly deletion type of error was seen.
- They are mostly phonological types of errors.
- Dyslexic case mostly had substitution types of errors as compared to normal case.

General Remarks

As we can see that not much error was found in both the cases but very minor types of errors were seen. At the age of fifteen, we can see that a dyslexic child who undergoes a special training for so many years can acquire the language well in both written and spoken form.

CHAPTER – IV

RESULTS AND DISCUSSION

4.0 INTRODUCTION

The present study examined the linguistic errors produced at word level by bilingual dyslexics learning Hindi and English in the schools of Delhi. The data has been collected from 20 dyslexic and 20 normal children of chronologically matched aged group. Separate Questionnaire was prepared for both Hindi and English language test. Separate tests was conducted on Math and Drawing also. There were total eight tests conducted. They included *Reading Tests*, *Writing Tests*, *Spelling tests*, both in Hindi and English language separately as well as *Math Test and Drawing Test*. The Questionnaire included word lists, sentences and paragraph. The errors have been identified and tabulated for Reading, Writing and Spelling tests as well as Math and Drawing Test.

- *English Test* included word list containing 136 words, one rhyme containing 60 words and a paragraph containing 64 words. The word list contained most frequently used simple and complex words. They contained both regular and irregular words. Total number of words was 260.
- *Hindi test* included word list of 145 words and 15 sentences comprising of 81 words. The word list contained most frequently used words which were simple and complex. It also included names of months and days. The total number of words was 226.
- Mathematics test included simple problems like addition, subtraction, multiplication and division. Two sets of paper were set. First included simple sums containing 15 problems meant for younger ones and other containing 39 problems for older students.
- Drawing test included shapes like circle, square etc. Two sets of paper were set. One included single shapes and second contained two shapes together like circle inside the triangle. Set 1 had 19 questions. Set 2 contained 10 questions.

A comparative study done on bilingual dyslexics and chronological age matched control group.

A cross-sectional research was conducted on 50 bilingual special children with various learning disorders.

The tests included:

1. Writing Test
2. Reading Test
3. Spelling Test
4. Mathematics Test
5. Drawing Test

both in Hindi and English language.

Criteria for inclusion of subjects:

Participants with any other disorder other than dyslexia were not included for the research. Some of the cases who were slow learners, ADD, ADHD, with Speech disorder and Autism were not included for the test.

Criteria for exclusion of subjects:

Participants who had any visual problem, hearing problem or speech problem were not included for the test. Mentally retarded subjects were also excluded.

Description about the tests conducted

English tests

The tests conducted for English language included reading, writing and spelling tests. Same questionnaire was used for all the tests. It included word list, poem, and a paragraph. The word list contained 136 words mostly with high frequency usage words. They were simple words as well as complex words.

Hindi tests

The tests conducted for Hindi language included reading, writing and spelling tests. Same questionnaire was used for all the tests. The questionnaire contained word list, names of months, names of the days in a week and 15 short sentences. The word list contained 145 words which were high frequency usage words.

Math test

Mathematics test was conducted on all the cases. Math test included Addition, subtraction, multiplication and division. Numeral writing was also conducted to test the sequencing problem if any.

Drawing test

Drawing test was conducted on all the subjects. It included different shapes like triangle, square, rectangle, circle, semicircle etc.

From the sample of 50 participants 20 participants were selected for comparative study with the control group because Reading and spelling tests were not conducted on 30 participants due to time constraint. The test was conducted both in Hindi and English language separately. The questionnaire contained a word list, sentences, rhymes and a paragraph.

This study has tried to examine the nature of reading, writing, spelling, math and drawing in bilingual as well as multilingual dyslexic cases learning Hindi and English in the schools of Delhi. Some of the students had more than one language as their first language. All the students had Hindi as their first language and English as second language.

As we all know that language acquisition takes place from very early age. Infant goes through different stages of language acquisition beginning from crying, cooing and babbling to one word production, two word combinations and sentence production that is from pre-linguistic to linguistic stages. Finally they are able to understand and communicate fluently in that language. Listening and speaking skills occurs first, through mother tongue or first language acquisition.

Reading and writing skills develop later. Before learning Reading and writing skills, the oral speech i.e listening and speaking skills are already developed in first language/s. The child has mastered the first language/s and recognizes the world through the means of his mother tongue. The child is able to relate the sound produced for the names of certain object with the real object. It means that the child is now capable of communicating through the means of a language. The capacity to use language successfully requires one to acquire a range of tools including phonology, morphology, syntax, semantics and an extensive vocabulary. Language can be vocalized as in speech or manual as in sign. The human language capacity is represented in the brain. Even though the human language capacity is finite one can say and understand an infinite number of sentences, which is based on a syntactic principle called recursion.

Dyslexic children may have some trouble in speech. When it comes to learning a language in its written form than Dyslexic children faces lots of problems. They are not able to relate sound and symbol i.e. grapheme-phoneme relationship as per the language orthography complexity. The letters appears like a puzzle for them sometimes. They produce errors in reading and writing. In learning second language, reading and writing begins together with listening and speaking. Hence we can say that in learning both Hindi and English, reading and writing takes place almost at the same time. Learning second language becomes more problematic. It becomes even more problematic when it comes to learning a foreign language which has become compulsory in many schools after fourth standard.

Second language acquisition is a process by which people learn a second language. A central theme in SLA is that of interlanguage, the idea that the language that learners use is not simply the result of differences between the languages they already know and the language they are learning, but that it is a complete language system in its own right, with its own systematic rules. This interlanguage gradually develops as learners are exposed to the target language. The order in which learners acquires features of their new language are constants even for learners with different native languages. There is a possibility

that the learners first language affects in learning the second language, this influence is called language transfer.

Dyslexia is one of the major specific learning disorders characterized with failure of mastery limited to circumscribed areas, primarily involving academic skills but general cognitive ability being normal or even superior. According to the international Dyslexia association, Dyslexia is a neurologically based, often familial disorder which interferes with the acquisition and processing of language. Varying in degrees of severity, its manifestation includes difficulties in receptive and expressive language, including phonological, morphological, syntactic and semantic processing in reading, writing and spelling, handwriting, typing and sometime arithmetic as well as drawing also. Dyslexia is not a result of lack of motivation, sensory impairment, inadequate instruction or environmental opportunities, or other limiting condition. Although dyslexia is lifelong condition, individuals with dyslexia frequently respond to timely and appropriate intervention.

Results and discussions

The results obtained after identifying and tabulating all the errors produced by 20 dyslexic cases, it was found that the maximum number of errors produced was in Hindi Spelling as compared to all other tests. Minimum number of errors was found in Hindi Reading. English had the maximum number of errors as compared to Hindi in all other tests. Below is the chart containing all the errors in all the tests conducted on Dyslexics and Non-dyslexics. The chart includes total number of errors, total number of correct responses and total number of questions not attempted along with its percentage. The dyslexic children were very slow in their responses as compared to the control group. They took longer time to complete the tests. Most of them were not interested in reading tests as this is the more problematic area of language for them. Dyslexic children took too much time to read a single word. The types of errors produced were of substitution, deletion, addition and metathesis as well as reversal types.

Total number of errors and correct response with the percentage table of both i.e. dyslexic and control group

Table 21

Chart of all the errors produced by Dyslexic group

English Tests	Number of errors	% of errors	Number of correct response	% of correct response	Number of questions not attempted	% of question attempted	Number of questions attempted	Total number of questions
Reading	286	5.5%	2586	49.7%	2329	44.7%	2871	5200
Writing	208	4%	3612	69.4%	1380	26.5%	3820	5200
Spelling	507	9.7%	2185	42%	2510	48.2%	2690	5200
Hindi Tests	Number of errors		correct response					
Reading	96	2.1%	2337	51.7%	2087	46.1%	2433	4520
Writing	151	3.3%	2932	64.8%	1482	32.7%	3083	4520
Spelling	626	13.8%	2659	58.8%	1235	27.3%	3285	4520
Drawing	144	37.8%	297	78.1%	27	7.1%	354	380
Math	55	18.3%	230	77.6%	45	15%	255	300

Chart of all the errors produced by Dyslexic group

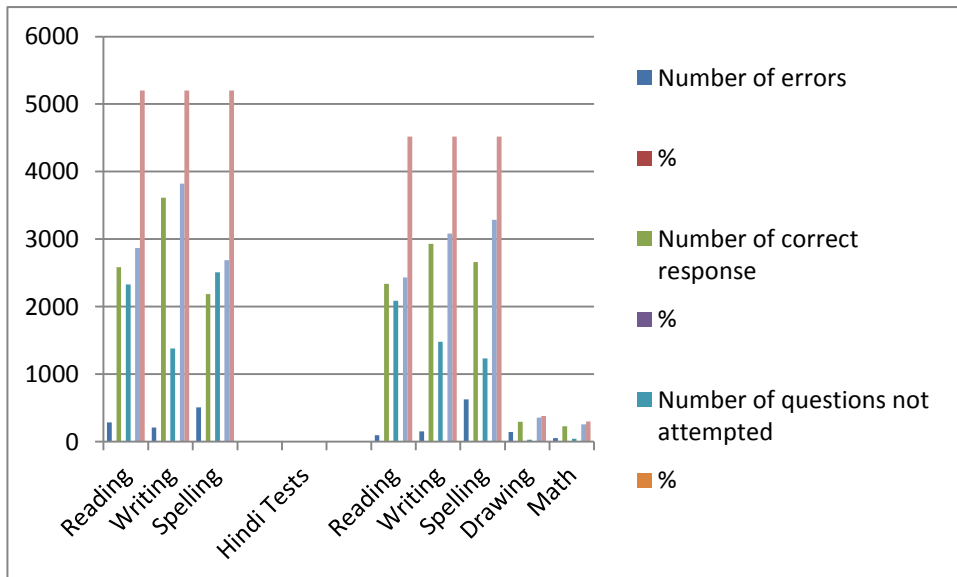
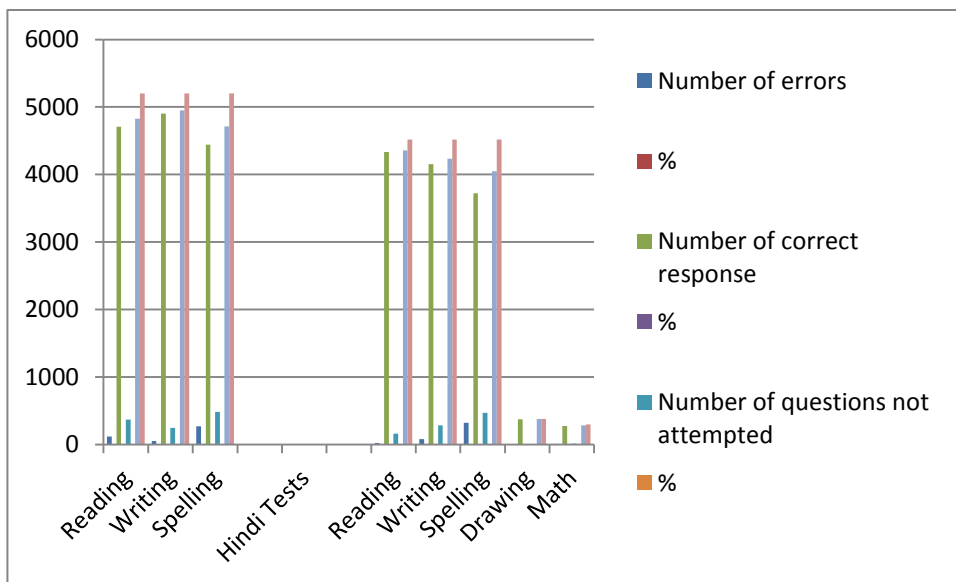


Chart of all the errors produced by control group

English Tests	Number of errors	% of errors	Number of correct response	% of correct response	Number of questions not attempted	% of question attempted	Number of questions attempted	Total number of questions
Reading	120	2.3%	4706	90.5%	371	7.1%	4829	5200
Writing	51	0.9%	4901	94.2%	248	4.7%	4952	5200
Spelling	273	5.2%	4441	85.4%	486	9.3%	4714	5200
Hindi Tests	Number of errors	%	correct response	%				
Reading	26	0.6%	4332	95.8%	162	3.6%	4358	4520
Writing	80	2%	4153	91.8%	286	6.3%	4234	4520
Spelling	324	7.2%	3724	82.3%	472	10.4%	4048	4520
Drawing	04	1%	376	98.9%	0	0	380	380
Math	09	3%	278	92.6%	13	4.3%	287	300

Chart of all the errors produced by control group



The above chart represents the findings of all the errors produced by Dyslexic and non-dyslexic children. Here are some of the descriptions of the above mentioned results.

English reading

- Dyslexic children had more number of errors than of non-dyslexic.
- Dyslexic group had 286 errors and non-dyslexic 120 errors. The total percentage is 5.5% and 2.3%
- Number of correct responses of dyslexics was 2586 and 4706 of non-dyslexics
- Percentage of correct responses of dyslexics and non-dyslexics are 49.7% and 90.5%.
- Maximum errors were of substitution types.

Hindi reading

- Total number of errors produced by dyslexics and non-dyslexics are 96 and 26. The percentage is 2.1% and 0.5%
- Total number of correct responses by dyslexics and non-dyslexics are 2337 and 4706. Total percentage is 51.7% and 95.8%
- Maximum errors were of substitution types.
- Dyslexics had more number of errors as compared to non-dyslexics

English writing

- Total number of errors produced by dyslexics and non-dyslexics are 208 and 51. The percentage is 4% and 0.9%
- Total number of correct responses by dyslexics and non-dyslexics are 3612 and 4901. Total percentage was 69.4% and 94.2%
- Maximum errors were of substitution types.
- Dyslexics had more number of errors as compared to non-dyslexics.

Hindi writing

- Total number of errors produced by dyslexics and non-dyslexics are 151 and 80. The percentage is 3.3% and 2%
- Total number of correct responses by dyslexics and non-dyslexics are 2932 and 4153. Total percentage was 64.8% and 91.8%
- Maximum errors were of substitution types.

- Dyslexics had more number of errors as compared to non-dyslexics.

English spelling

- Total number of errors produced by dyslexics and non-dyslexics are 507 and 273. The percentage is 9.7% and 5.2%
- Total number of correct responses by dyslexics and non-dyslexics are 2185 and 4441. Total percentage was 42% and 85.4%
- Maximum errors were of substitution types.
- Dyslexics had more number of errors as compared to non-dyslexics.

Hindi spelling

- Total number of errors produced by dyslexics and non-dyslexics are 626 and 234. The percentage is 13.8% and 7.2%
- Total number of correct responses by dyslexics and non-dyslexics are 2659 and 3724. Total percentage was 58.8% and 82.3%
- Maximum errors were of substitution types.
- Dyslexics had more number of errors as compared to non-dyslexics.

Drawing and Math tests

In both Math and drawing tests, dyslexic children had more errors than normal children.

The present study focuses on certain areas of language learning difficulties like Reading, Writing and Spelling. It also tried to draw inferences about **Opaque versus Transparent script** and examine which script will be easier to learn and therefore number of errors produced will be less. Present study shows that reading English was more difficult than Hindi. The results show that reading in English had more number of errors as compared to Reading in Hindi.

The second was “**regular verses irregular words.**” Is Reading affected due to irregularity in the form? English language includes both regularly and irregularly spelled words. For example-‘laugh’ is irregularly spelled word. It does not follow GPC rule (Grapheme-phoneme correspondence). The results of the present study show that Hindi reading has minimum number of errors as compared to English reading. Hindi follows GPC rule and hardly has any irregularly spelled words. Therefore, we can conclude that if a learner is able to recognize the sounds of phonemes and signs of graphemes in Hindi then the learner can easily read the words. Hindi is transparent language as compared to English.

And finally “**The role of native language**” is also considered for less production of errors.

Will the learner produce less error in their native language as compared to second language?

This research has tried to touch most of the areas included in language learning. Since the Subjects age range from 6-15 years, we can explore the types of problems coming in the way of learning first language as well as second language as a beginner as well as achiever. All the subjects selected for this research i.e. dyslexic as well as non-dyslexic has Hindi as their first language and English as a second language.

In this case, children start learning to read and write almost at the same time for both Hindi and English. Generally, Dyslexia is identified only after they start reading and writing. The case study of 20 dyslexic children shows that they have more problems in English as compared to Hindi when it comes to reading. They have minimum number of errors in reading Hindi and maximum errors in reading English.

This investigation has touched most of the aspects of language learning and tried to look in detail the most problematic area.

Dyslexic children produced more number of errors as compared to non-dyslexic learner.

Let's discuss one by one all the issues.

4.1 Opaque versus transparent scripts –

The general findings talks about less number of errors produced in transparent script. From my findings, this has come almost true. In Reading Hindi less number of errors was produced as compared to English Reading. Tables and figures are attached at the end of this chapter.

4.2 Regular and irregular forms of words:

Irregularity does affect reading and writing. Again this has come true that less number of errors is produced in regularly spelled words as compared to irregularly spelled words.

For example in present study, some cases produced such errors. I have encountered many words which are spelled phonetically and written phonemically.

Like – 'laugh' is written as 'laf'

'laugh' is read as 'long' and sometimes read as 'laug'

In Hindi words like

/bəhən/ is read as /bɛhən/ and also written like this.

Although these are not irregularly spelled words but are spoken like /bɛhən/ by many native speakers.

4.3 Role of native language

The present study compared the errors produced in Hindi and English, in reading, writing and spelling which shows that number of errors produced in English was more as compared to Hindi. But something important which was

observed was that the number of errors in Hindi spelling was more than English spelling and number of errors in Hindi reading was less than English reading.

Therefore, reading is affected more in English as compared to Hindi reading. This result can be interpreted as due to the transparency of the script.

From the analysis of case studies we can clearly see that there are more numbers of errors in English as compared to Hindi. Hindi is the native language as well as first language of many learners.

The Hypothesis proposed supports through these case studies done and detail analysis discussed.

Discussion on different types of errors produced in Reading, Writing and Spelling. They are Substitution, Deletion, Addition, Metathesis, Reversal and Other.

Let's discuss some of the errors produced in Copying English and Hindi word list.

In English writing –

1) Substitution of Consonants as well as vowels has been found.

Example –

Sugar – Suger /a/ is substituted by /e/

Pen - pan /e/ is substituted by /a/

Red - Rod /e/ is substituted by /o/

Some - Sone /m/ is substituted by /n/

2) Deletion of consonants and vowels

Yellow - Yello / w/

Give - Giv, /e/

Subtraction - subtracion /t/

Observation made from these examples shows that sound at the end which does not carry any value phonemically are dropped by some dyslexic learners. Also sounds which are silent are dropped.

3) Addition of consonants and vowels are also found in some case studies.

Write - worte /o/

Although number of errors produced in Addition is less as compared to Substitution and Deletion.

4) Metathesis and reversal of phonemes are such-

n - u

p - b

m - w

d - g

In Hindi writing mirror image letters are reversed.

प - त

च - ज

Substitution in Hindi is mainly long vowels changed into short vowels and similar looking consonants are substituted.

Examples are as follows:-

स - रा

ड़ - ड

ब - व

कबूतर - कबुतर

पानी - पानि

Geminates are also deleted in some cases.

कुत्ता - कुता

गुब्बारा - गुबारा

Substitution Errors

It has been found that almost all the cases have made the maximum number of substitution errors both in reading and writing. Since the production of vowel sounds need a very fine coordination of jaw height with the tongue tension, the dyslexics find it difficult to produce most of these sounds. As a result they tend to replace a longer vowel with a shorter one or vice versa. Sometimes they completely change the vowel sound. In some cases, even the consonants are substituted with a different one. This is also due to the confusion between the different sounds produced by the same consonant. The consonant/vowel substitution can be seen in the all the cases from 1 to 20. Example: pot i.e. /pɔt/as /puʈ/, good, i.e./gud/as/gɔd/ in writing.

Deletion Errors

Deletion of phoneme/syllable:

Deletion of phoneme as well as syllable was found in most of the cases. In Hindi most of the time the learner omitted half consonant while writing. Deletion of nasal sound was also found while writing. In some cases deletion of maatra (vowel sound) was also found. For example: /seb/ (Apple) was written as /səb/, /kəbutər/ as /kəbtər/ (Pigeon). Deletion of geminates was also found. For example: /bottle/ as /bolt/ and /little / as /litl/.

Addition Errors

Addition of final 'e':

In some cases, the learner has added a final 'e'. For example: /four/ is written as /foure/, /flower/ is written as/flaware/

Metathesis/Reversal errors:

This is said to be most typical of dyslexics. But except in few cases, there were very few errors of reversal. It is interesting to note that all the cases made the minimum no of reversal errors. Examples are-u/n, m/w

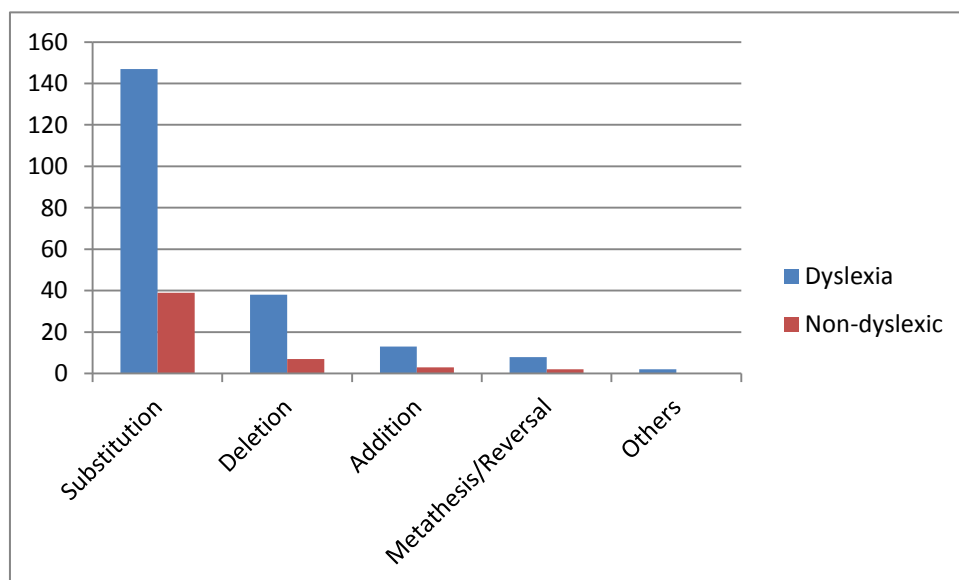
Lastly, the subjects were also found to be confused with phonetically graphemic shapes like, l/r, u/n, m/w etc.

The errors observed were classified into four different types namely, Metathesis/Reversals, Substitution, Addition and deletion. These errors were observed in different skills like Reading, Writing and Spelling. The responses of the 20 cases are summed up in the following charts.

Number of errors produced by Dyslexics and Non-dyslexics

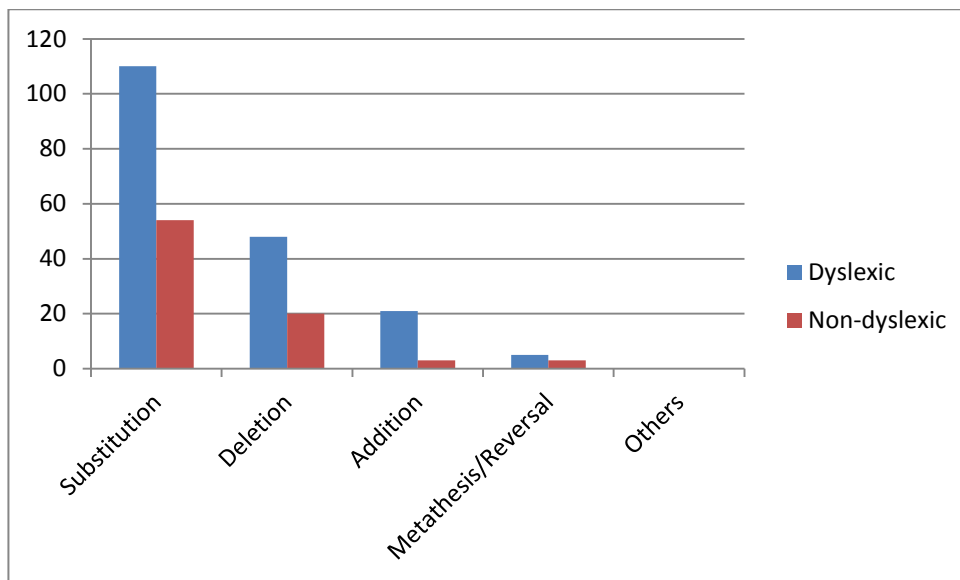
1) Total scores of English Writing errors-

	Substitution	Deletion	Addition	Metathesis/Reversal	Others
Dyslexia	147	38	13	8	2
Non-dyslexic	39	7	3	2	0



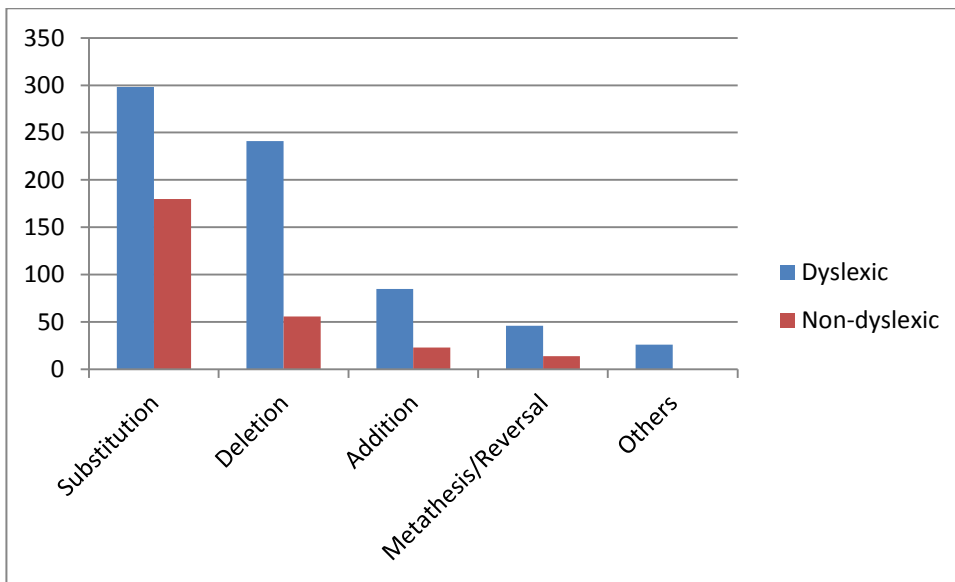
2) Total Scores of Hindi Writing errors:-

	Substitution	Deletion	Addition	Metathesis/Reversal	Others
Dyslexic	110	48	21	05	0
Non-dyslexic	54	20	3	3	0



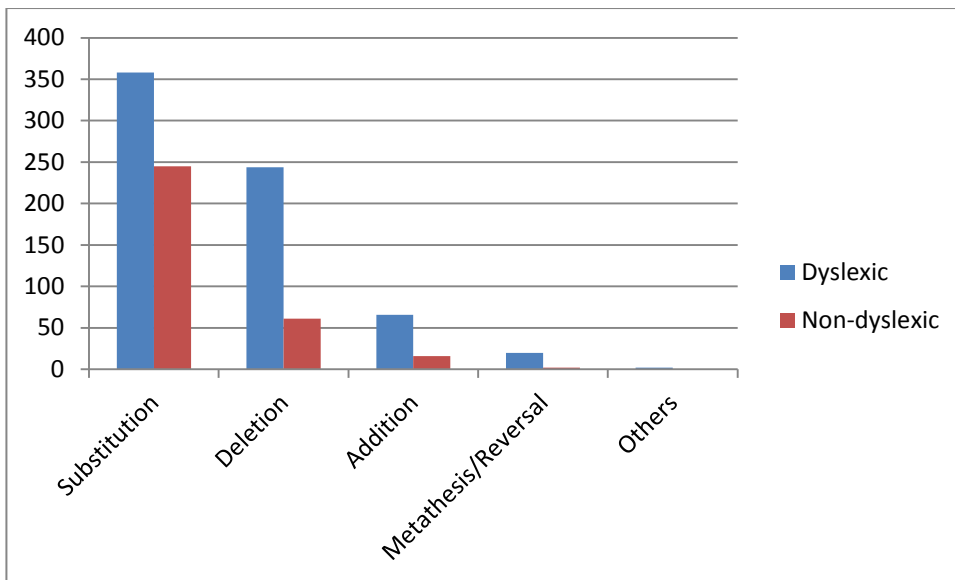
3) Total Scores of English Spelling errors:-

	Substitution	Deletion	Addition	Metathesis/Reversal	Others
Dyslexic	298	241	85	46	26
Non-dyslexic	180	56	23	14	0



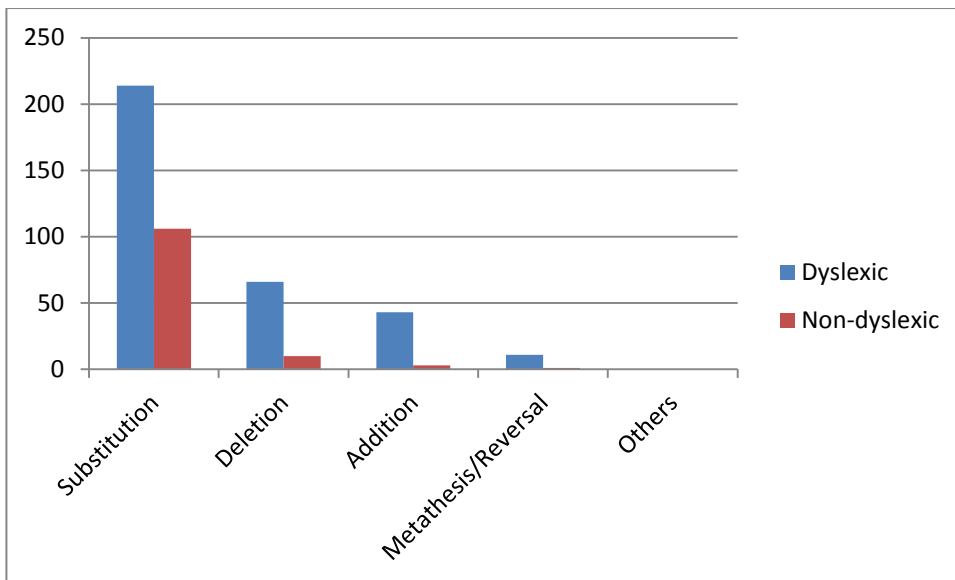
4) Total Scores Of Hindi Spelling errors:-

	Substitution	Deletion	Addition	Metathesis/Reversal	Others
Dyslexic	358	244	66	20	02
Non-dyslexic	245	61	16	2	0



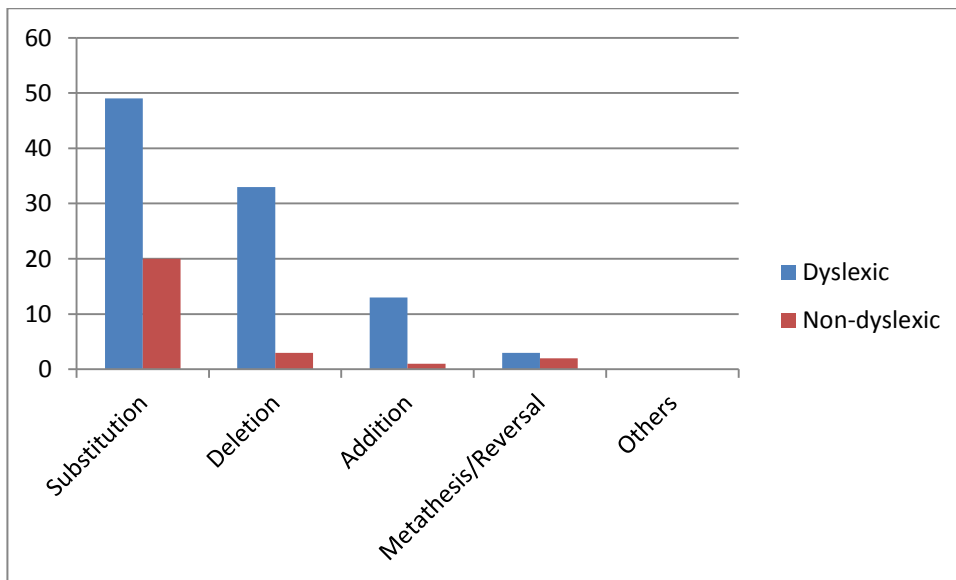
5) Total Scores of English Reading errors:-

	Substitution	Deletion	Addition	Metathesis/Reversal	Others
Dyslexic	214	66	43	11	0
Non-dyslexic	106	10	3	1	0



6) Total Scores Of Hindi Reading errors:-

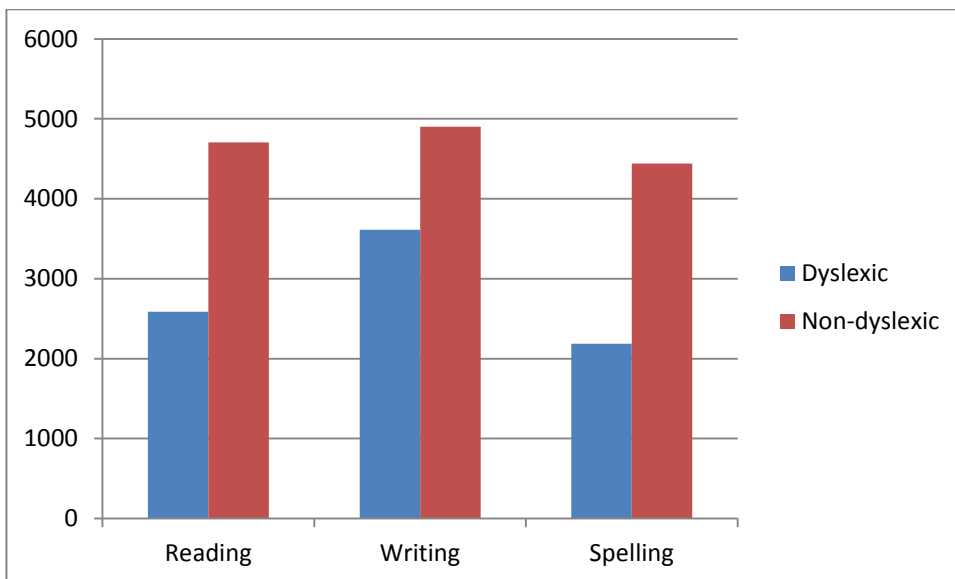
	Substitution	Deletion	Addition	Metathesis/Reversal	Others
Dyslexic	49	33	13	03	0
Non-dyslexic	20	3	1	2	0



Total number of correct responses in Reading, Writing and Spelling

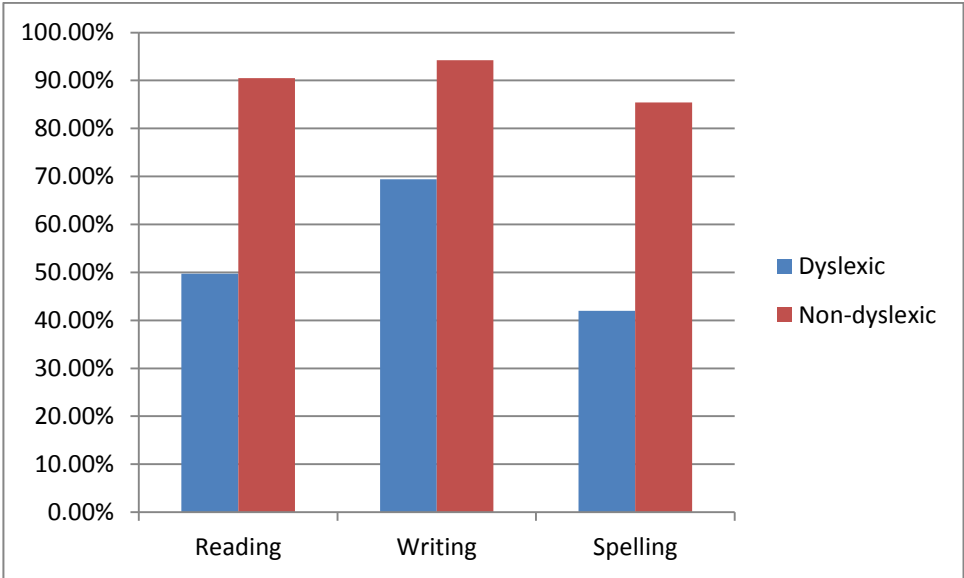
Number of correct response in English

	Reading	Writing	Spelling
Dyslexic	2586	3612	2185
Non-dyslexic	4706	4901	4441



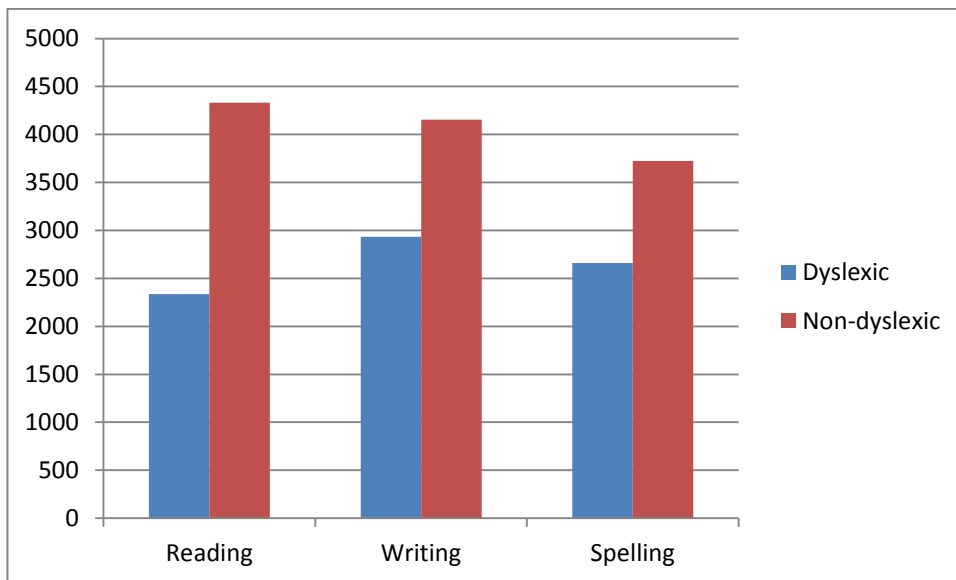
Percentage of correct responses in English

	Reading	Writing	Spelling
Dyslexic	49.7%	69.4%	42%
Non-dyslexic	90.5%	94.2%	85.4%



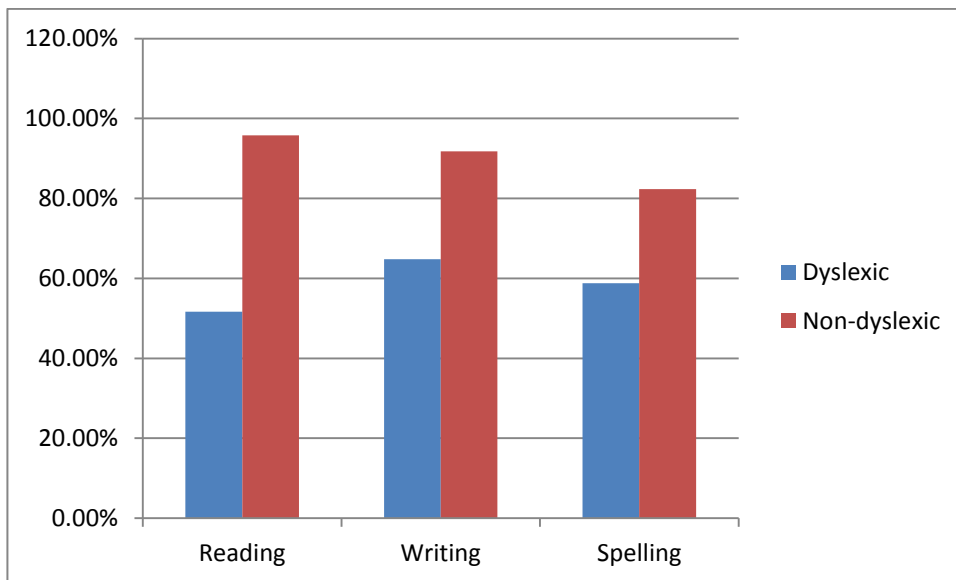
Number of correct responses in Hindi

	Reading	Writing	Spelling
Dyslexic	2337	2932	2659
Non-dyslexic	4332	4153	3724



Percentage of correct response in Hindi

	Reading	Writing	Spelling
Dyslexic	51.7%	64.8%	58.8%
Non-dyslexic	95.8%	91.8%	82.3%



CHAPTER- V

SUMMARY AND CONCLUSION

5.0 INTRODUCTION

The purpose of this research is ‘to investigate linguistic errors produced at word level by bilingual dyslexics learning Hindi and English’. The present research focusses on the types of errors produced by dyslexic children in reading, writing and spelling both in Hindi and English language. Errors produced in Drawing and Math was also focused. The types of error were of Substitution types, Deletion types, Addition types, Metathesis, Reversal and other types. 20 dyslexic and 20 non-dyslexic subjects were selected. Each case study included one dyslexic child and one non-dyslexic child of same age and gender. The age group was from 6 to 15 years. Both boys and girls were considered for the research purpose. The subjects were selected on the basis of availability. Hindi was the first language of all the subjects. English was learned as a second language. Total eight tests were conducted which included English reading tests, English writing tests, English spelling tests, Hindi reading tests, Hindi writing tests, Hindi spelling tests, Drawing tests and Math tests. The tests included Questionnaire method as well as small conversation with their respective teachers. Class test papers and Homework notebooks were also consulted. The questionnaire included frequently used words in a form of word list. It also included sentences and paragraphs. Separate questionnaire was made for Hindi and English tests. Same questionnaire was used for reading, writing and spelling tests in the respective languages. After the data collection from both dyslexics and non-dyslexics, the errors were identified and tabulated. Again different types of errors were identified and tabulated. They included substitution errors, deletion errors, addition errors, metathesis errors, reversal errors and any other errors. Once the tabulation of different types of errors was done, a comparative study was conducted between dyslexic and non-dyslexic cases. Further comparison was made between Hindi and English language.

RESULTS AND DISCUSSIONS

The results showed that dyslexic students had more number of errors than non-dyslexics.

The overall results showed that there was maximum number of errors in English as compared to Hindi. The maximum number of errors was of substitution types. Both consonants and vowels were substituted.

In Reading tests, English had more number of errors as compared to Hindi.

In Writing tests, again English had more number of errors as compared to Hindi,

In drawing tests, dyslexic students had more number of errors as compared to non-dyslexics.

In math tests, dyslexic case had more number of errors than non-dyslexics.

Differences observed in time taken, amount of tests completed, and handwriting

The difference found in time taken was that dyslexic children took much more time to do the tests as compared to non-dyslexics.

- Time taken to do the writing tests was **one and an half hours to two hours** by dyslexic children. On the other hand non-dyslexics took 20 to 40 minutes to complete the writing test.
- Dyslexic children could not complete the whole paper especially in reading and spelling. Control group without any hesitation completed the whole paper.
- Handwriting of dyslexic children was not good in spelling tests as compared to control group.

5.1 Summary of all the chapters

Summary of chapter one

Chapter one discusses the aims and objectives of the research. This chapter also discusses Literature review on Dyslexia in detail.

As already mentioned in chapter one, Dyslexia is a reading disorder where the person has problem in recognizing words and processing the grapheme-phoneme correspondence. Along with dyslexia, one can also have a writing disorder called dysgraphia and mathematics disorder called dyscalculia. Developmental Dyslexia occurs in children by birth. The child with normal IQ and no less than other children of their peer group can also be detected with developmental dyslexia. This is a time to wake up, to recognize the problem and proper diagnosis needed to understand the problem and proper remedy applied to overcome this problem. Dyslexia can be treated and almost 80% of the problem can be solved. Although it is a life- long problem as it is genetic but the best thing about this problem is that it is curable. There have been many famous dyslexics like Einstein, Tom Cruise and many who proved their ability. (Dyslexia-Wikipedia, the free encyclopedia)

Dyslexia usually manifests itself as failure in learning to read in the first grade at school. The reading difficulty can continue to adulthood. Early recognition of signs and symptoms can help the child to be identified and proper diagnosis can be done.(Shaywitz. S, Overcoming dyslexia, 2005)

Scope of the present study and general research questions as already mentioned in the first chapter.

This research investigates the linguistic errors produced at word level by the bilingual Dyslexic children learning Hindi and English in the schools of Delhi. A comparative study of error analysis was done among 20 dyslexic children and 20 chronologically age (CA) matched controls in the age group of 6-15 years both in Hindi and English languages separately. This research focuses on the types of errors produced by the dyslexic students and tries to find out the most problematic area of the language especially at word level in reading and writing. It might put some light in understanding the cognitive process of language learning specially in reading and writing. The orthographic effect was also

observed to understand the cognitive process in reading and writing in the two different orthographies

General research questions already mentioned in chapter one

- Whether orthography plays an important role in word recognition process?
- Does the mother tongue or first language affects the acquisition of second language and are the types of errors produced related or are completely different from the first language?
- We know that different languages follow different cognitive routes for reading according to the complexities of the scripts. We will be able to cross check the above statement through the types of errors produced in reading, writing and spelling of Hindi and English.
- Will the regular and irregular spelled words in the script contribute to the complexities of word recognition process? Will there be more number of errors in reading irregular forms of words as compared to regular forms of words?
- Will there be less number of errors in more frequently used words as compared to less frequently used words irrespective of their complexities in word recognition process? Is it the frequency of usage of the word responsible for number of errors produced?
- Does the length of the word also play a role in word recognition process? Will there be less number of errors produced in one syllable or two syllable words as compared to three or four syllable words?

Definition of Dyslexia by various researchers and organizations has been discussed in first chapter. This is one already mentioned in chapter one.

Dyslexics are not able to read properly and spell in a weird fashion. Letters on a page appeared meaningless jumble-with no more logic than alphabet spaghetti. They cannot make a connection between what they heard and what appeared on the page. (Sophy Fisher, Independent, Education. 7 November 1996) as cited in (Hulme and Snowling, 1997:1). Several definitions given are discussed in

chapter one. History of dyslexia, its causes, signs and symptoms are also discussed. Further focus has also been on types of Dyslexia like deep and surface dyslexia and many other types. Studies done on different languages as well as on bilinguals have also been discussed. Finally error analysis theories are also mentioned as this research is based on error analysis.

The present research is based on the methods of error analysis of L1 and L2 errors produced by the dyslexic students at reading and writing level in Hindi and English.

“Whenever a language is learnt or acquired one is faced with the problem of errors. Errors are an inevitable feature of learning. They are not problems to be overcome or evils to be eradicated. They in fact are part of learning and reveal the strategies that learners use to learn a language. They provide valuable insight into the language learning process.” - Pit Corder

Error Analysis is carried out in three successive stages. (Pit Corder, 1973)

1. Recognition of Errors
2. Description of Errors
3. Explanation of Errors

A thorough understanding of these three stages along with possible measures to overcome them is necessary for a proper analysis of the errors.

This research has tried to follow the method of error analysis on Hindi and English language produced by dyslexic students.

Results

The research questions have been analyzed through the method of error analysis conducted for this research. From the results we could see that orthography plays an important role in language learning. The results for reading showed that Hindi had less number of errors as compared to English. One of the reasons could be orthographic effect. More transparent the

orthography is, less number of errors produced in reading. In the process of reading, generally we follow two routes. One is whole word route and other is phonological route. When we come across new word we generally follow phonological route to read. That is how grapheme-phoneme correspondence rule is followed. Readers of phonologically transparent orthographies such as Hindi scripts, which do not have a large number of irregular words, do not rely on logographic or lexical reading to the same extent as readers of opaque alphabetic scripts do. In this research Hindi had less number of errors as compared to English in reading. It shows that number of errors produced will be less because it follows GPC rule mostly. But at the same time we cannot claim that there will be no error produced all. There are certain areas which are difficult to process like nasalized consonants. In English orthography, there are regularly spelled words as well as irregularly spelled words. It means some words follow GPC rule and some do not. Therefore, irregularly spelled word criteria are somewhat responsible for producing more errors in Opaque alphabetic script like English especially in reading. Therefore, opaque orthography as well as irregularly spelled word in that language could be the reasons for difficulty in reading; hence number of errors produced in English is more than in Hindi.

Summary of chapter two

Chapter two is Research methodology.

This chapter discusses about the research method applied to conduct this research.

This research was cross-sectional and empirical based. The dyslexic subjects were visited regularly for about 10 to 15 days. Data was collected from one of the schools of Delhi. Subjects were selected on the basis of their disability criteria. Only Dyslexic children were selected for this research. Data was collected through Questionnaire method. Separate Questionnaire was prepared for English and Hindi Language. Separate tests were conducted on Reading skills as well as on writing skills. The present study investigated the Linguistic

errors produced by bilingual Dyslexics at word level in Hindi and English. The scope of this study was to identify the types of errors produced by bilingual dyslexics and look into its cognitive process. The purpose of this research was to identify the types of errors produced at word level and compare it with the normal children of chronologically same age and gender. This research aims at writing case studies to know what are major types of errors produced and can be specified to dyslexics only.

Aims and Objectives of the research were as follows:

To analyze and describe the errors produced by bilingual dyslexics at word level in Hindi and English both in comprehension and production.

To classify and tabulate the Errors as

- Phonetic vs phonological reading errors,
- Graphic vs graphological writing errors.

Each of these errors was further classified as types of errors as follows:

Substitution types of errors

Deletion types of errors

Addition types of errors

Metathesis/Reversal and

Other types of errors

This chapter gives a literature review on research methods by various researchers.

Summary of chapter three

Chapter three is a detail case study of 20 bilingual dyslexics learning Hindi and English in the schools of Delhi. The age ranges from 6-15 years. Both boys and girls are included for the study.

The present research investigates the linguistic errors produced at word level by bilingual dyslexics learning Hindi as a first language and English as a second language. The age group is between 6-15 years. Dyslexic children are compared with normal chronologically aged (CA) matched control group. The tests include reading, writing and spelling in both Hindi and English language. Separate tests for drawing and mathematics were also conducted. Therefore all together eight tests were conducted.

The content of every case study presented here includes:

- 1) English reading test
- 2) English writing test
- 3) English spelling test
- 4) Hindi reading test
- 5) Hindi writing test
- 6) Hindi spelling test
- 7) Mathematics test and
- 8) Drawing test

English Test includes word list containing 136 words, one rhyme containing 60 words and a paragraph containing 64 words. The word list contains most frequently used simple and complex words. They contain both regular and irregular words. Total number of words is 260.

Hindi test includes word list of 145 words and 15 sentences including 81 words. The word list contains most frequently used words which are simple and complex. It also includes the names of months and days. The total number of words is 226.

Mathematics test includes simple problems like addition, subtraction, multiplication and division. Two sets of paper are set. First includes

simple sums containing 15 problems meant for younger ones and other containing 39 problems for older students

Drawing test included shapes like circle, square etc. Two sets of paper are set. One includes single shapes and second one contains two shapes together like circle inside the triangle. Set 1 has 19 questions. Set 2 contains 10 questions.

Data has been collected from 50 special need children with various disorders. They include dyslexic, slow learner, ADD, ADHD and autistic children ranging from the age group of 6 to 15 years. Participants who were only dyslexics were included for further tests. Data was also collected from 20 normal chronologically matched aged control group for comparison.

Tests conducted:

English and Hindi writing tests were conducted on 50 special need children. Math and drawing tests were also conducted on all 50 participants. Reading and Spelling tests were not conducted on 30 participants. Therefore case studies discussed in this chapter include 20 dyslexic participants and 20 normal chronologically aged matched control group for comparison.

The present research will examine the nature of reading process and the extent of types of errors produced by dyslexic students. It will also examine the role of mother tongue and its interference in the second language learning. Will there be less number of errors in Hindi as compared to English. Does orthography plays an important role in reading process. How does the mental lexicon stores and accesses the words. How do we retrieve words from different languages in case of bilingual? Is the process of second language learning different from first language learning? Many researchers have already constructed different models for language learning process. This research will verify the same.

The main objective of this research is to examine the different types of errors produced by dyslexic students and the difficulty they face during language learning.

The researchers have given dual route model for reading process which says they follow either semantic route or phonological route. Sometimes even both the routes can be used simultaneously. It is said that in the case of dyslexia one of the routes are damaged which causes problem in word recognition and retrieval process.

The format for the presentation of the 20 case studies is as follows:

The data was collected from 20 dyslexic children and 20 normal (CA) matched controlled group. Tabulation of the errors produced by dyslexics and control was presented. Errors were identified and tabulated for each tests conducted. They included all eight tests. They are English and Hindi reading, copying and dictation tests as well as math and drawing tests. The number and percentage of errors as well as correct responses were also calculated. Further classification of errors was done into five types of errors. Each case study is discussed separately beginning from the age group of six to the age of fifteen in ascending order. First the profile of the case is discussed and is followed by the assessment of the case study. A comparative chart of errors is presented for each case study. Then comparative study is done with the control case. Finally concluding remarks are presented in a general way.

Summary of Chapter four

This chapter is results and discussion. Errors are identified and tabulated. In this chapter, a comparative table of errors produced by bilingual dyslexics and non-dyslexics are presented. It focusses on certain issues like orthographic effect, regular vs irregular words and the role of native language in language learning.

The present study focuses on the areas of language learning difficulties like Reading, Writing and Spelling. It tries to draw inferences about **Opaque versus Transparent script** and examine which script will be easier to learn and therefore number of errors produced will be less. The results of the present study show that reading English was more difficult then Hindi. The results show that reading in English had more number of errors as compared to reading in Hindi.

The second was “**regular verses irregular words.**” Is Reading affected due to irregularity in the form? English language includes both regularly and irregularly spelled words. For example-‘laugh’ is irregularly spelled word. It does not follow GPC rule (Grapheme-phoneme correspondence). The results of the present study show that Hindi reading has minimum number of errors as compared to English reading. Hindi follows GPC rule and hardly has any irregularly spelled words. Therefore, we can conclude that if a learner is able to recognize the sounds of phonemes and signs of graphemes in Hindi then the learner can easily read the words. Hindi is transparent as compared to English.

And finally “**The role of native language**” is also considered for less production of errors.

Will the learner produce less error in their native language as compared to second language? Results show that there was less error in Hindi as compared to English. But in the area of spelling, it was found that Hindi had more errors than English.

This chapter discusses different types of errors produced in Reading, Writing and Spelling such as Substitution, Deletion, Addition, Metathesis, Reversal and Other.

Substitution Errors

It has been found that almost all the cases have made the maximum number of substitution errors both in reading and writing. Since the production of vowel sounds need a very fine coordination of jaw height with the tongue tension, the dyslexics find it difficult to produce most of these sounds. As a result they tend to replace a longer vowel with a shorter one or vice versa. Sometimes they completely change the vowel sound. In some cases, even the consonants are substituted with a different one. This is also due to the confusion between the different sounds produced by the same consonant. The consonant/vowel substitution can be seen in the all the cases from 1 to 20. Example: pot i.e. /pɒt/as /put/, good, i.e./gud/as/gɒd/ in writing.

Deletion Errors

Deletion of phoneme/syllable:

Deletion of phoneme as well as syllable was found in most of the cases. In Hindi most of the time the learner omitted half consonant while writing. Deletion of nasal sound was also found while writing. In some cases deletion of maatra (vowel sound) was also found. For example: /seb/ (Apple) was written as /səb/, /kəbutər/ as /kəbtər/ (Pigeon). Deletion of geminates was also found. For example: /bottle/ as /bolt/ and /little / as /litl/.

Addition Errors

Addition of final ‘e’:

In some cases, the learner has added a final ‘e’. For example: /four/ is written as /foure/, /flower/ is written as /flaware/. Addition of ‘e’ in English reading, like- ‘some’ is read as ‘somi’

Metathesis/Reversal errors:

This is said to be most typical of dyslexics. But except in few cases, there were very few errors of reversal. It is interesting to note that all the cases made the minimum number of reversal errors. Examples are-u/n, m/w

Lastly, the subjects were also found to be confused with the shapes like, l/r, u/n, m/w etc.

The errors observed were classified into four different types namely, Metathesis/Reversals, Substitution, Addition and deletion. These errors were observed in different skills like Reading, Writing and Spelling.

5.2 Main findings of the research

The results obtained after identifying and tabulating all the errors produced by 20 dyslexic cases, it was found that dyslexics had more number of errors as compared to non-dyslexics. Maximum number of errors produced was in Hindi Spelling as compared to all other tests. Minimum number of errors was found

in Hindi Reading. English had the maximum number of errors as compared to Hindi in all other tests.

It can be concluded as:-

- Maximum number of errors was produced in English as compared to Hindi overall.
- *English reading* had more number of errors than *Hindi reading*.
- Hindi reading had minimum number of errors overall.
- *English writing* had more number of errors than *Hindi writing*.
- *Hindi spelling* had more number of errors as compared to *English spelling*.
- Dyslexic children had more number of errors in Drawing as compared to non-dyslexics.
- Dyslexic children had more number of errors in Math as compared to non-dyslexics.

Total number of errors and correct responses with its percentage

Chart of all the errors produced by Dyslexic group

English Tests	Number of errors	%	Number of correct response	%	Number of questions not attempted	%	Number of questions attempted	Total number of questions
Reading	286	5.5%	2586	49.7%	2329	44.7%	2871	5200
Writing	208	4%	3612	69.4%	1380	26.5%	3820	5200
Spelling	507	9.7%	2185	42%	2510	48.2%	2690	5200
Hindi Tests	Number of errors		correct response					
Reading	96	2.1%	2337	51.7%	2087	46.1%	2433	4520
Writing	151	3.3%	2932	64.8%	1482	32.7%	3083	4520
Spelling	626	13.8%	2659	58.8%	1235	27.3%	3285	4520
Drawing	144	37.8%	297	78.1%	27	7.1%	354	380
Math	55	18.3%	230	77.6%	45	15%	255	300

Chart of all the errors produced by control group

English Tests	Number of errors	%	Number of correct response	%	Number of questions not attempted	%	Number of questions attempted	Total number of questions
Reading	120	2.3%	4706	90.5%	371	7.1%	4829	5200
Writing	51	0.9%	4901	94.2%	248	4.7%	4952	5200
Spelling	273	5.2%	4441	85.4%	486	9.3%	4714	5200
Hindi Tests	No.of errors	%	correct response	%				
Reading	26	0.6%	4332	95.8%	162	3.6%	4358	4520
Writing	80	2%	4153	91.8%	286	6.3%	4234	4520
Spelling	324	7.2%	3724	82.3%	472	10.4%	4048	4520
Drawing	04	1%	376	98.9%	0	0	380	380
Math	09	3%	278	92.6%	13	4.3%	287	300

The above chart represents the findings of all the errors produced by Dyslexic and non-dyslexic children. Here are some of the descriptions of the above mentioned results.

English reading

Dyslexic children had more number of errors then non-dyslexics.

- Dyslexic group had 286 errors and non-dyslexics 120 errors. The total percentage was 5.5% and 2.3%
- Number of correct responses of dyslexics was 2586 and 4706 of non-dyslexics
- Percentage of correct responses of dyslexics and non-dyslexics are 49.7% and 90.5%.
- Maximum errors were of substitution types.

Hindi reading

- Total number of errors produced by dyslexics and non-dyslexics are 96 and 26. The percentage is 2.1% and 0.5%
- Total number of correct responses by dyslexics and non-dyslexics are 2337 and 4706. Total percentage was 51.7% and 95.8%
- Maximum errors were of substitution types.
- Dyslexics had more number of errors as compared to non-dyslexics.

English writing

- Total number of errors produced by dyslexics and non-dyslexics are 208 and 51. The percentage is 4% and 0.9%
- Total number of correct responses by dyslexics and non-dyslexics are 3612 and 4901. Total percentage was 69.4% and 94.2%
- Maximum errors were of substitution types.
- Dyslexics had more number of errors as compared to non-dyslexics.

Hindi writing

- Total number of errors produced by dyslexics and non-dyslexics are 151 and 80. The percentage is 3.3% and 2%
- Total number of correct responses by dyslexics and non-dyslexics are 2932 and 4153. Total percentage was 64.8% and 91.8%
- Maximum errors were of substitution types.
- Dyslexics had more number of errors as compared to non-dyslexics.

English spelling

- Total number of errors produced by dyslexics and non-dyslexics are 507 and 273. The percentage is 9.7% and 5.2%
- Total number of correct responses by dyslexics and non-dyslexics are 2185 and 4441. Total percentage was 42% and 85.4%
- Maximum errors were of substitution types.
- Dyslexics had more number of errors as compared to non-dyslexics.

Hindi spelling

- Total number of errors produced by dyslexics and non-dyslexics are 626 and 234. The percentage is 13.8% and 7.2%

- Total number of correct responses by dyslexics and non-dyslexics are 2659 and 3724. Total percentage was 58.8% and 82.3%
- Maximum errors were of substitution types.
- Dyslexics had more number of errors as compared to non-dyslexics.

Drawing and Math tests

In both Math and drawing tests, dyslexic children had more errors than normal children.

Projections for future Investigation

The present research shows that dyslexic children had more problems in reading English than Hindi. In English the appearance of word does not show how it is articulated. A distinct phonological structure is rather difficult to formulate since English is a language of varying contrasts and features. Research and investigating of dyslexic nature are rare in India though there have been recent attempts. This probably shows that we give less importance to problems in English reading, thinking that it will be corrected after some time without actually knowing that it could be the cause of dyslexia. People cannot accept this so easily and hence leads to sometimes in complete failure in reading. As they are able to read Hindi which is their first language, there is hardly a reason to think of any deficiency. Though a number of researches are being attempted, it needs to be expanded in India especially in bilingual situations where English being the second language in Indian contexts. Though a couple of significant findings have encouraged the pattern of enquiry, it is necessary to educate the Nation about this disability that is ailing perhaps a large proportion of learners with no major intervention. Nehru (1997, New Delhi) has propounded a couple of theories concerning hypothesis to explain dyslexic reading errors which is based on distorted grapheme representation. Rama (1984, Mysore) has brought out a study attempting to diagnose and remediate dyslexia among the Kannada readers.

In most of the schools these children are invisible in the present schooling system. They need to be recognized. Children who are continuously lacking behind their peers need to be attended separately. Teachers have to be made more aware so that they can focus better on them.

The present research gives a clear distinction in the performance of the dyslexics and the normal children. Dyslexic children are continuously lacking behind their peers in almost all the language learning skills.

There is a vital role of the orthography of the language concerned to assess the intensity in word recognition of the language. Phonics refers to the sound-letter association. It begins with an understanding that each letter of the English alphabet stands for one or more sounds. Phonemic awareness refers to the ability to hear and differentiate between the various grapheme-phoneme structures. The structure of the language under consideration plays a major part in the recognition and processing aspect. Unlike English, where there can be a lot of spelling rules including magic 'e' rules, silent letters, soft 'c's and 'g's, hard 'c's and 'g's etc., which can create additional confusion for the reader, Hindi has on the other hand a very distinct pattern of grapheme-phoneme structure. Most word constructions in Hindi language are pronounced in a consistent manner. Dyslexics who speak and read English have problems because the appearance of a word does not necessarily tell how it is pronounced, for example 'but' and 'put' are not pronounced the same way.

Individuals with deficits in phonemic awareness are likely to have poor decoding accuracy. An individual with a phonological awareness deficit often has trouble associating a grapheme with its phoneme. While this could be true of the English reader, the parallel cannot be drawn on a similar pattern in Hindi language. The phoneme /k/ for instance would not be the same in the words *kite* and *knight* (where /k/ is silent). On the other hand, in Hindi language phoneme /m/ would always sound the same in any situation. Hindi has a nearly absolute one-to-one grapheme-phoneme consistency.

Finally, many of the dyslexic learners with word recognition disabilities consequently have problem in their phonological awareness and orthographic knowledge, knowledge of grapheme-phoneme correspondences in the alphabetic principle, and application to phonological decoding.

APPENDIX I

ERRORS PRODUCED BY DYSLEXICS

CLASSIFICATION OF ERRORS

After identifying and tabulating the errors produced by 20 dyslexic children in both Hindi and English tests, further classification of the errors was done into *five categories*.

After classifying and tabulating the errors as

- 1) Phonetic vs. phonological reading errors and
- 2) Graphic vs graphological writing errors.

Each of these types of errors was further classified as errors of

- 1. Substitution**
- 2. Addition**
- 3. Deletion**
- 4. Metathesis and reversal**
- 5. Others**

The inventory of errors thus obtained is analyzed to understand the basic differences in learning Hindi and English by Bilingual dyslexics. Based on the detailed comparison of the errors in Hindi and English it will be possible to explain the following:

- whether the errors are more or less in *transparent alphasyllabic scripts* or *opaque alphabetic scripts*,
- whether there are more or less errors in *regular or irregular* forms of the two languages,
- Whether the errors will be more or less in native language, Hindi or second language, English.

- What kind of errors are more in Hindi and what kind of errors are more in English, and why?

CASE STUDY - 3

Name : DM
 Age : 7 Years
 Mother Tongue : Hindi

1. Total number of errors produced in copying English word list, Poem and paragraph = 18+10 =28 errors

1) Number of Substitution = 20 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	Black	Block	a/o
2.	Ball	Boll	a/o
3.	Lotus	totus	L/t
4.	flower	flouer	w/u
5.	correct	correch	t/h
6.	know	enow	k/e
7.	mouth	maith	ou/ai
8.	leg	ley	g/y
9.	Elephant	Elephand	t/d
10.	Own	oun	w/u
11.	Two	Twe	o/e
12.	Seven	Siven	e/i
13.	Eight	Eighe	t/e
14.	look	loot	k/t
15.	Tony	Tonk	y/k
16.	Jerry	Lerry	J/L
17.	back	bock	a/o
18.	reaching	reoching	a/o
19.	too	tou	o/u
20.	Bad	Bod	a/o

2) Number of Deletion – 5 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	little	litle	t
2.	stole	sole	t
3.	scared	suared	c
4.	different	diff	erent
5.	everyone	everone	y

3) Number of Addition = 1errors

S. No.	Word List	Addition	Phoneme Addition
1.	skip	sikip	i

4) Number of Metathesis = 1error

S. No.	Word List	Metathesis	Phoneme reversal
1.	square	spuare	q/p

2. Total number of errors produced in Dictation of English word list = 42 errors

1) Number of Substitutions = 22 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	Milk	nilk	m/n
2.	sugar	shogr	s/sh, u/o
3.	Table	tade	b/d
4.	chair	chear	ai/ea
5.	white	with	wh/w
6.	Violet	wilte	v/w
7.	Orange	orinch	a/i, ge/ch
8.	Bronze	broveins	z/s
9.	stair	ster	ai/e
10.	laugh	laf	ugh/f
11.	fair	fear	ai/ea
12.	some	sum	homophones
13.	saw	sio	aw/io
14.	was	wos	a/o
15.	leaf	livef	ea/ive
16.	branch	bronch	a/o
17.	right	rite	homophees
18.	Read	Road	ea/oa
19.	correct	crit	e/i
20.	ear	year	homophones
21.	leaf	livef	ea/ive

2) Number of Deletion = 24 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	Coffee	Cofe	f, e
2.	sugar	shogr	u/a
3.	Table	tode	l
4.	Yellow	yolle	w
5.	white	with	e
6.	violet	wilte	o
7.	Golden	Glben	o
8.	silver	slver	i
9.	stair	ster	i
10.	bottle	btl	l,e
11.	little	littl	e
12.	shirt	shit	r
13.	Dress	deres	s
14.	shine	shin	e
15.	greed	gead	r
16.	rose	ros	e
17.	lily	lil	y
18.	lotus	lots	u
19.	right	rite	gh

S. No.	Word List	Deletion	Phoneme deletion
20.	correct	crit	or,c
21.	wrong	rong	w
22.	night	nite	gh
23.	eyes	ies	ey
24.	nose	nos	e

3) Number of Addition = 9 errors

S. No.	Word List	Addition	Phoneme Addition
1.	Blue	bluea	a
2.	Brown	Browin	i
3.	Bronze	Broveins	vei
4.	skip	sikip	i
5.	pet	peat	a
6.	see	seea	a
7.	far	fear	e
8.	dress	deres	e
9.	leaf	livef	v

4) Number of Metathesis/Reversal=2

S. No.	Word List	Metathesis	Phoneme Interchangd
1.	Yellow	yolle	e/o, oe
2.	Golden	Giben	d/b

5) Total number of errors produced in copying Hindi word list = 11

1) Number of Substitution = 5 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	हँसना	हरना	हँ/हस/र
2.	कूटना	कुटना	्/ु
3.	खेलता	खोलता	/ो
4.	चोरी	चोर	री/र
5.	कुत्ता	कूत्ता	कु/कू

2) Number of Deletion = 3 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	गाड़ी	गड़ी	।
2.	अनारस	अनरस	।
3.	चोरी	चोर	े

3) Number of Addition = 1error

S. No.	Word List	Addition	Phoneme Addition
1.	दौड़ना	दौड़ाना	।

4) Number of Metathesis/Reversal = 1error

S. No.	Word List	Metathesis	Phoneme reversal
1.	चल	जल	च/ज

5) Total number of errors produced in Hindi Dictation of word list = 17 errors

1) Number of Substitution = 10 errors

S. No.	Word List	Substitution	Phoneme substitution
I)	फूल	फुल	, / ु
II)	बिल्ली	बबिली	ल/ब
III)	कबूतर	कबुतर	, / ु
IV)	चिड़िया	चीड़ीआ	िि, या/आ
1.	खरगोश	खरगेश	ो / े
2.	जूता	जुता	, / ु
3.	मेज	मेझ	ज/झ
4.	दौड़ना	दोठना	ड़/ठ
5.	पूछना	पुछना	, / ङ
6.	पढ़ना	पड़ना	ढ़/ड़

2) Number of Deletion = 6 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	कुर्सी	कुसी	
2.	मजदूर	मदूर	ज
3.	गुब्बारा	गुबारा	ब
4.	रस्सी	रसी	स्
5.	हँसना	हसना	.
6.	पकाना	पकना	ा

3) Number of Addition = 0

4) Number of Metathesis/Reversal = 2 errors

S. No.	Word List	Metathesis	Phoneme interchanged
1.	कुर्सी	कूसी	, / ू
2.	कुत्ता	कूता	, / ू

3. Total number of errors produced in Reading Test of Hindi word list = 8 errors

1) Number of Substitution = 5 errors

S. No.	Word List	Substitution	Phoneme substitution
4.	लिखना	खेलना	लि/खे, ख/ल
5.	गाड़ी	गुड़िया/गाड़ी	गा/गु
6.	सेब	सोब, सेब	से/सो
7.	सच	सोच/सच	स/सो
8.	जल	गल	ज/ग

2) Number of Deletion = 2 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	कुत्ता	कुता	त्
2.	साधू	सधू	ा

3) Number of Addition = 1 error

S. No.	Word List	Deletion	Phoneme deletion
1.	चलना	चलाना	ɪ

4) Number of Metathesis = 0

VI) Total number of errors produced in Reading English word list = 56 errors

1) Number of Substitution = 32 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	Sugar	singi	u/n
2.	mouth	mauth	ou/au
3.	stair	sɪar	ea/a
4.	skip	skai	ip/ai
5.	Wash	vaysh	ɔ/ay
6.	laugh	long	a/ɔ, f/g
7.	pot	puɪ	ɔ/u
8.	pet	piɪ/pet	ɛ/i
9.	Bottle	biɪtel	ɔ/i
10.	Good	gɔd	u/ɔ
11.	fair	fa:ɪə	e/a
12.	far	fa:ɪ	a/a:ɪ
13.	Pin	pen	i/e
14.	Shine	shin	a:ɪn/in
15.	saw	sai	ɔ/ai
16.	leaf	laf	i/a
17.	Root	roɪ	u/o
18.	Write	riɪ	ai/ɪ
19.	Read	red	i/e
20.	correct	soreɪ	k/s
21.	Eye	i	ai/i
22.	Ear	ɛ	iə/ɛ
23.	Aeroplane	a:yɔr	e/a:
24.	leg	len	g/n
25.	circle	sirkal	ə/i
26.	own	ɔn	o/ɔ
27.	Eight	ɪnɪt	e/ɪ
28.	wash	wɛɪ	a/e
29.	listen	lɪtl	
30.	hear	hai	a/ai
31.	light	lit	aɪ/I
32.	Heavy	high	e/ai
33.			

2) Number of Deletion = 12 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	violet	vaiɪ	o/e
2.	cry	kai	r
3.	little	liɪ	l
4.	Dress	dese	r
5.	lily	lie	li

S. No.	Word List	Deletion	Phoneme deletion
6.	Lotus	los	tə
7.	Eye	i	a
8.	Ear	e	a
9.	Aeroplane	ayer	e/a
10.	Subtraction	sabtanto	r,tion
11.	light	lit	ai/I
12.	Branch	Berec	n

3) Number of Addition = 7 errors

S. No.	Word List	Addition	Phoneme Addition
1.	Chair	cha:ər	a
2.	some	sɒmi	i
3.	Right	regɪd	g
4.	wrong	vɹɒŋ	v
5.	air	ayr	a
6.	hand	hendvi	vi
7.	music	mausrin	a, rin

4) Number of Metathesis / Reversal = 1 error

S. No.	Word List	Metathesis reversal	Phoneme interchanged
1.	candle	klinde	l

5) Number of other = 2 errors

S. No.	Word List	Other	
1.	rectangle	Ronky	
2.	Zig-zag	zebra	

CASE STUDY -4

Name : GK
 Age : 8 years old, Female, Dyslexic
 Languages known : Punjabi, Hindi and English

I) Total Number of errors produced in Copying English word list = 18 errors

1.1) Number of Substitution = 11 errors

S. No.	Word List	Substitution	Phoneme Substituted
1.	Red	Rad	e/a
2.	Yellow	Yellow	o/a
3.	Brown	Brawn	o/a
4.	Orange	Orenge	a/e
5.	Son	San	o/a
6.	Month	Manth	o/a
7.	Skip	Stip	k/t
8.	Dress	Drass	e/a
9.	Great	Great	e/a
10.	Rectangle	rectanalc	g/a, e/c
11.	Donkey	Dankey	o/a

1.2) Number of Deletion = 1 error

S. No.	Word List	Deletion	Phoneme Deleted
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1.	Multiply	mutiply	1
----	----------	---------	---

1.3) Number of Addition = 0 error

1.4) Number of Metathesis/reversal = 1 error

S. No.	Word List	Metathesis	Phoneme interchanged or reversed
1.	Square	Spuare	q/p

1.5) Total number of errors produced in Copying English poem = 5 errors

1.6) Number of Substitution=1 error

S. No.	Word List	Substitution	Phoneme Substituted
1.	a small	asmall	l

1.7) Number of Deletion = 3 errors

S. No.	Word List	Deletion	Phoneme Deleted
1.	the big ball	whole phrase deleted	
2.	Who stole --- ball	whole phrase deleted	
3.	the small box	whole phrase deleted	

1.8) Number of Addition = 1 error

S. No.	Word List	Addition	Phoneme added
1.	Tony	added	

II) Total number of errors produced in English dictation word list = 28 errors

2.1) Number of Substitution = 15 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	Red	Rad	e/a
2.	Bronze	Bones	z/s
3.	Month	mane	o/a
4.	Stair	care	st/c
5.	Wash	Eosh	W/E
6.	Love	Eove	l/E
7.	Pot	Pen	ot/en
8.	Bottle	Boat	ottle/oat
9.	Pin	Ein	P/E
10.	Bat	Bale	t/le
11.	Pant	Pent	a/e
12.	Greed	Gart	reed/art
13.	Shoes	she	oes/e
14.	Lotus	latr	us/r
15.	paint	pin	aint/in

2.2) Number of Deletion = 6 errors

S. No.	Word List	Deletion	Phoneme Deleted
1.	Tea	te	a
2.	Table	tabl	e
3.	Color	Rar	co
4.	Green	Rin	G
5.	Black	Balk	c
6.	Month	mane	th

2.3) Number of Addition = 0

2.4) Number of Metathesis – 3

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	Star	Sart	t,r
2.	Black	Balk	l,a
3.	Greed	Gart	ree/ar

III) Total number of errors produced in Copying Hindi word list = 3 errors

3.1) Number of Substitution = 2 error

S. No.	Word List	Substitution	Phoneme Substitution
1.	गोभी	गेभी	गो/गे
2.	बाजा	बाना	जा/ना

3.2) Number of Deletion = 0 error

3.3) Number of Addition - 1

S. No.	Word List	Addition	Phoneme Addition
1.	पढ़ना	पढ़न्ना	=

3.4) Number of Metathesis = 0 error

IV) Total number of errors produced in Dictation of Hindi word list = 49 errors

4.1) Number of Substitution = 29 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	कागज	काकस	ग/क ज/स
2.	कबूतर	कबुतर	, / ु
3.	खरगोश	खरगेश	गो/गे
4.	बैठना	बौठना	
5.	दौड़ना	डोड़ना	दौ/डो
6.	पकड़ना	पकलना	ड़/ल
7.	समझना	समजाना	झ/जा
8.	धोना	डोनह	ध/ड
9.	पूछना	पुछवा	, / ु, ना/वा
10.	कूटना	कुटना	, / ु
11.	बहन	भहेन	ब/भ, ह/हे
12.	गाड़ी	गड़ी	गा/ग
13.	दिन	दीन	दि/दी
14.	दोपहर	दबहार	दो/द, प/ब, ह/हा
15.	पतला	पटला	त/ट
16.	झूठ	ठोट	
17.	तरबूज	टरबुज	त/ट, बू / बु
18.	बकरी	बकड़ी	री/ड़ी
19.	कछुआ	खछुआ	क/ख
20.	अलग	अलक	ग/क
21.	लिखना	लीखना	लि/ली

S. No.	Word List	Substitution	Phoneme Substitution
22.	जोड़ना	जोरना	ड़/र
23.	सुखाना	सुखना	खा/ख
24.	सफेद	सफल	फे/फ, द/ल
25.	नदी	नड़ी	दी/ड़ी
26.	पिता	पीता	पि/पी
27.	साधू	साऊर	धू/ऊ
28.	आम	माम	आ/मा
29.	छोड़ना	चोड़ना	छो/चो

4.2) Number of Deletion = 13 errors

S. No.	Word List	Deletion	Phoneme Deleted
1.	कुर्सी	कुसी	
2.	जंगल	जगल	
3.	कुत्ता	कुता	त्
4.	मजदूर	मजुर	दू
5.	गुब्बारा	गुबारा	ब्
6.	रस्सी	रसी	स्
7.	गेंद	गेद	
8.	दोस्त	दोस	त्
9.	गाय	गय	ा
10.	आँख	आख	
11.	अनार	आर	ना
12.	अनारस	आरस	ना
13.	हँसना	हसना	

4.3) Number of Addition = 6 errors

S. No.	Word List	Addition	Phoneme Addition
1.	घड़ा	धाड़ा	ा
2.	लम्बा	लमला	म
3.	उतारना	उताराना	ा
4.	जहाज	जहाजा	ा
5.	साधू	साऊर	र
6.	धाना	डोनह	ह

4.4) Number of Metathesis = 3 errors

S. No.	Word List	Metathesis	Phoneme Interchanged/Reversed
1.	फूल	फलू	

2.	लालची	लाजली	
3.	हरा	हार	

CASE STUDY – 5

Name : DV
Age : 9 years, Male
Languages Known : Hindi and English
I) Total number of Errors produced in Copying English word list = 6 errors
1.1) Number of substitution = 3 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	Pink	Bink	P/B
2.	Some	sone	m/n
3.	Know	knou	w/u

2) Number of Deletion = 2 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	silver	siler	v
2.	Give	Giv	e

3) Number of Addition = 0

4) Number of Metathesis – 1

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	Two	Tow	wo/ow

English Dictation

II) Total number of errors produced in Dictation of English word list = 63+18+24 = 105 errors

1) Number of Substitution in word list + Poem + Paragraph 25+9+9 = 43 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	Brush	Bes	
2.	Paint	pat	
3.	Violet	well	
4.	Silver	cever	
5.	some	sum	
6.	Lily	lile	
7.	Flower	flovrr	
8.	Write	Rit	
9.	Correct	crat	
10.	Eye	Is	
11.	Mouth	moth	
12.	Teeth	thi	
13.	Face	fas	
14.	Monkey	monck	
15.	Donkey	Donc	
16.	Own	on	
17.	ten	tan	
18.	sum	son	

S. No.	Word List	Substitution	Phoneme Substitution
19.	Multiply	melfpply	t reversal f
20.	Subtraction	suotrsn	
21.	Divide	Devd	
22.	Give	Gtd	
23.	Drink	Drc	
24.	Music	Muzsq	
25.	Heavy	Hv	

1.1) Number of substitution in poem = 9 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	Got	crot	g/cr
2.	full	fal	u/a
3.	wax	vax	w/v
4.	stuck	stac	u/a
5.	scared	skared	c/k
6.	Jerry	Jere	y/e
7.	and	acd	n/c
8.	took	toc	k/c
9.	back	bac	k/c

1.2) Number of Substitution in Paragraph = 9 substitution

S. No.	Word List	Substitution	Phoneme Substitution
1.	Serving	sirving	
2.	Men	nen	
3.	work	wroc	
4.	earn	onrn	e/o
5.	all	ol	a/o
6.	their	there	
7.	without	wethout	i/e
8.	method	mathd	e/a
9.	worshipping	worshshipink	g/k

English Dictation

2) Number of Deletion in word list + Poem+ Paragraph 54+10+16 = 80

Number of Deletion in Word list = 54

S. No.	Word List	Deletion	Phoneme deletion
1.	Coffee	coff	ee
2.	Sugar	sgar	u
3.	Brush	bes	r
4.	paint	pat	in
5.	Violet	welt	io
6.	Orange	orager	n
7.	Golden	goden	l
8.	silver	cever	l
9.	Bronze	brog	n/e
10.	month	mnt	o/h
11.	Skip	skp	i
12.	see	se	e

13.	laugh	lf	augh
14.	Bottle	botl	t, e
15.	shirt	sht	ir
16.	pant	pnt	a
17.	dress	des	r/s
18.	shoes	shoe	s
19.	shine	sin	h,e
20.	saw	so	w
21.	great	grat	e
22.	greed	grd	ee
23.	Rose	roos	e
24.	Lotus	lots	u
25.	Flower	flovrr	e
26.	leaf	lef	a
27.	root	rot	o
28.	write	rit	w,e
29.	correct	crat	or, c
30.	night	nit	gh
31.	Eye	is	eye
32.	Mouth	moth	u
33.	teeth	thi	ee
34.	face	fas	ce
35.	Hair	har	i
36.	monkey	monck	ey
37.	Donkey	donc	ey
38.	Rectangle	rectagle	n
39.	Zig-zag	zg-zg	i,a
40.	Zero	zro	e
41.	own	on	w
42.	Addition	Adsn	ditio
43.	Subtraction	suotrsn	b,tion
44.	Multiply	meltpply	i
45.	Divide	devd	i,e,
46.	Give	gtd	ive
47.	Take	tak	e
48.	sleep	slep	e
49.	listen	lisn	te
50.	hear	ha	e,r
51.	Heavy	hv	
52.	candle	codle	n
53.	Drink	drc	
54.	light	lit	gh

2.1) Number of Deletion in poem = 10 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	Jerry	Jre	e,r,y
2.	stole	ste	ol

3.	full	fal	l
4.	Tony's	tony	'
5.	Stole	stol	e
6.	Brought	brt	ough
7.	back	bac	k
8.	became	bkm	eca, e
9.	good	god	o
10.	friend	frien	d

2.2) Number of Deletion in paragraph = 16 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	different	diffret	e,n
2.	reaching	reching	a
3.	said	sad	i
4.	wants	want	s
5.	everyone	verone	y
6.	bread	brrd	ea
7.	does	des	o
8.	spend	spd	en
9.	all	al	l
10.	time	tim	e
11.	chanting	chtin	an, g
12.	Thing	thig	n
13.	ones	ons	n
14.	duty	dut	y
15.	method	mathd	o
16.	worshiping	worshshipink	g

3) Number of Addition in word list + poem + paragraph = 3+0+4 = 7errors

Number of Addition in word list = 03

S. No.	Word List	Addition	Phoneme addition
1.	Orange	orager	r
2.	Love	Leveve	ve
3.	Rose	roos	o

3.1) Number of Addition in Poem – 0

3.2) Number of Addition in Paragraph – 4

S. No.	Word List	Addition	Phoneme addition
1.	Great	Great	e
2.	Bread	brrd	r
3.	earn	earn	a
4.	worshipping	worshshipink	sh

4) Number of Metathesis = 2+0+1

S. No.	Word List	Metathesis	Phoneme interchanged
1.	Cross	cors	r
2.	two	tow	w

1 Reversal

S. No.	Word List	Metathesis	Phoneme Reversal
1.	Multiply	Meltpply	t /f

4.1) Number of Metathesis in Paragraph = 1

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	Work	wroc	r

III) Total number of errors produced in Reading English word list + poem + Paragraph = 30+5+13 = 48

1. Number of Substitution = 17+3+8 = 28

Number of Substitution in Word list = 17

S. No.	Word List	Substitution(transcription)	Phoneme Substitution
1.	tea	te	i/e
2.	Fun	fUn	ə/U
3.	cry	say	k/s
4.	Cross	sɔs	k/s
5.	Own	evən	o/e
6.	Multiply	ple	ai/e
7.	give	give	ə/e
8.	eat	eɪ	i/e
9.	Hear	hier	ə/e
10.	pant	penɪ	ɛ/e
11.	Dress	dʁus	ɛ/u
12.	some	sUm	ə/U
13.	write	vraɪ	r/v
14.	Correct	sorrekt	k/s
15.	Night	nɪɪ	ai/ij
16.	Hand	hend	ɛ/e
17.	know	nao	o/ao

1.1) Total number of Substitution in Poem = 3 errors

S. No.	Word List	Substitution(transcription)	Phoneme substitution
1.	Stuck	sɪUk	ə/U
2.	asked	skɪd	ə/I
3.	brought	bouɪ	ɔ/ou

1.2) Number of substitution in paragraph =4 errors

S. No.	Word List	Substitution	Phoneme addition
1.	Reaching	reɪɪŋ	i/e
2.	Great	grɪɪ	e/I
3.	said	sɪd	ɛ/I
4.	earn	iər	ə/iə
5.	does	doz	ə/o
6.	all	oll	ɔ/o
7.	anything	enɪɪŋ	th/t

8. Total Number of Deletion in Reading = 7+3+6 = 16 errors

Number of Deletion in Reading word list = 7 errors

S. No.	Word List	Deletion	Phoneme deleted
1.	Cry	say	r

S. No.	Word List	Deletion	Phoneme deleted
2.	cross	so s s	r
3.	Multiply	pl y	məlɪ
4.	light	li t	a
5.	fair	fi r	e
6.	shoes	ʃu s	z
7.	wrong	w r ong	r

2.1) Number of Deletion in poem = 3 errors

S. No.	Word List	Deletion	Phoneme deleted
1.	asked	sk i d	a
2.	brought	b r oʊt	r
3.	black	b l æk	l

2.2) Number of Deletion in paragraph = 6 errors

S. No.	Word List	Deletion	Phoneme Deletion
1.	Everyone	eri u ən	v
2.	earn	i a r	n
3.	spend	s e nd	p
4.	chanting	cu n t	ɪŋ
5.	anything	eni- t ing	th
6.	one's	o n e	's

7. Total number of Addition produced in Reading=0

8. Total number of Metathesis produced in Reading English word list, poem and paragraph=2+0+2=4

S. No.	Word List	Metathesis	Phoneme interchanged
1.	Eat	a t e	ea
2.	saw	wa s	sa
3.	does	do s e	es
4.	duty	bu t i	d/b

IV) Total number of errors produced in Copying Hindi word list + days and Months + sentences = 14+3+7 = 24 errors

1) Number of Substitution = 12+2+1 = 15

Number of Substitution in word list = 12 errors

S. No.	Word List	Substitution	Phoneme Substituted
1.	खरगोश	खरगोवू	श/वू
2.	कपड़ा	कमड़ा	प/म
3.	छोड़ना	धोड़ना	छ/ध
4.	पीना	जीना	प/ज
5.	सोचना	सोजना	च/ज
6.	पूछना	पूछका	न/क
7.	पढ़ना	पदना	ढ़/द
8.	पौधा	पौड	धा/ड
9.	अनार	अआर	ना/आ
10.	रोटी	रोदी	ट/द

S. No.	Word List	Substitution	Phoneme Substituted
11.	रात	राम	त/म
12.	तबला	तबता	ल/त
13.	मार्च	माची	र्च/ची
14.	इतवार	डतवार	इ/ड
15.	मैंने	मेने	मैं/मे

2) Number of Deletion = 2+0+4 = 6 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	कुर्सी	कुसी	
2.	पानी	पनी	।
3.	खेलता	खलत	, ।
4.	कुत्ता	कुता	त्
5.	हैं	है	.
6.	मैंने	मैने	.

3) Number of Addition – 0+1+1 = 2 errors

S. No.	Word List	Addition	Phoneme Addition
1.	अक्तूबर	अकतूबर	क
2.	पहने	पहेने	

4) Number of Metathesis/Reversal=2 errors

S. No.	Word List	Metathesis/ Reversal	Phoneme Interchanged
1.	सोचना	सोजना	च/ज
2.	कलम	कमल	लम/मल

V) Total number of errors produced in Hindi Dictation = 50+14+23 = 87 errors

1) Number of Substitution = 33+7+12 = 52 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	कबूतर	कबुतर	, / ु
2.	खरगोश	खरगेश	गो/गे
3.	जूता	जुता	, / ु
4.	घड़ा	गड़ा	घ/ग
5.	घोड़ा	मोड़ा	घ/म
6.	दौड़ना	दोड़ना	दौ/दो
7.	हंसना	हसना	हं/ह
8.	छोड़ना	छेड़ना	छो/छे
9.	समझना	समजना	झ/ज
10.	खाना	खामा	ना/मा
11.	पीना	पिना	पी/पि

S. No.	Word List	Substitution	Phoneme Substitution
12.	पूछना	पुचना	छ/च
13.	पकाना	पकाबा	ना/बा
14.	पीसना	पिसना	पी/पि
15.	कूटना	रुटन	कू/रुए ना/न
16.	पढ़ना	पड़ना	ढ़/ड़
17.	सीखना	सिखन	सी/सि ना/न
18.	पहनना	पेहन	प/पे
19.	पीला	पिला	पी/पि
20.	नीला	निला	नी/नि
21.	भूरा	बूरा	भू/बू
22.	नाव	नाओ	व/ओ
23.	गधा	गदा	धा/दा
24.	साधू	सादू	धू/दू
25.	आँख	आम	आँ/आ, ख/म
26.	गोभी	गौब	गो/गौ
27.	भाई	बाई	भा/बा
28.	लोहा	लोआ	हा/आ
29.	छोटा	छेटा	छो/छे
30.	झूठ	झीठ	झू/झी
31.	तरबूज	तरबूस	ज/स
32.	लालची	लालचि	ची/चि
33.	कछुआ	पचुआ	क/प, छु/चु

Days and Months = 7 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	अप्रैल	अपरेल	प्रै/परे
2.	जून	जुन	जू/जु
3.	अक्टूबर	अटऔबर	क्तू/टऔ
4.	नवम्बर	नवमबर	म/म
5.	बुद्धवार	मुदवार	बु/मु/द्ध/द
6.	गुरुवार	गुरुवार	रू/रु
7.	शनिवार	शनीवार	श/श,नि/नी

Sentence = 12 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	नही	नहे	ही/हे
2.	मेरे	मैरे	मे/मै

S. No.	Word List	Substitution	Phoneme substitution
3.	जूते	जुते	जू/जु
4.	चोरी	चरई	चो/च, री/रई
5.	मुझे	मुजे	झ/ज
6.	स्कूल	सकल	स/स, कू/क
7.	पढ़ना	पड़ना	ढ़/ड
8.	उसने	उसन	उ/उु
9.	पसंद	परद	स/र
10.	पैसे	पेसे	पै/पे
11.	कुत्ता	कोता	कु/को, त/ता
12.	रोटी	रोटि	टी/टि

2) Number of Deletion = 17+6+6 = 29 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	बिल्ली	बीलि	ल
2.	कुत्ता	कुता	त
3.	मजदूर	मदुर	ज
4.	गुब्बारा	गुबारा	ब
5.	रस्सी	रसी	रु
6.	उठाना	उठान	ा
7.	हँसना	हसना	.
8.	नहाना	नाहनाना	ा
9.	बताना	बतना	ा
10.	सीखना	सिखन	ा
11.	पहनना	पेहन	ना
12.	उतारना	उतारन	ा
13.	सुखाना	सुखना	ा
14.	अमरूद	अमरद	.
15.	आँख	आम	.
16.	लम्बा	लबा	म्
17.	दोस्त	दोत	रु

Days and Months = 6 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	मार्च	माँच	
2.	अगस्त	अत	गरु
3.	सितम्बर	सीतबर	म्

S. No.	Word List	Deletion	Phoneme deletion
4.	दिसम्बर	दीसबर	ः
5.	सोमवार	सोवार	म
6.	मंगलवार	मगवार	, ल

Sentences – 6 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	किताब	कितब	।
2.	भाग	भग	।
3.	गुलाब	गलाब	,
4.	पसंद	परद	,
5.	दिए	दए	ि
6.	कुत्ता	कोता	त्

3) Number of Addition=1 error

S.No.	Word List	Addition	Phoneme Addition
1.	मार्च	माँच	,
2.	पतला	पलतता	ता

4) Number of Metathesis = 1+0+0 = 1

S. No.	Word List	Metathesis	Phoneme Interchanged
	पतला	पलतता	तला

CASE STUDY – 6

Name : AD
 Age : 9 years, Male
 Languages Known : Hindi and English

I) Total errors produced in Copying English word list = 5 errors

1) Number of Substitution = 4 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	Silver	selver	i/e
2.	correct	corriect	e/i
3.	Face	face	e/c
4.	sum	sun	m/n

2) Number of Deletion = 0

3) Number of Addition = 1

S. No.	Word List	Addition	Phoneme addition
1.	two	towo	o

4) Number of Metathesis = 0

II) Total number of errors produced in Copying Hindi word list = 8 errors

1) Number of Substitution = 5 errors

S. No.	Word List	Substitution	Phoneme substitution
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S. No.	Word List	Substitution	Phoneme substitution
1.	कबूतर	कवूतर	ब/व
2.	घड़ा	घडा	ड़/ड
3.	घोड़ा	घोडा	ड़/ड
4.	बैठना	बौठना	बै/बौ
5.	दौड़ना	दैडना	दौ/दै, ड़/ड

2) Number of Deletion – 3

S. No.	Word List	Deletion	Phoneme deletion
1.	कुर्सी	कुसी	
2.	जंगल	जगल	
3.	बिल्ली	बिल्ल	ी

3) Number of Addition = 0

4) Number of Metathesis = 0

III) Total number of errors produced in English Dictation of word list = 15 errors

1) Number of Substitution = 8 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	star	ster	a/e
2.	cry	kry	c/k
3.	laugh	laf	augh/f
4.	bat	bot	a/o
5.	saw	so	aw/o
6.	was	wos	a/o
7.	leaf	lif	ea/i
8.	branch	bronch	a/o

2) Number of Deletion = 7 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	Bottle	bott	t,e
2.	Little	litl	t, e
3.	Shirt	shit	r
4.	Dress	deres	s
5.	Rose	ros	e
6.	Lily	lil	y
7.	Lotus	lots	u

3) Number of Addition = 1 error

S. No.	Word List	Addition	Phoneme addition
1.	Dress	deres	e

4) Number of Metathesis = 0

IV) Total number of errors produced in Hindi Dictation of word list = 10 errors

1) Number of Substitution = 8 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	गोभी	गोबी	भी/ब
2.	रानी	रानि	े/ि
3.	बहन	वहन	ब/व
4.	गाड़ी	गाढ़ी	ड़/ढ
5.	रोटी	रोटि	े/ि
6.	कछुआ	कछुहा	आ/हा
7.	पपीता	पपिता	े/ि
8.	पूछना	पचधना	छ/च

2) Number of Deletion = 2 errors

S. No.	Word List	Deletion	Phoneme Deletion
1.	लालची	लाची	ल
2.	तरबूज	तबुज	र, ू

3) Number of Addition = 1 error

S. No.	Word List	Addition	Phoneme added
1.	पूछना	पूचधना	ध

V) Total number of errors produced in Reading English word list = 10 errors

1) Number of Substitution = 9 errors

S. No.	Word List	Addition(Transcription)	Phoneme addition
1.	Stair	st̩ar	ea/a
2.	Laugh	lɔŋg	af/ɔŋg
3.	good	gɔd̩	u/ɔ
4.	shirt	shit	ə/i
5.	saw	sai	ɔ/ai
6.	leaf	laf	i/a
7.	read	red	i/e
8.	air	a:yər	e/a:
9.	some	somi	ə/o

2) Number of Deletion = 1 error

S. No.	Word List	Deletion(Transcription)	Phoneme deletion
1.	cry	kai	r

3) Number of Addition = 1 error

S. No.	Word List	Addition(Transcription)	Phoneme addition
1.	some	somi	i

4) Number of Metathesis = 0

VI) Total number of errors produced in Reading Hindi word list = 7 errors

1) Number of Substitution = 4 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	गेंद	गेट	गें/गेए द/ट
2.	दोस्त	दोरत	स/र
3.	गाय	गया	गा/ग, य/या
4.	बाजा	बजार	बा/ब

2) Number of Deletion = 1 error

S. No.	Word List	Deletion	Phoneme deletion
1.	सेब	सब	

3) Number of Addition = 3 errors

S. No.	Word List	Addition	Phoneme added
1.	बाजा	बजार	र
2.	बकरी	बकारी	।
3.	कछुआ	कुछुआ	,

4) Number of Metathesis = 0

CASE STUDY – 7

Name : TN
 Age : 9 years, Male
 Mother Tongue : Hindi

I) Number of errors produced in copying English word list = 21 errors

1) Number of Substitution -17 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	Pink	kink	p/k
2.	Black	Blach	k/h
3.	Wash	Wask	h/k
4.	Shirt	Shiet	r/e
5.	Great	Gread	t/d
6.	Lotus	Latus	o/a
7.	Wrong	Wrang	o/a
8.	Monkey	Monbey	k/b
9.	Donkey	Donbey	k/b
10.	Sum	Sun	m/n
11.	Music	Misic	u/i
12.	stole	stale	o/a
13.	one	ane	o/a
14.	name	nane	m/n
15.	his	hen	s/n
16.	great	creat	g/c

2) **Number of Deletion = 2 errors**

S. No.	Word List	Deletion	Phoneme deleted
1.	wants	want	s
2.	without	witout	h

3) **Number of Addition = 2 errors**

S. No.	Word List	Addition	Phoneme addition
1.	Elephant	Eleppant	p
2.	God	Good	o

4) **Number of Metathesis – 1error**

S. No.	Word List	Metathesis	Phoneme Reversal
1.	Dad	Bad	D/B

II) **Total number of errors produced in English Dictation of word list –
66+18+28=112 errors**

1) **Number of Substitution = 73 errors**

S. No.	Word List	Substitution	Phoneme substitution
1.	Sky	Skia	y/ia
2.	Brush	Brash	u/a
3.	Violet	Wilet	v/w
4.	Brown	Brun	w/u
5.	Black	Blek	ac/e
6.	Orange	Orenj	ge/j
7.	Silver	Selver	i/e
8.	Bronze	Brons	ze/s
9.	Month	Manth	o/a
10.	stair	staer	i/e
11.	skip	skeep	i/ee
12.	wash	wosh	a/o
13.	cry	cri	y/i
14.	laugh	laf	ugh/f
15.	Dad	ded	a/e
16.	Little	leter	
17.	Bad	bed	a/e
18.	Fair	faer	i/e
19.	Shirt	shrat	ir/ra
20.	Shoes	show	es/w
21.	Saw	so	aw/o
22.	Great	grat	ea/a
23.	Greed	gred	ee/e
24.	Lily	lele	i/e, y/e
25.	Lotus	lotes	u/e
26.	Write	riting	
27.	Read	reed	a/e
28.	Correct	krent	c/k
29.	Eye	Iey	E/I
30.	face	fase	c/s

S. No.	Word List	Substitution	Phoneme substitution
31.	Hair	Haer	i/e
32.	Hand	hend	a/e
33.	Elephant	elephent	a/e
34.	Cross	krose	c/k
35.	Circle	sclur	c/s
36.	Rectangle	rekentgle	c/k
37.	Zig-zag	zebkk	i/e, g/b
38.	Own	on	
39.	Four	fore	ur/re
40.	Multiply	melepia	u/e
41.	Divide	devid	i/e
42.	Drink	drne	k/c
43.	Heavy	heve	ea/e, y/e
44.	Jerry	Jare	e/a, y/e
45.	Tony	Tone	y/e
46.	small	smol	a/o
47.	was	his	
48.	wax	veks	w/v, x/ks, a/e
49.	Tony	Tome	n/m, y/e
50.	scared	skaered	c/k
51.	who	hou	
52.	brought	brot	ough/o
53.	back	beek	ac/ee
54.	took	tuk	oo/u
55.	back	bak	ck/k
56.	became	bekan	c/k, m/n
57.	There	They	re/y
58.	different	defrent	i/e
59.	ways	yas	w/y
60.	said	sied	a/e
61.	work	wrak	o/a
62.	worship	wrshep	i/e
63.	wants	wos	a/o
64.	work	wrbs	k/b
65.	who	how	
66.	chanting	chending	a/e, t/d
67.	without	wedut	i/e, th/d
68.	doing	duing	o/u
69.	anything	enething	a/e, y/e
70.	Their	they	
71.	one's	onece	s/c
72.	Duty	dute	y/e
73.	worshipping	wersheping	o/e, i/e
74.	Coffee	kofe	c/k

2) Number of Deletion = 43 errors

S. No.	Word List	Deletion	Phoneme deleted
1.	Coffee	kofe	f,e
2.	chair	charer	i
3.	White	wit	h,e
4.	Brown	brun	o
5.	Black	blek	c
6.	Bottle	botl	t,e
7.	Dress	dres	s
8.	Shine	shin	e
9.	Greed	gred	e
10.	Leaf	lef	a
11.	Write	riting	w
12.	Wrong	rong	w
13.	Mouth	muth	o
14.	Aeroplane	aroplan	e,e
15.	Monkey	Monke	y
16.	Donkey	Donkey	y
17.	own	on	w
18.	seven	sevn	e
19.	divide	devid	e
20.	drink	drnc	i
21.	heavy	heve	a
22.	stole	stol	e
23.	small	smol	l
24.	Tony's	tone	s
25.	asked	aske	d
26.	who	hou	w
27.	brought	brot	ugh
28.	back	bak	c
29.	became	bekan	e
30.	different	difrent	f,e
31.	ways	yas	w
32.	reaching	reching	a
33.	great	grat	e
34.	worship	wrshep	o
35.	wants	wos	ant
36.	every	evey	r
37.	work	wrb	o
38.	earn	an	e,r
39.	bread	dread	a
40.	does	biz	oes
41.	people	peple	o
42.	without	wedut	o
43.	earn	arn	e

3) Number of Addition = 11 errors

S. No.	Word List	Addition	Phoneme addition
1.	Sky	skia	a
2.	water	warter	r
3.	sugar	shuger	h
4.	chair	charer	er
5.	color	coloer	e
6.	pot	pont	n
7.	write	riting	ing
8.	lips	lepse	e
9.	leg	lage	e
10.	doing	duning	n
11.	method	metherd	r

4) Number of Metathesis = 13 errors

S. No.	Word List	Metathesis	Phoneme interchanged
1.	blue	bule	lu/ul
2.	Hair	hari	ir/ri
3.	Circle	sclur	
4.	Square	sbuer	q/b
5.	Zig-zag	zebkk	g/b
6.	Big	bid	g/d
7.	bread	dred	b/d
8.	does	biz	d/b
9.	best	dest	b/d
10.	ways	yas	ays/yas
11.	said	sied	ai/re
12.	work	wrak	or/ra
13.	who	how	w/w

III) Total number of errors produced in Reading English word list – 32 errors

1) Number of Substitution = 29 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	Sky	ski	aɪ/i
2.	Bronze	brɒnzi	ə/i
3.	Stair	stɪr	ea/i
4.	Cry	sri	k/s, aɪ/i
5.	laugh	lag	f/g
6.	shirt	ʃɪrɪ	ə/i
7.	pant	peɪnɪ	ɛ/e
8.	shoes	ʃoz	u/o
9.	shine	ʃɪni	ə/i
10.	Great	grɪt	e/i
11.	Lotus	lɒtʌs	a/u
12.	Write	vraɪt	aɪ/i
13.	Correct	kɔːrdʒɪ	

S. No.	Word List	Substitution	Phoneme substitution
14.	Eye	ivi	ar/ivi
15.	Ear	ir	iə/i
16.	Circle	sirk	ə/i
17.	Square	skvar	u/v
18.	Rectangle	riktangel	e/i
19.	Zero	zero	i/e
20.	Own	oven	o/e
21.	Eight	iet	e/ie
22.	Nine	nini	ai/i
23.	stuck	stuk	a/u
24.	wax	vɔx	ə/u
25.	reaching	riacing	i/ia
26.	Great	griaɪ	e/ia
27.	worship	vorʃip	ə/o
28.	bread	brid	æ/i
29.	earn	iərn	ə/iə

2) Number of Deletion = 1error

S. No.	Word List	Deletion	Phoneme deletion
1.	Circle	sirk	l

3) Number of Addition = 5 errors

S. No.	Word List	Addition	Phoneme addition
1.	Bronze	brɔnzi	i
2.	shine	ʃini	i
3.	write	vriɪ	v
4.	own	oven	v
5.	eight	iəɪ	i

4) Number of Metathesis = 0

IV) Total number of errors produced in copying Hindi word list = 8 errors

1) Number of Substitution = 5 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	उठाना	उठावा	ना/वा
2.	धोना	धोवा	ना/वा
3.	पूछना	पुछना	् / ु
4.	जोड़ना	जोड़वा	ना/वा
5.	नापना	नापवा	ना/वा

2) Number of Deletion = 0

3) Number of Addition = 3 errors

S. No.	Word List	Addition	Phoneme Addition
1.	रस्सी	रररसी	र/र
2.	पहनना	पहनाना	ɪ

S. No.	Word List	Addition	Phoneme Addition
3.	साधू	साधू	।

4) Number of Metathesis = 0

V) Total number of errors produced in dictation of Hindi word list = 43 +9+10
= 62 errors

1) Number of Substitution = 38 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	फूल	फुल	\ / ु
2.	कबूतर	कबुतर	\ ु
3.	चिड़िया	चिड़ीया	िि
4.	खरगोश	खरगोम	श/म
5.	जूता	जुता	\ ु
6.	मेज	नेज	मे/ने
7.	मजदर	मजदुर	\ / ु
8.	घड़ी	घरी	ड़/र
9.	बैठना	बेटना	/ ए ठ/ट
10.	दौड़ना	दोरना	/े, ड़/र
11.	छोड़ना	छोरना	ड़/र
12.	समझना	सबजना	म/ब, झ/ज
13.	पीना	पीनी	ना/नी
14.	धोना	दोना	ध/द
15.	पूछना	पोछना	/े
16.	कूटना	कुटना	\ / ु
17.	पढ़ना	पड़ना	ढ़/ड़
18.	भूरा	बुरा	भू/बु
19.	पिता	पीता	पि/पी
20.	पौधा	पोधा	पौ/पो
21.	साधू	साधु	\ / ु
22.	गोभी	गोबी	भ/ब
23.	झूठ	जुट	झू/जु
24.	तरबूज	तरबुज	\ / ु
25.	चूहा	चुहा	\ / ु
26.	अप्रैल	एपरल	अ/ए, प्रै/पर
27.	अक्तूबर	अकतूबर	क्/क
28.	दिसम्बर	दीसमबर	म्/म
29.	गुरुवार	गुरुवार	\ / ु

S. No.	Word List	Substitution	Phoneme substitution
30.	शुक्रवार	शुकरवार	क्र/कर
31.	गेंद	गेनद	गें/गेन
32.	दोस्त	दोसत	स्/स
33.	स्कूल	सूल	स्/सू
34.	बस्ते	बसते	स् / स
35.	निकाला	नीकाला	नि/ी
36.	गई	गी	ग/गी
37.	फूल	फुल	् / ु
38.	नए	ने	न/ने

2) Number of Deletion =14 errors

S. No.	Word List	Deletion	Phoneme deleted
1.	जंगल	जगल	.
2.	बिल्ली	बीली	ल्
3.	गुब्बारा	गुबारा	ब्
4.	हँसना	हसना	.
5.	आँख	आख	.
6.	भाई	भह	ा
7.	बाजा	बजा	ा
8.	दोपहर	दोपह	र
9.	लम्बा	लबा	म्
10.	जुलाई	जूल्ला	ई
11.	सितंबर	सीतबर	.
12.	नवम्बर	नवबर	म्
13.	अच्छी	अछी	च्
14.	स्कूल	सूल	क्

3) Number of Addition = 9 errors

S. No.	Word List	Addition	Phoneme addition
1.	मार्च	मारच	र
2.	शुक्रवार	शुकरवार	र
3.	गेंद	गेनद	न
4.	दोस्त	दोसत	स
5.	बस्ते	बसते	स
6.	भाग	भागा	ा
7.	कुर्सी	कुरसी	र
8.	रस्सी	रससी	स

S. No.	Word List	Addition	Phoneme addition
9.	बहन	बहेन	

4) Number of Metathesis = 0

VI) Total number of errors produced in Reading Hindi word list = 16 errors

1) Number of Substitution = 7 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	पकड़ना	पढ़ना	
2.	धोना	नोना	ध/न
3.	पहनना	पहनहा	ना/हा
4.	भूरा	शूरा	भ/श
5.	गधा	गथा	धा/था
6.	कूटना	कूदना	ट/द
7.	अक्टूबर	अक्टूबर	त/ट

2) Number of Deletion = 3 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	दोपहर	दोहर	प
2.	पढ़ना	प	ढ़ना
3.	फरवरी	फैवरी	र

3) Number of Addition = 6 errors

S. No.	Word List	Addition	Phoneme Addition
1.	जनवरी	जैनवरी	
2.	फरवरी	फैवरी	
3.	मई	मेई	
4.	सितंबर	सितैंबर	
5.	नवम्बर	निवैम्बर	ि, ⁿ
6.	दिसम्बर	दिसेम्बर	

4) Number of Metathesis = 1 errors

S. No.	Word List	Metathesis	Phoneme interchanged
1.	अलग	अगल	लग/गल

CASE STUDY – 8

Name : PB
Age : 10 years, Female
Mother Tongue : Punjabi, Hindi

V) Total number of errors produced in Copying English word list = 1 error

1) Number of substitution = 0

2) Number of deletion = 0

3) Number of Addition = 1 error

S. No.	Word List	Addition	Phoneme Addition
1.	One	onor	or

4) Number of Metathesis=0

VI) Total number of errors in Copying Hindi word list = 4 errors

1) Number of Substitution = 2 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	फूल	फुल	ॠ/ॡ
2.	कबूतर	कबुतर	ॠ/ॡ

2) Number of Deletion = 2 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	मजदूर	मजदू	र
2.	दौड़ना	दौना	ड़

Rest not attempted

CASE STUDY -9

Name : AK

Age : 10 years old, Male

Mother Tongue : Hindi

I) Total Number of errors produced in Copying English word list = 10 errors

1) Number of Substitution = 09 errors

S. No.	Word List	Substitution	Phoneme Substituted
1.	Water	Wuter	a/u
2.	Pink	Pinb	k/b
3.	Black	Block	a/o
4.	Orange	Oronge	a/o
5.	Skip	Sbip	k/b
6.	Monkey	Monbey	k/b
7.	Donkey	Donbey	k/b
8.	Cat	Cot	a/o
9.	Take	Tabl	ke/bl

2) Number of Deletion = 1 error

S. No.	Word List	Deletion	Phoneme Deletion
1.	Square	Squar	e

3) Number of Addition = 0 error

4) Number of Metathesis = 0 error

II) Total number of errors produced in Copying Hindi word list – 10 errors

1) Number of Substitution = 7 error

S. No.	Word List	Substitution	Phoneme Substitution
1.	कागज	कामज	ग/म
2.	जंगल	जगल	जं/ज, ग/गं
3.	गधा	मधा	ग/म
4.	अलग	अलम	ग/म
5.	गाड़ी	माड़ी	ग/म

S. No.	Word List	Substitution	Phoneme Substitution
6.	रात	रान	त/न
7.	गेंद	मेंद	ग/म

2) Number of Deletion = 2 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	पपीता	पपीत	।
2.	सुखाना	सुखान	।

3) Number of Addition – 0 errors

4) Number of Metathesis = 1 error

S. No.	Word List	Metathesis	Phoneme interchanged
1.	कलम	कमल	लम/मल

IV) Total number of errors produced in Hindi dictation of word list = 2 errors

1) Number of Substitution = 1 error

S. No.	Word List	Substitution	Phoneme substitution
1.	गाड़ी	गेरी	गा/गे, ड़/र

2) Number of Deletion = 1 error

S. No.	Word List	deletion	Phoneme Deleted
14.	बाजा	बाज	।

3) Number of Addition = 0

4) Number of Metathesis = 0

CASE STUDY – 10

Name : AR
Age : 11 years, Male
Mother Tongue : Hindi

I) Total number of errors produced in Copying English word list = 14 errors

1) Number of Substitution = 6 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	Red	Ped	R/P
2.	Lily	lilv	y/v
3.	Hair	Halr	i/l
4.	Air	Hir	A/H
5.	Aeroplane	Heroplanc	A/H, e/c
6.	Square	svuare	q/v

2) Number of Deletion = 3 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	Bronze	broze	n
2.	Great	Geat	r
3.	Zero	Zro	e

3) Number of Addition = 2 errors

S. No.	Word List	Addition	Phoneme Addition
1.	God	Good	o
2.	Circle	Circcle	c

4) Number of Metathesis = 0

II) Total Number of errors produced in Copying Hindi word list = 4 errors

1) Number of Substitution = 0 errors

2) Number of Deletion = 3 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	कुर्सी	कुसी	
2.	कुत्ता	कुता	र
3.	गुब्बारा	गुबारा	ब

3) Number of Addition = 1 errors

S. No.	Word List	Addition	Phoneme addition
1.	बिल्ली	बिलली	ल

4) Number of Metathesis = 0 errors

III) Total number of errors produced in English dictation of word list = 0

IV) Total number of errors produced in Hindi dictation = 2

V) Total number of errors produced in Reading English word list = 7 errors

1) Number of Substitution = 7 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	moon	mɔn	u/ɔ
2.	Tea	tɛ	i/ɛ
3.	Coffee	stori	
4.	sugar	stori	
5.	color	kud	
6.	Brush	rid	
7.	Red	rid	

2) Number of Deletion = 0

3) Number of Addition = 0

4) Number of Metathesis = 0

VI) Total number of errors produced in reading Hindi word list = 1 errors

1) Number of Substitution=1 error

S. No.	Word List	Substitution	Phoneme substitution
1.	गुब्बारा	गुलाब	ब्बारा/लाब

CASE STUDY - 11

Name : ST
Age : 11 years, female, dyslexic.
Languages known : Hindi and English

I) Total number of errors in Copying English word list, poem and Paragraph = 17+4+10=31 errors

1.1) Number of Substitution=14 errors

S.No	Word list	Substitution	Phoneme substituted
1.	Sugar	Suger	a/e
2.	Pen	Pan	e/a
3.	Red	Rad	e/a
4.	Bronze	Bronza	e/a
5.	Correct	Carrect	o/a
6.	Some	Sone	m/n
7.	Hand	HAnd	a/A
8.	Leg	Log	e/o
9.	Circle	Circiə	l/i, e/ə (Reversal)
10.	Nine	NiNe	n/N
11.	Multiply	MuPtiPLY	l/P
12.	Divide	Pivide	D/P
13.	Drink	DriDk	n/D
14.	Candle	CandLe	l/L

1.2) Number of Deletion= 1 error

S.No	Word list	Deletion	Phoneme deletion
1	Subtraction	Subtracion	/t/

1.3) Number of Addition = 1error

S.No	Word list	Addition	Phoneme addition
1	Music	Mushic	/h/

1.4) Number of Metathesis = 1error

S.No	Word list	Metathesis	Phoneme/syllable interchanged
1	Rectangle	Rectangel	(le/el)

1.5) Number of Substitution in Copying English poem = 1 errors

- 1) Who stole *the* big ball?
Who stole *who* big ball?
the /who

1.6) Number of Deletion in Copying English poem = 1 errors

- 1) Tony Stole the small box
Tony stole small box
Deletion of Article "the"

1.7) Total number of Errors produced in Copying English Paragraph – 10 errors

1.8) Number of Substitution – 2 errors

S.No	Word List	Substitution	Phoneme Substitution
1	Men	Man	e/a
2	worshiping	worniping	h/n

1.9) Number of Deletion = 6 errors

S.No	Word List	Deletion	Phoneme deletion
1.	There	Tere	h
1.	serving	seving	r
2.	too	to	o
3.	said	sid	a
4.	hard	had	r
5.	bread	bred	a

1.10) Number of Addition=0

1.11) Number of Metathesis = 1error

S.No	Word List	Metathesis	Phoneme/syllable interchanged
1.	Their	thire	eir/ire

I) Total Number of Errors produced in Copying Hindi word list =18+7=25 errors

2.1) Number of Substitution = 14 errors

S.No	Word List	Learner's response	Phoneme substitution
1.	घोड़ा	छोड़ा	ध/छ
2.	पढ़ना	पछना	ढ़/द
3.	धोना	छोना	ध/छ
4.	गधा	गछा	ध/छ
5.	पौधा	पौछा	ध/छ
6.	साधू	साछू	ध/छ
7.	बाजा	ताजा	ब/त
8.	छोटा	छीट	ो/ी
9.	तबला	तवला	ब/व
10.	शेर	शोर	शे/शो
11.	सफेद	सफेठ	द/ठ
12.	भूरा	सूरा	भ/सं
13.	लाल	ताल	ल/त
14.	गेंद	गोंद	गें/गो

2.2) Number of Deletion – 2 errors

S.No	Word List	Learner's response	Phoneme Deletion
1.	उठाना	उठना	ा
2.	लम्बा	लम्ब	ा

2.3) Number of Addition=0

2.4) Number of Metathesis=0

2.5) Number of errors in Copying sentences of Hindi = 7 errors

2.6) Number of Substitution – 3 errors

S.No.	Word List	Substitution	Phoneme Substituted
1.	करके	करने	के/ने
2.	आज	आच	ज/च
3.	फूल	फुल	ू/ु

2.7) Number of Deletion = 4 errors

S.No.	Word List	Deletion	Phoneme deletion
1.	खाता	खता	ा
2.	मेरी	मरी	

3.	भाग	भग	ɪ
4.	कुत्ता	कुता	ɾ

II) Total number of errors produced in Dictation of English word list =46 errors

3.1) Number of Substitution = 33 errors

S.No	Word List	Substitution	Phoneme substituted
1.	Water	WATer	at/AT
2.	Coffee	coffy	ee/y
3.	Sugar	suger	a/e
4.	Brush	Brach	ush/ach
5.	White	whiTe	t/T
6.	Pink	pind	k/b
7.	Golden	goldan	e/a
8.	bronze	noose	z/s
9.	Cry	dry	c/d
10.	laugh	love	augh/ove
11.	Dag	BaG	D/B, d/G
12.	Little	litten	le/en
13.	Bad	Bag	d/g
14.	Pin	PiG	n/G
15.	Shirt	ceck	sh/c/ irt/eck
16.	Some	Sum	Homonyms
17.	Saw	sor	W/r
18.	Great	brakl	G/b
19.	Great	Gread	t/d
20.	Leaf	leaF	f/F
21.	Write	Right	homophones
22.	Right	Ride	
23.	Correct	Carret	o/a
24.	Wrong	Whong	r/h
25.	hand	hen	
26.	Zig-Zag	ZIG-zek	g/k, a/e
27.	Own	on	homophone
28.	Sum	Some	homophone
29.	Subtraction	subject	
30.	Multiply	muntiply	i/n
31.	Sleep	Sleap	e/a
32.	Listen	liston	e/o
33.	Candle	cabdle	n/b

3.2) Number of Deletion – 11 errors

S.No	Word list	Deletion	Phoneme deletion
1.	Little	Litten	l
2.	Shirt	ceck	t
3.	Pant	pan	t
4.	Shoes	shoe	s
5.	Correct	carret	c

S.No	Word list	Deletion	Phoneme deletion
6.	Evening	evning	e
7.	Mouth	moth	u
8.	Hand	hen	d
9.	Own	on	w
10.	Subtraction	subject	
11.	Heavy	havy	e

3.3) Number of Addition – 7 errors

S.No	Word list	Addition	Phoneme Addition
1.	Skip	Skipe	e
2.	God	Good	o
3.	Bat	Back	ck
4.	Little	Litten	n
5.	Shirt	ceck	k
6.	Was	Walls	ll
7.	Music	mushic	h

3.4) Number of Metathesis – 3 errors

S.No	Word List	Metathesis	Phoneme interchanged
1.	Chair	Chire	air/ire
2.	Stair	Stare	air/are
3.	Rectangle	Rectangel	gle/gel

III) Total number of errors produced in Hindi Dictation of word list – 42 errors

4.1) Number of substitution= 24 errors

S.No	Word List	Learner's response	Phoneme Substitution
1.	फूल	फुल	फू/फु
2.	धोना	दौना	धोना/दौ
3.	कूटना	टूटना	कू/टू
4.	पढ़ना	पदना	ढ़/द
5.	लिखना	लीखना	लि/ली
6.	तोलना	तोनना	ल/न
7.	सुखाना	सुरटाना	खा/रटा
8.	पिता	पीता	पि/पी
9.	गधा	गदा	धा/दा
10.	साधू	सादू	धू/दू
11.	नल	नाना	न/ना, ल/ना
12.	हल	फल	ह/फ
13.	रानी	राजा	नी/जा
14.	बहन	भाई	
15.	साड़ी	गाड़ी	सा/गा
16.	पतला	पटला	त/ट

S.No	Word List	Learner's response	Phoneme Substitution
17.	तरबूज	तूरवूज	त/तू, बू/वू
18.	बकरी	वकरी	ब/व
19.	लम्बा	लम्वा	ब/व
20.	अक्टूबर	अकटुबर	क/कए त/ट
21.	मंगलवार	मगलंवाड	मं/लं र/ड
22.	छोटा	छोले	टा/ले
23.	स्कूल	स्कूल	कू/कु
24.	रोटी	रोटि	टी/टि

4.2) Number of Deletion – 17 errors

S.No	Word list	Learner's response	Phoneme deleted
1.	कागज	कगज	।
2.	कुर्सी	कुसी	
3.	कुत्ता	कुता	त्
4.	पकाना	पकता	।
5.	नापना	नपना	।
6.	पहनना	पहना	।
7.	उतारना	उतरना	।
8.	काला	कला	।
9.	नीला	नील	।
10.	आंख	आरहट	
11.	गोभी	गेभी	ी
12.	लम्बा	लौब	म्, बा
13.	पपीता	पपता	ी
14.	अप्रैल	अपैल	प्र
15.	बुद्धवार	बुदवार	द्ध
16.	शुक्रवार	शुकवार	क्र
17.	भाग	भग	।

4.3) Number of Addition – 7 errors

S.No	Word List	Learner's response	Phoneme Added
1.	जहाज	जाहाजा	।, ।
2.	नाव	नावा	।
3.	नल	नाना	।
4.	शाम	शामा	।
5.	चावल	चावला	।
6.	तरबूज	तूरवूज	

7.	लोहा	लौहा	लौ
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4.4) Number of Metathesis and Reversal – 5 errors

S.No	Word List	Learner's response	Phoneme interchanged
1.	सोचना	सोजना	च-ज
2.	जोड़ना	चोड़ना	ज-च
3.	पहनना	पहना	प-त
4.	सच	सज	च-ज
5.	चोरी	जोरी	च-ज

V) Total number of errors produced in Reading test of English word list =3 errors

5.1) Number of Substitution – 3 errors

S.No	Word List	Substitution	Phoneme Substitution
1.	Son	Sɒn	o/ɔ
2.	Laugh	laɪŋ	f/ŋ
3.	God	Gud	ɔ/u

VI) Total number of errors produced in Reading test of Hindi word list =2 errors

6.1) Number of Substitution=0

6.2) Number of Deletion=2

S.No	Word List	Deletion	Phoneme deletion
1.	सेब	सब	
2.	कबुतर	कबतर	

6.3) Number of Addition=0

6.4) Number of Metathesis=0

CASE STUDY – 12

Name : AM
Age : 11 years
Mother tongue : Hindi

I) Total number of errors produced in Copying English word list and poem = 8+5=13 errors

1) Number of Substitution = 8+1 = 9 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	Dress	Drcss	e/c
2.	Great	Gveat	r/v
3.	Correct	Correct	e/c
4.	Elephant	Elepand	t/d
5.	Rectangle	Rcctangle	e/c
6.	serving	sevving	r/v
7.	reaching	veaching	r/v, e/c
8.	Great	Gvat	r/v
9.	Jerry	Javr	e/a

2) Number of Deletion in word list = 2 errors

S. No.	Word List	Deletion	Phoneme Deletion
1.	color	colo	r
2.	Heavy	hevy	a

2.1) Number of Deletion in poem = 1 error

S. No.	Word List	Substitution	Phoneme substitution
1.	Jerry	Javr	y

2.2) Number of Deletion in Paragraph=3 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	Great	Gvat	e
2.	Everyone	evryone	e
3.	worshiping	worship	ing

3) Number of Addition = 1error

S. No.	Word List	Addition	Phoneme Added
1.	White	whith	h

4) Number of Metathesis=0

II) Total number of errors produced in English dictation word list = 26 errors

1) Number of Substitution = 14 errors

S. No.	Word List	Substitution	Phoneme substituted
1.	Tea	ty	ea/y
2.	Milk	moky	
3.	Color	kusya	c/k
4.	White	wity	e/y
5.	Brush	Bshay	
6.	Silver	Salvy	i/a, er/y
7.	Cry	Kury	c/k
8.	Laugh	lff	augh/ff
9.	God	Goat	d/t
10.	Write	riat	
11.	Night	nity	
12.	Elephant	Elepand	t/d
13.	Square	srkla	
14.	Drink	DK	

2) Number of Deletion = 15 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	Milk	Moky	l
2.	Sugar	Shaugya	r
3.	chair	chiry	a
4.	Paint	pant	i
5.	white	wriy	h
6.	violet	vility	o
7.	Black	Blky	a
8.	Orange	orghau	an
9.	silver	salvy	e
10.	Donkey	Dokey	n
11.	flower	flow	er
12.	write	riat	w

S. No.	Word List	Deletion	Phoneme deletion
13.	Night	Nity	gh
14.	cross	cos	r, s
15.	Drink	DK	rin

3) Number of Addition =10 errors

S. No.	Word List	Addition	Phoneme deletion
1.	Milk	moky	y
2.	Sugar	shaugya	ha, y
3.	Chair	chiry	y
4.	pink	pinky	y
5.	Violet	vility	y
6.	Black	blky	y
7.	Orange	orghau	h (n/u)
8.	Silver	slavy	y
9.	cry	kury	u
10.	God	Goat	a

4) Number of Metathesis/Reversal = 2 errors

S. No.	Word List	Metathesis	Phoneme inter changed
1.	Orange	Orghau	e
2.	Square	srkla	

5) Number of other = 1error

S. No.	Word List	other	
1.	Color	kusya	

III) Total number of errors produced in Copying Hindi word list, days and months, Sentences = 18 errors

1) Number of substitution =11errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	जूता	जुता	् / ु
2.	तोलना	लोलना	त/ल
3.	अगस्त	अगरत	स्/र
4.	अक्तूबर	अकतूबर	क्/क
5.	खाता	राता	ख/रा
6.	खेलता	रोलता	खे/रा
7.	किताब	किताव	ब/व
8.	मेरी	मेरे	री/रे
9.	दोस्त	दोसत	स्/स
10.	चोरी	चेरी	चो/चे
11.	बस्ते	बसते	स्/स

2) Number of Deletion =5 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	कुर्सी	कुसी	

S. No.	Word List	Deletion	Phoneme deletion
2.	जंगल	जगल	
3.	गुब्बारा	गब्बारा	
4.	हूँ	हँ	
5.	कुत्ता	कुता	त्

3) Number of Addition =4 errors

S. No.	Word List	Addition	Phoneme Addition
1.	बहन	बहना	ा
2.	कुत्ता	कुतता	त
3.	दोस्त	दोसत	स
4.	बस्ते	बसते	स

4) Number of Metathesis = 0

IV) Total number of errors produced in Hindi Dictation = 62+15+45 = 122 errors

1) Number of Substitution = 42+3+18 =63 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	फूल	फुला	ु, ल/ला
2.	कागज	कागस	ज/स
3.	तोता	तौता	ौ
4.	चिड़िया	चीड़ीया	ि
5.	जूता	जुता	ु/ु
6.	मेज	मोज	े/े
7.	मजदूर	मजुदर	ज/जुए दू/द
8.	घोड़ा	घौड़ा	ौ
9.	गुब्बारा	गबरा	गु/ग, बा/ब
10.	रोना	रौना	े/ै
11.	बैठना	बहठना	ै/ब
12.	दौड़ना	दोढ़ना	े/े, ड/ढ़
13.	नहाना	नाहा	न/ना
14.	धोना	दोना	ध/द
15.	पूछना	पुछना	ु/ु
16.	कूटना	कुटना	ु/ु
17.	पढ़ना	पड़ना	ढ़/ड़
18.	लिखना	लीकना	ि/ी, ख/क
19.	भूरा	बुरा	भू/बु
20.	नाव	नाग	व/ग

S. No.	Word List	Substitution	Phoneme Substitution
21.	पिता	पीता	ि / ी
22.	पौधा	पोदा	ौ / ो, ध/द
23.	घड़ा	घदा	ड़/द
24.	साधू	सादू	ध/द
25.	अमरूद	अवरु	म/व
26.	गोभी	गोबी	भो/बो,
27.	भाई	बाया	भ/ब, ई/या
28.	रोटी	रूटी	ौ
29.	सेब	रोब	स/रा
30.	छोटा	छोता	ट/त
31.	झूठ	जुट	झू/जु
32.	तरबूज	तरवुझ	ज/झ
33.	चूहा	चुहा	, / ू
34.	कछुआ	खचुवा	क/ख, छ/च
35.	जून	जुना	, / ू
36.	दिसम्बार	डसबर	दि/ड
37.	शनिवार	शनीवार	ि
38.	मेरे	मै	/ ै
39.	यह	या	
40.	मेरे	मैरे	/ ै
41.	जूते	जुतौ	, / ू
42.	चारू	चारु	/ ू
43.	अच्छी	अचई	च / च, छी/ई
44.	दोस्त	दऔत	दो/द, स/औ
45.	चोरी	छोरी	च/छ
46.	भाग	बा	भा/बा
47.	मुझे	मुजी	झे/जी
48.	स्कूल	सकुला	स/स, ू, ल/ला
49.	मे	मै	/ ै
50.	गई	गी	ग/गी
51.	मुझे	मुजो	झे/जो
52.	के	को	/ ो
53.	भाग	बा	भा/बा
54.	नए	नह	ए/ह

S. No.	Word List	Substitution	Phoneme Substitution
55.	कपड़े	कपड़ो	/ ो
56.	सफेद	सफोद	/ ो
57.	शुक्रवार	शुकरवार	/ ो
58.	केला	कोला	/ ो
59.	पैसे	पैसो	/ ो
60.	मेरी	मोरी	ी
61.	करके	करको	/ ो
62.	उसने	उसनो	/ ो
63.	मेरी	मैरी	/ ै

2) Number of Deletion =49 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	कुर्सी	कुसी	
2.	जंगल	जगलन	.
3.	बिल्ली	बली	ि, ल
4.	गुब्बारा	गुबरा	ब, ा
5.	रस्सी	रसी	स्
6.	बैठना	बहठना	
7.	नहाना	नाहा	ना
8.	बताना	बतना	ा
9.	पकाना	पकना	ा
10.	उतारना	उतरना	ा
11.	सुखाना	सुखना	ा
12.	जहाज	जहज	ा
13.	अमरूद	अवरूद	द
14.	अनारस	अनरस	ा
15.	अलग	अल	ग
16.	आम	अम	ा
17.	शाम	शम	ा
18.	लोहा	लोह	ा
19.	लम्बा	लबा	म्
20.	दोस्त	दोती	स्
21.	लालची	लाची	ल
22.	जनवरी	जावरी	न
23.	फरवरी	फवरी	र

S. No.	Word List	Deletion	Phoneme deletion
24.	मार्च	माचा	
25.	जुलाई	जुया	ला
26.	अगस्त	रगस	त
27.	सितम्बर	सतबर	म्
28.	नवम्बर	नाबर	व, म्
29.	दिसम्बर	डसबर	म्
30.	सोमवार	सोवार	म
31.	मंगलवार	मगवार	ल
32.	बृहस्पतिवार	बहसवार	, पति
33.	रविवार	रववार	ि
34.	हूँ	हु	'
35.	मेरे	मै	रे
36.	किताब	कताब	ि
37.	खरीदे	खरदो	ो
38.	है	ह	
39.	भाग	बा	ग
40.	अच्छा	अछला	च
41.	लगता	ल	गता
42.	बस्ते	बतो	स्
43.	निकाला	नकला	ि, ा
44.	गुलाब	गलबा	, आ
45.	पसन्द	पसद	न्
46.	पैसे दिए	पह दी	
47.	कुत्ता	कुता	त्
48.	लेकर	लोक	र
49.	पहने	पनो	ह

3) Number of Addition=15 errors

S. No.	Word List	Addition	Phoneme Addition
1.	फूल	फुला	ा
2.	जंगल	जगलन	न
3.	बैठना	बहठना	ह
4.	अनार	अनारा	ा
5.	बहन	बहना	ा
6.	दिन	दिना	ा

S. No.	Word List	Addition	Phoneme Addition
7.	चावल	चावला	ɪ
8.	दाल	दाला	ɪ
9.	जून	जुना	ɪ
10.	मै	मैर	र
11.	सेब	सोबा	ɪ
12.	नही	नीही	ी
13.	स्कूल	सकुला	ɪ
14.	अच्छा	अछला	ला
15.	फूल	फुला	ɪ

4) Number of Metathesis = 3 errors

S. No.	Word List	Metathesis	Phoneme interchanged
1.	मजदूर	मजुदर	.
2.	आग	अगा	ɪ
3.	आँख	अखा	ɪ

V) Total number of errors produced in Reading Test of English word list = 15 errors

1) Number of Substitution = 12 errors

S. No.	Word List	Substitution(Transcription)	Phoneme Substitution
1.	sky	ske	aɪ/e
2.	Coffee	sofi	k/s
3.	Sugar	sufi	g/f
4.	brush	brədə	ʃ/d
5.	golden	goldən	ə/e
6.	Son	sɒn	ə/ɔ
7.	month	mun	ə/u
8.	stair	sɛptɛmber	
9.	fun	fun	ə/u
10.	cry	sre	k/s
11.	laugh	long	f/g
12.	God	gud	o/u

2) Number of Deletion – 0

3) Number of Addition – 3 errors

S. No.	Word List	Addition	Phoneme addition
1.	Star	stear	a/ea
2.	Bronze	brɒnzi	ə/i
3.	Love	lovi	ə/i

4) Number of Metathesis/Reversal = 0

VI) Total number of errors produced in Reading test of Hindi word list = 5 errors

1) Number of Substitution = 5 errors

S. No.	Word List	Substitution	Phoneme Substitution
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S. No.	Word List	Substitution	Phoneme Substitution
1.	तोता	पापा	त/प
2.	सोना	सेना	ो/
3.	छोड़ना	छेड़ना	ो/
4.	सोचना	सेचना	ो / ^
5.	धोना	धेना	ो / ^

- 2) Number of Deletion = 0
3) Number of Addition = 0
4) Number of Metathesis = 1 error

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	तोता	पापा	त/प

CASE STUDY – 13

Name : MK
Age : 11 years, Male
Mother Tongue : Hindi

I) Total number of Errors produced in Copying English word list = 8 errors

1) Number of Substitution = 8 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	Month	Manth	o/a
2.	God	Gad	o/a
3.	Bottle	Battle	o/a
4.	Good	Goad	o/a
5.	Dress	Drerr	ss/rr
6.	shoes	shaer	s/r, o/a
7.	Rose	Rase	o/a
8.	Lotus	latus	o/a

- 2) Number of deletion = 0
3) Number of Addition = 0
4) Number of Metathesis – 0

II) Total number of errors produced in Copying Hindi word list = 2 errors

1) Number of Substitution = 0

2) Number of Deletion = 2

S. No.	Word List	Deletion	Phoneme deletion
1.	जंगल	जगल	.
2.	बिल्ली	बिली	र्

- 3) Number of Addition = 0
4) Number of Metathesis = 0

III) Total number of errors produced in Hindi Dictation of Word list = 3 errors

1) Number of Substitution = 2 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	राजा	राजी, राजि	जा/जी, जि
2.	रोटी	रुटी	रो/रु

3) Number of deletion = 0

4) Number of Addition = 0

4) Number of Metathesis = 1 errors

S. No.	Word List	Metathesis reversal	Phoneme Interchanged
1.	चल	जल	च/ज

IV) Total number of errors produced in Reading Hindi word list = 19 errors

1) Number of Substitution = 11 errors

S. No.	Word List	Substitution	Phoneme substituted
1.	पानी	नपतप	
2.	कबूतर	कबतरऊ	, / ऊ
3.	राजा	सज/राज/राजा	
4.	भाई	भालू/भाली	
5.	बहन	भी/बाहर/बहन	
6.	गाड़ी	गल/सलगम	
7.	बाजा	बज/बाजा	
8.	सेब	सब/सभी	
9.	दिन	दन/दी/दीदी	
10.	शाम	सारा/सम/मौसम	
11.	गेंद	सिध/प्रसिद्ध/गद	

2) Number of Deletion = 9 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	पपीता	पती	पी
2.	फूल	फल	.
3.	कागज	गुज	का
4.	कुर्सी	कस	, , ि
5.	जंगल	जगल	.
6.	बिल्ली	बस/बल	ि, ल, ी
7.	बाजा	बज/बाजा	।, ।
8.	सेब	सब	
9.	दिन	दन	ि

3) Number of Addition = 2 errors

S. No.	Word List	Addition	Phoneme addition
2.	कल	कलम	म

S. No.	Word List	Addition	Phoneme addition
3.	एक	ऐनक	न

5) **Number of Metathesis = 0**

CASE STUDY 14

Name : SS
Age : 11 years
Mother Tongue : Hindi

I) **Total number of errors produced in Copying English word list = 14 errors**
Most of the errors are , a = q, n = h

1) **Number of Substitution = 12 errors**

S. No.	Word List	Substitution	Phoneme Substitution
1.	Star	stqr	a/q
2.	Water	Wqter	a/q
3.	Tea	Teq	a/q
4.	Sugar	Sugqr	a/q
5.	Table	Tqbule	a/q
6.	Chair	Chqir	a/q
7.	Paint	Pqint	a/q
8.	Pink	Pihk	n/h
9.	Pin	Pih	n/h
10.	Hand	Hind	a/i
11.	Square	Squqre	a/q
12.	Zig-zag	Zig-zig	a/i

2) **Number of Deletion – 2 errors**

S. No.	Word List	Deletion	Phoneme Deletion
1.	Lips	Lip	s
2.	Multiply	Multily	p

3) **Number of Addition = 0**

4) **Number of Metathesis - 0**

II) **Total number of errors produced in copying Hindi word list =17 errors**

1) **Number of substitution = 11**

S. No.	Word List	Substitution	Phoneme substitution
1.	फूल	पूल	फ/प
2.	घड़ा	घड	ड़/ड
3.	घोड़ा	घोडा	ड़/ड
4.	घड़ी	घडो	ड़/ड
5.	गुब्बारा	मब्बारा	गु/म
6.	कपड़ा	कपडा	ड़/ड
7.	सोना	रोना	सो/रो
8.	धोना	घोना	घ/ध

S. No.	Word List	Substitution	Phoneme substitution
9.	पूछना	पूघना	छ/घ
10.	पकड़ना	पूघना	छ/घ
11.	छोड़ना	छोडना	ड़/ड

2) Number of Deletion = 5 errors

S. No.	Word List	Deletion	Phoneme deleted
1.	कुसी	कुसी	
2.	जंगल	जगल	.
3.	खरगोश	खागोश	र
4.	जूता	जता	.
5.	गुब्बारा	मबबारा	.

3) Number of Addition= 1 errors

S. No.	Word List	Addition	Phoneme Addition
1.	खरगोश	खागोश	।

4) Number of Metathesis = 1 errors

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	समझना	समझान	झ/झा, ना, न

CASE STUDY – 15

Name : GG
 Age : 12 years, male
 Mother Tongue : Punjabi, Hindi

I) Number of errors produced in Copying English word list = 3 errors

1) Number of substitution =2 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	ten	fen	t/f
2.	three	t ^h ree	h/l ^h

2) Number of deletion = 0

3) Number of Addition = 0

4) Number of Metathesis =2 errors

S. No.	Word List	Metathesis	Phoneme interchanged
1.	serving	sevring	rv/vr
2.	ten	fen	t/f reversal

II) Total number of errors produced in English Dictation of word list – 55+10=65 errors

1) Number of substitution = 20 errors

S. No.	Word List	Substitution	Phoneme substitution
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S. No.	Word List	Substitution	Phoneme substitution
1.	Tea	ted	a/d
2.	sugar	suger	a/e
3.	skip	skin	p/n
4.	laugh	lagrst	
5.	far	for	a/o
6.	pant	past	n/s
7.	saw	stan	
8.	Great	Gape	
9.	lily	lef	
10.	lotus	loster	
11.	flower	fulor	
12.	Right	write	
13.	square	sqgsert	
14.	rectangle	reatle	
15.	own	non	
16.	Give	gave	i/a
17.	listen	lesam	
18.	Music	miceus	
19.	Heavy	haves	
20.	candles	clacse	

2) Number of Deletion = 33 errors

S. No.	Word List	Deletion	Phoneme deleted
1.	Coffee	coffe	e
2.	silver	slever	i
3.	Bronze	brsh	onge
4.	month	moth	n
5.	stair	star	i
6.	dress	drss	e
7.	great	gape	r,t
8.	Greed	gart	e
9.	lily	lef	ly
10.	leaf	lef	a
11.	Branch	bachr	n
12.	correct	cart	rec
13.	wrong	wom	r
14.	evening	eving	en
15.	mouth	moth	u
16.	Hair	her	i
17.	Aeroplane	aroplane	e
18.	addition	addton	i
19.	listen	lesam	t
20.	Wednesday	wenday	dnes
21.	Saturday	starday	u
22.	January	jarny	u
23.	February	febrer	ua, y

S. No.	Word List	Deletion	Phoneme deleted
24.	March	mach	r
25.	April	airl	p
26.	July	jly	u
27.	August	augst	u

3) Number of Addition = 9 errors

S. No.	Word List	Addition	Phoneme addition
1.	Yellow	Yellown	n
2.	Golden	Goldnen	n
3.	Saw	stan	t
4.	Ear	Eear	e
5.	lips	lipe	
6.	Square	sqqsert	psent
7.	three	theree	e
8.	music	miceus	e
9.	Lotus	loster	ar

4) Number of Metathesis = 13 errors

S. No.	Word List	Metathesis	Phoneme interchanged
1.	Brush	bursh	ru
2.	Paint	pinat	a,i
3.	White	withe	h/t
4.	Brown	Borwn	ro
5.	silver	slever	il
6.	pin	bin	p/b
7.	Branch	bachr	r
8.	write	wirte	ri/ir
9.	cross	corss	ro/or
10.	circle	cricle	ir/ir
11.	music	miceus	us, ic
12.	Friday	firday	ri/ir
13.	Thursday	Thrusday	ur/ru

5) Number of other = 5 errors

S. No.	Word List	Other	
1.	Color	coargl	
2.	Rectangle	Realts	
3.	subtraction	stohtokrof	
4.	Multiply	mstrat	
5.	Divide	dist	

III) Total number of errors produced in Copying Hindi word list = 3 errors

1) Number of substitution = 1 error

S. No.	Word List	Substitution	Phoneme substitution
1.	जंगल	जमल	ग/म

2) Number of Deletion = 1 error

S. No.	Word List	Deletion	Phoneme deletion
1.	जंगल	जमल	

3) Number of Addition = 2 errors

S. No.	Word List	Addition	Phoneme Addition
1.	बिल्ली	बिलली	ल
2.	चलना	चलाना	।

IV) Total number of errors produced in Hindi Dictation of word list = 107 errors

1) Number of Substitution =46 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	कबूतर	कबुतर	\ / ु
2.	जूता	जुता	\ / ु
3.	मेज	मेद	ज/द
4.	रोना	रेना	े / े
5.	सोना	सेना	े / े
6.	बैठना	बेठन	/ े
7.	सोचना	सेचन	े / े
8.	गोभी	धमी	गो/घ, भी/मी
9.	एक	अश	ए/अ, क/श
10.	रोटी	राल	रो/रा, टी/ल
11.	दिन	देन	दि/दे
12.	गेंद	मेद	गें/मे
13.	लोहा	लहवा	लो/लह, हा/वा
14.	साड़ी	सारे	ड़ी/रे
15.	पतला	पटला	त/ट
16.	छोटा	उछता	टा/ता
17.	झूठ	सीट	झू/सी, ठ/ट
18.	दोस्त	अेअ	
19.	तरबूज	तरतीबी	
20.	तबला	ताबल	त/ता
21.	गाय	बाल	
22.	बकरी	वरती	ब/व
23.	शेर	शर	शो/श
24.	कछुआ	कछवा	छु/छ, आ/वा
25.	पीसना	पइस	पी/पइ
26.	कूटना	टाना	
27.	पढ़ना	पड़ी	
28.	लिखना	लीकख	लि/ली

S. No.	Word List	Substitution	Phoneme substitution
29.	बोलना	बाना	बो/बा
30.	सीखना	सीकख	
31.	जोड़ना	जाना	जो/जा
32.	तोलना	तेरना	तो/ते
33.	सफेद	सीक्द	स/सी
34.	भूरा	बेला	भू/बे
35.	जहाज	जाज	जहा/जा
36.	नाव	नाम	व/म
37.	पिता	पपीत	
38.	चाचा	चची	चा/च
39.	चाची	चची	चा/च
40.	गधा	मधा	ग/म
41.	साधू	सेध	सा/से, धू/ध
42.	लकड़ी	लमड़ी	क/म
43.	जून	जुन	, / ु
44.	सोमवार	सेमवार	सो/से
45.	मंगलवार	ममलवार	ग/म
46.	बुद्धवार	बधरवार	बु/ब, द्ध/ध

2) Number of Deletion = 50 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	फूल	फल	.
2.	कुर्सी	कुरस	ी
3.	कुत्ता	कुता	त्
4.	चिड़िया	चड़िया	ि
5.	मजदूर	मदूर	ज
6.	बैठना	बेठन	ा
7.	दौड़ना	दाना	ड़
8.	हँसना	हसना	.
9.	छोड़ना	छना	ड़
10.	सोचना	सेचन	ा
11.	समझना	सइझन	ा
12.	नहाना	नाहा	ना
13.	राजा	रज	ा, ा

S. No.	Word List	Deletion	Phoneme deletion
14.	रानी	रन	।
15.	भाई	भई	।
16.	सेब	सब	
17.	दोपहर	देपह	र
18.	शाम	शम	।
19.	गेंद	मेद	.
20.	चूहा	चहा	.
21.	कछुआ	कछवा	.
22.	बताना	बातन	।
23.	पकाना	पकना	।
24.	पीसना	पइस	ना
25.	कूटना	टाना	कू
26.	पढ़ना	पड़ी	ना
27.	लिखना	लीकख	ना
28.	बालना	बाना	ल
29.	सीखना	सीकख	ना
30.	जोड़ना	जाना	ड़
31.	नापना	नापन	।
32.	उतारना	उतार	ना
33.	सुखाना	सोख	ना
34.	पीला	पला	ी
35.	जहाज	जाज	हा
36.	माता	मात	।
37.	चाची	चची	।
38.	साधू	सेध	.
39.	अमरूद	अग	रूद
40.	आग	अग	।
41.	मार्च	मर्च	।
42.	फरवरी	फवार	री
43.	अगस्त	अगत	स्
44.	अक्टूबर	अकर	तूब
45.	ब	हस्पतिवार	वहस्पतिवार
46.	रविवार	रविवर	।
47.	केला	केल	।

S. No.	Word List	Deletion	Phoneme deletion
48.	खाता	खात	।
49.	गेंद	गद	
50.	जूते	जूत	

3) Number of Addition = 12 errors

S. No.	Word List	Addition	Phoneme added
1.	कुर्सी	कुरस	र
2.	बिल्ली	कुरस	र
3.	बिल्ली	बीलली	ल
4.	लोहा	लहवा	वा
5.	छोटा	लहवा	वा
6.	लम्बा	लमबा	म
7.	लिखना	लीकख	क
8.	पिता	पपीत	प
9.	लड़की	लड़ीकी	ी
10.	सड़क	सड़की	ी
11.	नवम्बर	नावम्बर	।
12.	शनिवार	शनिवर	।

4) Number of Metathesis = 2 errors

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	बकरी	बरती	र
2.	कलम	कमल	लम

5) Number of others = 2 errors

S. No.	Word List	other	
1.	तरबूज	तरतीबी	
2.	लालची	लाशकय	

V) Total number of errors produced in reading Hindi word list = 12 errors

1) Number of substitution = 11 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	कागज	काजू	ग/म
2.	बिल्ली	बेल/बैल	
3.	कुत्ता	कुता/कुर्ता	त्त, आ ^१
4.	नाना	नानी	।/ी
5.	मजदूर	मंदिर	
6.	घोड़ा	घड़ी	
7.	घड़ी	घड़ा	
8.	रोना	रानी	

S. No.	Word List	Substitution	Phoneme substitution
9.	उठाना	बोलना/उठना	
10.	खरगोश	खीरा	
11.	दौड़ना	देखना	

2) Number of Deletion = 5 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	कागज	काजू	ग
2.	बिल्ली	बेल/बैल	ल
3.	कृता	कुता	र
4.	गुब्बारा	गबरा	ब
5.	खरगोश	खीरा	

3) Number of Addition = 0

4) Number of Metathesis = 0

V) Total number of errors produced in Reading test of English word list – 21 errors

S. No.	Word List	Substitution(Transcription)	Phoneme substitution
1.	Violet	voʊt	
2.	Fair	fər	
3.	far	fər	
4.	Pant	plɑnt	
5.	Great	gredər	
6.	Branch	bɪk	
7.	correct	kərɛkt	
8.	wrong	vɔm	
9.	Know	keno	
10.	evening	evəri	
11.	zig-zag	zɪp	g/p
12.	light	lækt	ai
13.	stair	sɪər	ea/a
14.	divide	drav	

2) Number of Deletion = 9 errors

S. No.	Word List	Deletion(Transcription)	Phoneme Deletion
1.	Violet	voʊt	le
2.	Golden	gold	en
3.	fair	fər	a
4.	lily	li	li
5.	Branch	bɪk	r
6.	evening	Evri	ɪŋ
7.	Zig-zag	zip	zag
8.	zero	zo	er
9.	multiply	mɛltɪ	plai

3) Number of Addition = 4 errors

S. No.	Word List	Addition(Transcription)	Phoneme addition
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S. No.	Word List	Addition(Transcription)	Phoneme addition
1.	Pant	plant	l
2.	know	keno	k
3.	Eye	aɪz	z
4.	Own	onər	ər

4) Number of Metathesis = 2 errors

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	Month	mauth	n/u
2.	zig-zag	zip	g/p

CASE STUDY – 16

Name : AN
Age : 12 years, Male
Mother tongue : Punjabi, Hindi

I) Total number of errors produced in copying English word list = 8 errors

1) Number of Substitution = 8 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	Laugh	Lough	a/o
2.	Elephant	ElePhant	p/P
3.	Drink	DRink	r/R
4.	Subtraction	Seibtraction	u/ei
5.	Eat	Eab	t/b
6.	Tony	iony	T/i
7.	the	The	t/T
8.	their	Their	t/T

2) Number of Deletion = 1 errors

S. No.	Word List	Deletion	Phoneme Deletion
1.	Donkey	Donky	e

3) Number of Addition = 2 errors

S. No.	Word List	Addition	Phoneme Addition
1.	cry	cery	e
2.	Write	Worite	o

4) Number of Metathesis = 0

II) Total number of words produced in Copying Hindi word list= 0

III) Total number of errors in Hindi Dictation of word list – 41 errors

1) Number of Substitution = 14 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	कबूतर	कूतरी	क/कू

S. No.	Word List	Substitution	Phoneme substitution
2.	रस्सी	रीसी	र/री
3.	समझना	समजना	झ/ज
4.	पूछना	पुछना	\ / उ
5.	नीला	नीचा	ला/चा
6.	नाव	नोओ	ना/नो, व/ओ
7.	माता	मावा	ता/वा
8.	पिता	पापा	पि/ा, त/प
9.	साधू	साधु	\ / उ
10.	आलू	आलु	\ / उ
11.	गोभी	गोबी	भ/ब
12.	तरबूज	तरबुज	\ / उ
13.	झूठ	झूट	ठ/ट
14.	पढ़ना	पड़ना	ढ़/ड़

2) Number of deletion = 27 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	पपीता	पीता	प
2.	फूल	फल	.
3.	जंगल	जगल	.
4.	कबूतर	कूतरी	बू
5.	मजदूर	मजदर	.
6.	घड़ा	घड़	ा
7.	घोड़ा	घोड़	ा
8.	गुब्बारा	गबारा	,, ष
9.	रस्सी	रीसी	र
10.	उठाना	ऊठना	ा
11.	दौड़ना	दड़ना	ौ
12.	हँसना	हसना	ँ
13.	सोचना	सचना	सो
14.	नहाना	हाना	न
15.	लिखना	लखना	ि
16.	कूटना	कटना	.
17.	सीखना	सीखन	ा
18.	पहनना	पहैना	न
19.	सुखाना	सुखन	ा

S. No.	Word List	Deletion	Phoneme deletion
20.	सफेद	सेद	फ
21.	माला	माल	।
22.	आँख	आख	.
23.	आम	अम	।
24.	भाई	भई	।
25.	दाल	दल	।
26.	लालची	लाची	ल
27.	कछुआ	कछवा	.

3) Number of Addition = 2 errors

S. No.	Word List	Addition	Phoneme Addition
1.	कुर्सी	कूरसी	र
2.	गेंद	गेनद	न

4) Number of Metathesis = 0

IV) Total number of errors produced in reading test of English word list = 55 errors

1) Number of Substitution = 35 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	sugar	surəj	
2.	color	kɔlə	ə/ɔ
3.	brush	bruʃ	ə/u
4.	paint	pent	e/ɛ
5.	violet	waɪt	v/w
6.	son	sɒn	ə/ɔ
7.	month	mədər	
8.	stair	stɑr	ea/a
9.	skip	ski:p	ɪ/i:
10.	Fun	fɛn	ə/ɛ
11.	laugh	loug	f/g
12.	little	laɪt	ɪ/aɪ
13.	Bad	bed	ɛ/e
14.	fair	fəry, fər	ea/ə
15.	ship	ʃaɪ	ɪ/aɪ
16.	Dress	drɪs	ɛ/ɪ
17.	shoes	ʃəʃ	u/ə
18.	shine	ʃɪne	aɪ/ɪne
19.	some	somi	ə/o
20.	saw	savə	ɔ/a

S. No.	Word List	Substitution	Phoneme substitution
21.	Great	grɪt	e/i
22.	was	bɛts	
23.	Lily	laɪ	ɪ/aɪ
24.	Night	nɪghaɪt	aɪ/ɪghaɪt
25.	Eye	ɪys	a:ɪ/ɪys
26.	Face	fɪk	es/ɪk
27.	Hair	hɛr	ea:/ə
28.	Aeroplane	əpɛl	
29.	Cross	kɛlərs,klas	
30.	zero	zebra	
31.	Divide	dɪvaɪd	
32.	Take	təkeɪ	e/ə
33.	listen	lɪstən	ən/tən
34.	music	muzɪk	ɪu/u
35.	light	laɪt	aɪ/i

2) Number of Deletion – 11 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	Water	wɔ:t	ə
2.	Golden	gɒnd	ol
3.	Dad	dɛ,də	d
4.	ship	ʃaɪ	p
5.	Lily	laɪ	li
6.	Lotus	ləts	ə
7.	Correct	kəreɪt	k
8.	Hair	hɛr	e
9.	Air	a:ɪ	eə
10.	Subtraction	ʃhət	
11.	Multiply	mʌltɪ	plɑɪ

3) Number of Addition – 12 errors

S. No.	Word List	Addition	Phoneme addition
1.	tea	tɛn,tɛ	n
2.	silver	sɪlɪvɛr	i
3.	Bronze	bɹɒnʒi	i
4.	Pet	pɛnt	n
5.	God	gɒld	l
6.	Branch	bɹɑncəs	əs
7.	wrong	vɹɒŋg	v
8.	know	kenə	ke
9.	night	nɪghaɪt	g

S. No.	Word List	Addition	Phoneme addition
10.	leg	ling	ŋ
11.	Zero	zebra	b
12.	own	oven	ve

4) Number of Metathesis/Reversal = 2 errors

S. No.	Word List	Metathesis	Phoneme interchanged
1.	sugar	surəj	gər/rəj
2.	pot	ɔp	p/t

CASE STUDY – 17

Name : DH
 Age : 13 years, Male
 Mother Tongue : Hindi

- I) Total number of errors produced in Copying English word list = 0
 II) Total number of errors produced in Dictation of English word list = 1 error
 1) Number of Substitution = 0+2
 2) Number of Deletion = 0
 3) Number of addition = 3

S. No.	Word List	Addition	Phoneme added
1.	Lily	lilly	l
2.	Tony	Toony	o
3.	Tony's	Toonies	o,ies

S. No.	Word List	Substitution	Phoneme substitution
1.	the	a	
2.	one's	once	

4) Number of Metathesis = 0

- III) Total number of errors produced in copying Hindi word list = 2 errors
 1) Number of Substitution = 2 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	नीला	निला	ि/ि
2.	फरवरी	फरवरि	ि/ि

- 2) Number of Deletion = 0
 3) Number of Addition = 0
 4) Number of Metathesis = 0

- IV) Total number of errors produced in Dictation of Hindi word list
 44+2+11=57

1) Number of Substitution = 46 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	पपीता	पपिता	ि/ि
2.	फूल	फुल	ु

S. No.	Word List	Substitution	Phoneme substitution
3.	कुर्सी	कोरसी	कु/को
4.	कबूतर	कबुतर	, / उ
5.	तोता	जोता	त/ज
6.	मेज	मैज	/ ै
7.	मजदूर	मजदोर	दू/दो
8.	गुब्बारा	गौबारा	गु/गौ
9.	छोड़ना	चौड़ना	छो/चौ
10.	सोचना	सोचवा	ना/वा
11.	पीना	पिना	े/ि
12.	पूछना	पुछना	, / उ
13.	पीसना	पिसना	े/ि
14.	कूटना	कौटना	कू/कौ
15.	सीखना	सिखना	सी/सि
16.	गोभी	गोबी	भ/ब
17.	गाड़ी	धाड़ी	गा/धा
18.	सेब	सैब	/ ै
19.	नापना	वापवा	न/व
20.	सुखाना	सुवाना	खा/वा
21.	पीला	पिला	े/ि
22.	नीला	निल	े/ि
23.	सफेद	सफैद	/ ै
24.	भूरा	बौरा	भू/बौ
25.	बाजा	बाजौ	जा/जौ
26.	पेड़ा	पैड	/ ै
27.	साधू	साधो	धू/धो
28.	अमरूद	अमरीद	रू/री
29.	आलू	आली	लू/ली
30.	गेंद	गैंद	/ ै
31.	मोटा	मौटा	ा / ौ
32.	झूठ	जोट	झू/जो, ठ/ट
33.	पपीता	पपिता	े/ि
34.	तरबूज	तरबोज	बू/बो
35.	चूहा	चोहा	, / ो
36.	शेर	शैर	/ ै

S. No.	Word List	Substitution	Phoneme substitution
37.	कछुआ	कछवी	छु/छ, आ/वी
38.	हूँ	ही	
39.	मेरे	मैर	/ ^१
40.	जूते	जुते	, / _३
41.	मेरी	मोरी	/ ी
42.	चोर	चौर	ी/औ
43.	फट	कट	फ/क
44.	फूल	फुल	, / क
45.	पसंद	पसंद	
46.	सोनी	सोनि	ी/ि

2) Number of Deletion = 6 errors

S. No.	Word List	Deletion	Phoneme Deletion
1.	बिल्ली	बिली	ल्
2.	कुत्ता	कुता	त्
3.	गुब्बारा	गौबारा	ब्
4.	रस्सी	रसी	स्
5.	नहाना	नहना	ा
6.	काला	कला	ा

3) Number of Addition = 3 errors

S. No.	Word List	Addition	Phoneme added
1.	कुर्सी	कोरसी	र
2.	बहन	बहैन	
3.	पतला	पताला	ा

4) Number of Metathesis = 2 errors

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	मार्च	मार्ज	च/ज
2.	जून	चुन	जू/चु

CASE STUDY 18

Name : TS
Age : 13 years
Mother Tongue : Hindi

I) Total number of errors produced in Copying English word list, Poem and Paragraph = 21 errors

1) Number of Substitution = 15 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	chair	cnair	h/n

S. No.	Word List	Substitution	Phoneme Substitution
2.	Green	green	G/g
3.	month	montn	h/n
4.	See	soe	e/o
5.	Pant	Pont	a/o
6.	Some	Same	o/a
7.	Wrong	Wrang	o/a
8.	Mouth	Mauth	o/a
9.	Elephant	6lephant	E/6
10.	Cross	Crass	o/a
11.	four	faur	o/a
12.	sum	svm	u/v
13.	zig-zag	zig-zig	a/i
14.	Errors in poem-2		
15.	Wax	fox	w/f, a/o
16.	box	boy	x/y

2) Number of Deletion – 4 errors

S. No.	Word List	Deletion	Phoneme Deletion
1.	Right	Righ	t
2.	Multiply	Muliply	t
3.	one's	ones	'
4.	Tony's	Tonys	'

3) Number of Addition – 1error

S. No.	Word List	Addition	Phoneme Addition
1.	ball	baill	i

4) Number of Metathesis = 0

II) Total number of errors produced in English Dictation of word list, Poem and Paragraph = 71 errors

1) Number of Substitution = 47 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	Sun	suN	n/N
2.	Moon	MooN	n/N
3.	coffee	coFFer	f/F, e/r
4.	chair	chHare	h/H, ir/re
5.	Pen	PeN	n/N
6.	Colour	colovr	u/v
7.	paint	print	a/r
8.	White	wather	
9.	Pink	prinkey	
10.	Black	blacA	k/A
11.	Golden	guredan	l/r
12.	Silver	Sealvar	i/ea,l/d,e/a
13.	Bronze	Brovgeda	n/v, Z/g
14.	Son	svn	o/v
15.	Month	maneysh	o/a, t/s
16.	Stair	savr	i/v

S. No.	Word List	Substitution	Phoneme Substitution
17.	wash	wathef	s/t
18.	laugh	claff	gh/ff
19.	Dad	did	a/i
20.	bottle	potter	b/p, e/r
21.	litle	littor	le/or
22.	Fair	Fare	i/r
23.	ship	shopp	i/o
24.	Shirt	shart	i/a
25.	Dress	Dranchar	e/a
26.	shoes	shous	e/u
27.	shine	shaldared	
28.	some	same	o/a
29.	Great	get	
30.	Branch	Robach	
31.	Read	Raday	
32.	evening	eyea	
33.	mouth	movse	u/s, t/s
34.	face	fausl	c/s
35.	Hair	hear	ai/ea
36.	Hand	hen	a/e
37.	Elephant	Elaphant	e/a
38.	Cross	crass	o/a
39.	Zig-zag	ji	z/j
40.	own	one	
41.	Sve	siy	x/y
42.	Multiply	multiply	l/t
43.	wash	vasap	w/v
44.	sleep	should	l/h
45.	Listen	Ease	L/E
46.	Music	Muse	i/e
47.	Heavy	Havgo	y/g

2) Number of Deletion = 11 errors

S. No.	Word List	Deletion	Phoneme Deleted
1.	Stair	Savr	t
2.	little	littor	l
3.	Great	get	r,a
4.	Evening	eyea	ning
5.	mouth	movse	th
6.	Hand	hen	d
7.	zig-zag	ji	g
8.	zero	or	ze
9.	addition	addy	tion
10.	Drink	DIND	r
11.	Music	muse	c

3) Number of Addition = 17 errors

S. No.	Word List	Addition	Phoneme Addition
1.	Pink	Prinkey	r,ey
2.	Brown	Brovndd	dd
3.	Golden	gvredan	e
4.	Laugh	claff	c
5.	ship	shopp	p
6.	pant	peant	e
7.	Greed	greadeB	eB
8.	leaf	leaft	t
9.	Read	Raday	y
10.	face	fause	u
11.	leg	leag	a
12.	To	teah	ah
13.	Eight	Enight	n
14.	Give	give of	of
15.	take	thadd	h,d
16.	took	tooke	e
17.	wash	vasap	ap

4) Number of Metathesis/ Reversal = 4 errors

S. No.	Word List	Metathesis	Phoneme interchanged
1.	Bottle	pottlr	b/p
2.	Bad	bag	d/g
3.	Branch	Robach	
4.	four	frou	our/rou

5) Number of other = 16

S. No.	Word List	Other	
1.	Orange	oeronlan	
2.	Bronze	Brovgeda	
3.	Month	Maneysh	
4.	Wash	wathef	
5.	Dress	Dranchar	
6.	Shine	shaldared	
7.	was	wath etal	
8.	Rose	gdoddordog	
9.	lily	lillawd	
10.	Lotus	lovrtaal	
11.	Rectangle	Reashctall	
12.	Subtraction	sholbd	
13.	Divide	depolof	
14.	take	thadd	
15.	Heavy	Havgo	
16.	Candle	crlaifle	

III) Total number of errors produced in Copying Hindi word list, days and months, sentences = 21+4+12 = 37

1) Number of substitution = 23 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	फूल	पुल	फू/पु
2.	तोता	तेता	तो/ते
3.	मजदूर	मजदुर	दू/दु
4.	गुब्बारा	गुव्वारा	ब्बा/व्वा
5.	छोड़ना	छेड़ना	छो/छे
6.	पूछना	पुछना	पू/पु
7.	कूटना	कुटना	कू/कु
8.	साधू	साधु	धू/धु
9.	आलू	आलु	लू/लु
10.	गाभी	गोमी	भी/मी
11.	बहन	वहन	ब/व
12.	मोटा	मोढा	ट/ढ
13.	झूठ	झुठ	, / उ
14.	तरबूज	तरबुज	, / उ
15.	चूहा	चुहा	, / उ
16.	जून	जुन	, / उ
17.	हूँ	हुँ	, / उ
18.	पास	पाअ	स/अ
19.	जूते	जुते	, / उ
20.	चोरी	चेरी	चो/चे
21.	करके	करवे	के/वे
22.	स्कूल	स्कुल	, / उ
23.	भाग	आग	भा/आ

2) Number of Deletion = 7

S. No.	Word List	Deletion	Phoneme deleted
1.	कुर्सी	कुसी	
2.	रानी	रान	ी
3.	शाम	शम	ा
4.	साड़ी	सड़ी	ा
5.	अप्रैल	अपैल	
6.	किताब	कितब	ा
7.	कुत्ता	कुता	त्

3) Number of Addition= 6 errors

S. No.	Word List	Addition	Phoneme Addition
1.	आँख	आखा	।
2.	गाय	गाया	।
3.	अक्तूबर	अकतुबर	क
4.	अच्छी	अछछी	छ
5.	बस्ते	बस्ते	
6.	पसंद	पसनद	न

4) Number of Metathesis = 0

5) Number of other = 0

IV) Total number of errors produced in Hindi Dictation of word list, Names of the days and Months, Sentences = 47 errors

1) Number of Substitution = 25 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	पपीता	पपिता	पे/ि
2.	फूल	फुल	, /ु
3.	पानी	बीली	
4.	चिड़िया	चाड़िया	चि/चा
5.	जूता	जुता	, /ु
6.	घोड़ा	गोरा	घ/गए ङ/र
7.	गुब्बार	गुपब	
8.	उठाना	ऊठ	उ/ऊ, ठा/ठ
9.	बैठना	वेठन	बै/वे, ना/न
10.	दौड़ना	दोरन	दौ/दो, ङ/र, ।
11.	छोड़ना	घोड़ना	छ/घ
12.	समझना	समजन	झ/ज, ।
13.	पीना	पिना	पी/पि
14.	धोना	दोना	ध/द
15.	पीसना	पिसन	पे/ि, ना/न
16.	कूटना	कुतन	, /ु, ट/त, ना/न
17.	जोड़ना	चोरन	ज/च, ङ/र, ना/न
18.	तोलना	तोरन	ल/र, ना/न
19.	नापना	नपन	ना/न
20.	पूछना	पुघना	छ/घ
21.	तरबूज	तरबुज	, /ु
22.	चूहा	चुवा	, /ु, ह/व
23.	बकरी	बकड़ी	र/ड़

S. No.	Word List	Substitution	Phoneme substitution
24.	शोर	शोर	/ो
25.	कछुआ	कुहवा	क/कु, छु/ह, अ/व

2) Number of Deletion = 24 errors

S. No.	Word List	Deletion	Phoneme deleted
1.	कागज	कगज	।
2.	कुर्सी	कुसी	
3.	बिल्ली	बीर	ल्ली
4.	कुत्ता	कुता	त्
5.	मजदूर	मजुर	दूर
6.	घड़ी	घड़	ी
7.	गुब्बारा	गुपब	ब्बारा
8.	रस्सी	रसी	स्
9.	उठाना	ऊठ	।, ना
10.	चलना	जल	च/ज, ना
11.	दौड़ना	दोरन	।
12.	हँसना	हँसन	।
13.	पकड़ना	पकड़न	।
14.	बताना	बतना	।
15.	पकाना	पकन	।
16.	पीसना	पिसन	।
17.	पढ़ना	पढ़	ना
18.	लिखना	लिखन	।
19.	बोलना	बोलन	।
20.	सीखना	सीखन	।
21.	नापना	नपन	।
22.	पहनना	पहन	ना
23.	उतारना	ऊतरन	।
24.	सुखाना	सुखन	।

3) Number of Addition = 1error

S. No.	Word List	Addition	Phoneme addition
1.	कबूतर	कुबुतर	,

4) Number of Metathesis = 7 errors

S. No.	Word List	Metathesis	Phoneme Metathesis
1.	चलना	जल	च/ज
2.	सोचना	सोजन	च/ज

5) Number of others = 2 errors

S. No.	Word List	other	
1.	पानी	बीली	
2.	गुब्बारा	गुपब	

CASE STUDY - 19

Name : SS
 Age : 15 Years, Female
 Mother Tongue : Hindi

I) Total number of errors produced in copying English word list = 4 errors

1) Number of Substitution = 1 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	Food	Foad	o/a

2) Number of Deletion = 0

3) Number of Addition = 0

4) Number of Metathesis = 1

S. No.	Word List	Metathesis	Phoneme reversal
1.	Pink	Piuk	n/u

5) Number of others = 2

S. No.	Word List	others	
1.	Green	Geen	
2.	Cry	Cy	

II) Total number of errors produced in Dictation of English word list = 31 errors

1) Number of Substitutions = 11 errors

S. No.	Word List	Substitution	Phoneme Substitution
1.	Agreement	agriment	e/i
2.	French	Franch	e/a
3.	parade	purad	a/u
4.	laugh	lough	a/o
5.	Greed	Gread	e/a
6.	Lily	Lili	y/i
7.	Branch	Brunch	a/u
8.	Right	worite	
9.	Aeroplane	Aroplain	one/ain
10.	Zig-zag	zig-zak	g/k
11.	own	cone	

2) Number of Deletion = 08

S. No.	Word List	Deletion	Phoneme deletion
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S. No.	Word List	Deletion	Phoneme deletion
1.	Wrong	Rong	w
2.	else	els	e
3.	heavenly	heavly	en
4.	parade	purad	e
5.	Balloons	Baloons	l
6.	Aeroplane	Aroplain	e
7.	Divide	Divid	e
8.	Multiplication	Multipication	l

3) **Number of Addition = 9 errors**

S. No.	Word List	Addition	Phoneme addition
1.	Agreement	Agrriment	r
2.	Bottle	Bottale	a
3.	Pant	Panet	e
4.	Lotus	Loutas	u
5.	Right	Worite	o
6.	Cross	Crros	r
7.	Circle	cicule	u
8.	four	foure	e
9.	Hair	heair	e

4) **Number of Metathesis/Reversal=3 errors**

S. No.	Word List	Metathesis	Phoneme Interchanged
1.	Violet	Voilat	io/oi
2.	Month	Mouuth	n/u
3.	Drink	Driuk	n/u

III) **Total number of errors produced in reading English word list = 10 errors**

1) **Number of Substitution = 9 errors**

S. No.	Word List	Substitution	Phoneme substitution
1.	Duty	dəʃi	ɪu/ə
2.	Else	elzi	s/zi
3.	Loyal	loyal	ə/a
4.	Horse	haus	ɔ/au
5.	France	frenc	a/e
6.	German	gɪərman	j/g
7.	Parade	pəraɪ	ə/i
8.	Balloons	bɔlnəs	ə/ɔ
9.	Arrangement	əgrɪmənt	

2) **Number of Deletion = 0 error**

3) **Number of Addition = 2 errors**

S. No.	Word List	Addition	Phoneme Addition
1.	Wrong	rɔŋgər	ər
2.	Parade	pəraɖi	i

4) Number of Metathesis/Reversal = 1error

S. No.	Word List	Metathesis	Phoneme reversal
1.	Balloons	bɔlnəs	uns/nəs

IV) Total number of errors produced in Copying Hindi word list =5 errors

1) Number of Substitution = 4 errors

S. No.	Word List	Substitution	Phoneme substitution
1.	रोटी	राटी	रे/र
2.	मोटा	माटा	रे /र
3.	दोस्त	ढोस्त	द/ढ
4.	दाल	ढाल	द/ढ

2) Number of Deletion = 1error

S. No.	Word List	Deletion	Phoneme deletion
1.	काला	काल	ल

3) Number of Addition = 0

4) Number of Metathesis/Reversal = 0

V) Total number of errors produced in Reading test of Hindi word list = 4 errors

1) Number of Substitution = 0

2) Number of Deletion = 2 errors

S. No.	Word List	Deletion	Phoneme deletion
1.	वर्षाकालीन	वर्ष कालीन	ल
2.	समाप्त	स्मात	प

3) Number of Addition = 1 error

S. No.	Word List	Addition	Phoneme Addition
1.	पढ़ना	पढ़ाना	न

4) Number of Metathesis = 2 errors

S. No.	Word List	Metathesis	Phoneme interchanged
1.	लड़की	लकड़ी	ड़की/कड़ी

Appendix II
TEST FOR STUDENTS

Name _____

Age _____

Mother Tongue _____

Languages known _____

Linguistic Background

Languages spoken at home _____

Languages spoken at School _____

Father's Language _____

Mother's Language _____

Word List

To put in notes – alveolar stops may alternate with retroflex stops, schwa may alternate with /a/.

Sun	sən	Violet	vəɪlət
Moon	mu:n	Brown	braʊn
Star	stɑ:(ə)/stɑ:r	Black	blæk
Sky	skai	Orange	ɔrɛnj
Water	wɔ:(t)ətə	Golden	gɒldn
Food	fu:d	Silver	sɪlvə
Tea	ti:	Bronze	brɒnz
Milk	mɪlk	Son	sən
Coffee	kɒfi:	Month	mənθ
Sugar	ʃʊgə:/ʃʊgər	Stair	steə
Table	teɪbəl	Skip	skɪp
Chair	çɛ:(ə)/çɛ:r	Wash	wɔʃ
Pen	pɛn	Fun	fʌn
Color	kələ/kələr	Love	ləv
Brush	brʌʃ	See	si:
Paint	peɪnt	Cry	kraɪ
Red	rɛd	Laugh	lɑ:f
Blue	blu	Dog	dɔ:g
Green	grɪ:n	Pot	pɒt
Yellow	jeləʊ	Pet	pɛt
White	waɪt	God	gɔ:d
Pink	pɪnk	Bat	bæt
Dad	dæ:d	Leaf	li:f
Ball	bɔ:l	Branch	brɑ:nc
Bottle	bɒtl	Root	ru:t
Little	lɪtl	Write	raɪt
Bad	bæ:d	Read	ri:d
Good	gʊd	Right	raɪt
Fair	fɛ:ə	Correct	kə'rekt
Far	fɑ:	Wrong	rɔ:ŋ(g)
Fish	fɪʃ	Yes	jɛs
Ship	ʃɪp	No	nəʊ
Pin	pɪn	Know	nəʊ
Shirt	ʃɜ:t	Night	naɪt
Pant	pæ:nt	Day	deɪ
Dress	dres	Evening	i:vnɪŋ
Shoes	ʃu:z	Eye	aɪ
Shine	ʃaɪn	Ear	i:ər
Some	səm	Nose	nəʊz
Saw	sɔ:	Mouth	maʊθ
Great	gre:t	Lips	lɪps
Was	wɔz	Teeth	ti:t

Greed	gri:d	Face	fe:s
Rose	rɔ:z	Hair	hɛ:ə
Lily	lɪli	Air	ɛ:ə
Lotus	lo:təs	Aeroplane	ɛ:roʊple:n
Flower	flaʊər/fla:r	Hand	hænd
Leg	lɛg	Three	θri:
Monkey	mənki	Four	fɔ:r
Donkey	dɒnki	Five	faɪv
Cat	kæt	Sum	səm
Elephant	ɛlɪfənt	Addition	ədɪʃən
Cross	kɹɒs	Subtraction	səʊtrækʃən
Circle	sɜ:kl	Multiply	mʌltɪplaɪ
Square	skwɛ:	Divide	daɪvaɪd
Rectangle	rɛktæŋgl	Give	gɪv
Zig-zag	zɪg-zæɡ	Take	te:k
One	wən	Look	lʊk
Zero	zi:ro	Eat	i:t
Own	o:n	Drink	drɪŋk
Two	tu:	Wash	wɒʃ
To	tu:	Sleep	sli:p
Too	tu:	Listen	lɪsn
Ten	tɛn	Hear	hiər
Eight	e:t	Music	myu:zɪk
Nine	nain	Light	laɪt
Six	sɪks	Heavy	hevi
Seven	sɛvən	Candle	kændl

Copy the following poem:-

Jerry got a big ball

Tony stole the big ball

Jerry got a small box

Box was full of wax

Tony's hand got stuck to it.

Tony got scared.

Jerry asked Tony, who stole the big ball?

Tony brought back the big ball.

Jerry took back the small box.

Jerry and Tony became good friends.

Copy the following paragraph:-

There are different ways of serving God. There are different ways of reaching God too. Great men have said that work is worship. God wants everyone to work hard and earn his bread. God does not like people who spend all their time in chanting his name without doing anything to earn their bread. Doing one's duty is the best method of worshipping God.

Maths Test

1) Add

- a) $6+6 =$ $6+7 =$ $8+6 =$
 $9+4 =$ $4+8 =$ $3+2 =$
- b) $24+69 =$ $72+89 =$ $36+69 =$
- c) $124+167 =$ $368+936 =$ $286+893 =$

2) Subtract

- a) $8-4 =$ $9-6 =$ $6-3 =$
- b) $39-16 =$ $26-8 =$ $15-14 =$
- c) $261-132 =$ $328-264 =$ $936+836 =$

3) Multiply

- a) $2 \times 3 =$ $3 \times 3 =$ $4 \times 3 =$
- b) $24 \times 3 =$ $13 \times 6 =$ $19 \times 6 =$
- c) $154 \times 5 =$ $268 \times 6 =$ $344 \times 3 =$

4) Divide

- a) $8/2 =$ $9/2 =$ $6/3 =$
- b) $18/3 =$ $24/6 =$ $96/3 =$
- c) $245/5 =$ $168/3 =$ $150/5 =$

Number Writing Test

Q. 1. Write Numbers from 15-35?

Q. 2. Write numbers from 35-85?

Q. 3. Write numbers from 120-190?

Hindi Questionnaire prepared to examine Special children with learning disability

Hindi writing and reading Tests for students

Hindi Word List

S. No.	Word List	Phonetic Transcription	English translation
1.	कमल	Kəməl	Lotus
2.	पपीता	Pəpita	Papaya
3.	फूल	Phul	Flower
4.	कागज	Kagəz	Paper
5.	कुर्सी	KŪrsi	Chair
6.	जंगल	Jəngəl	Forest
7.	बिल्ली	BIlli	Cat
8.	कुत्ता	KUtta	dog
9.	पानी	Pani	Water
10.	नाना	Nana	Grand father
11.	कबूतर	Kəbutər	Pigeon
12.	तोता	tota	Parrot
13.	चिड़िया	chIrIya	Bird
14.	खरगोश	khərgosh	Rabbit
15.	जूता	juta	Shoe
16.	मेज	Mez	table
17.	मजदूर	məzdur	worker
18.	घर	ghər	House
19.	घड़ा	ghəɾa	Pot
20.	घड़ी	ghəɾi	Watch
21.	गुब्बारा	GUbbara	balloon
22.	रस्सी	rəssi	rope
23.	कपड़ा	kəɾa	cloth
24.	रोना	rona	to cry
25.	सोना	sona	to sleep
26.	उठाना	Uṭhana	wake up
27.	बैठना	bəṭhna	to sit
28.	चलना	cəlna	to walk

S. No.	Word List	Phonetic Transcription	English translation
29.	दौड़ना	Dorna	to run
30.	हँसना	həsna	to Laugh
31.	पकड़ना	pəkərna	to catch
32.	छोड़ना	chorna	to leave
33.	सोचना	socna	to think
34.	समझना	Səməjhna	to understand
35.	खाना	khana	to eat
36.	पीना	pina	to drink
37.	नहाना	nəhana	to take bath
38.	धोना	dhona	to wash
39.	पूछना	puchna	to ask
40.	बताना	bətana	to tell
41.	पकाना	pəkana	to cook
42.	पीसना	pisna	to paste
43.	कूटना	kuṭna	to grind
44.	पढ़ना	pəṛna	to study
45.	लिखना	likhəna	to write
46.	बोलना	boləna	to speak
47.	सीखना	sikhna	to learn
48.	जोड़ना	jorna	to add
49.	तोलना	tolna	to weight
50.	नापना	napəna	to measure
51.	पहनना	pəhəna	to wear
52.	उतारना	utarna	to remove
53.	सुखाना	sukhana	to dry
54.	लाल	lal	red
55.	पीला	pila	yellow
56.	काला	kala	black
57.	नीला	nila	blue
58.	सफेद	səfed	white
59.	हरा	həra	green
60.	भूरा	Bhura	brown
61.	जहाज	jəhaj	ship

S. No.	Word List	Phonetic Transcription	English translation
62.	नाव	nao	boat
63.	माता	mata	mother
64.	पिता	pɪta	father
65.	चाचा	chacha	uncle
66.	चाची	chachi	aunti
67.	पेड़	peɾ	tree
68.	पौधा	pɔdha	plant
69.	गधा	gədha	donkey
70.	साधू	sadhu	saint
71.	आम	aam	mango
72.	अमरूद	əmrud	guava
73.	अनार	ənar	pomegranate
74.	अनारस	ənarəs	pineapple
75.	आलू	alu	Potato
76.	आग	aag	fire
77.	आँख	ankh	eye
78.	अलग	ələg	seperate
79.	कमल	kəməl	lotus
80.	कलम	kələm	pen
81.	लकड़ी	ləkri	wood
82.	लड़की	lərki	girl
83.	सड़क	səɾək	road
84.	गोभी	Gobhi	cauliflower
85.	कल	kəl	tomorrow
86.	नल	nəl	tap
87.	चल	cəl	walk
88.	पल	pəl	moment
89.	हल	həl	solution
90.	एक	ek	one
91.	दस	dəs	ten
92.	जल	jəl	water
93.	राजा	raja	king
94.	रानी	rani	queen

S. No.	Word List	Phonetic Transcription	English translation
95.	भाई	bhai	brother
96.	बहन	bəhən	sister
97.	गाड़ी	gaɽi	car
98.	बाजा	baja	musical instrument
99.	रोटी	roɽi	bread
100.	सेब	seb	apple
101.	रात	rat	night
102.	दिन	dɪn	day
103.	दोपहर	dopəhər	afternoon
104.	शाम	ʃam	evening
105.	गेंद	gend	Ball
106.	लोहा	loha	iron
107.	साड़ी	saɽi	sari
108.	मोटा	moɽa	fat
109.	पतला	pətəla	thin
110.	छोटा	choɽa	small
111.	लंबा	ləmba	tall
112.	सच	səc	true
113.	झूठ	ʒhutʰ	false
114.	दोस्त	dost	friend
115.	चावल	chawəl	rice
116.	दाल	dal	pulse
117.	तरबूज	tərbuz	watermelon
118.	तबला	təbla	tabla
119.	चूहा	cuha	mouse
120.	गाय	gay	cow
121.	बकरी	bəkri	goat
122.	शेर	ʃer	lion
123.	लालची	lalci	greedy
124.	कछुआ	kəɕua	tortoise
125.	जनवरी	jənuəri	January
126.	फरवरी	fərvəri	February

S. No.	Word List	Phonetic Transcription	English translation
127.	मार्च	marc	March
128.	अप्रैल	əprɛl	April
129.	मई	mɪi	May
130.	जून	jun	June
131.	जुलाई	julai	July
132.	अगस्त	əgəst	August
133.	सितंबर	sɪtəmbər	September
134.	अक्तूबर	əktubər	October
135.	नवंबर	nɒvembər	November
136.	दिसंबर	dɪsəmbər	December
137.	सोमवार	Somvar	Monday
138.	मंगलवार	Məngalvar	Tuesday
139.	बुधवार	budhvar	Wednesday
140.	बृहस्पतिवार/गुरुवार	brihəspətivar/Guruvar	Thursday
141.	शुक्रवार	ʃukrəvar	Friday
142.	शनिवार	ʃənivar	Saturday
143.	रविवार/इतवार	rəvivar/itvar	Sunday

No.	Sentence
1	मैं केला खाता हूँ। mɛ kela khata hu I eat banana.
2	मैं सेब नहीं खाता हूँ। mɛ seb nahi khata hu. I don't eat apple.
3	मैं गेंद से खेलता हूँ। mɛ gend se khelta hu. I play with ball.
4	मेरे पास पैसे हैं। mere pas pɛse hɛ I have money.
5	यह मेरी किताब है। Yəh meri kitab hɛ This is my book.

6	मेरे जूते मेरे नाना ने खरीदे हैं।
	Mere jute mere nana ne khəride hæ.
	My grandmother has bought my shoes.
7	चारू मेरी अच्छी दोस्त है।
	Charu meri əcchi dost hæ.
	Charu is my good friend
8	चोर चोरी करके भाग गया।
	cor cori kərke bhag gəya
	Thief stole and ranway
9	मुझे स्कूल में पढ़ना अच्छा लगता है।
	mUjhe iskul me pəɽna əccha ləgta hæ.
	I like studying in the school.
10	उसने मेरे बस्ते से कलम निकाला
	Usne mere bəste se kələm nikala
	He took out pen from my bag.
11	मेरी किताब फट गई है।
	Meri kitab phət gai hæ.
	My book is torn.
12	मुझे गुलाब के फूल बहुत पसंद है।
	Mujhe gulab ke phul bəhut pəsənd hæ.
	I like rose flower very much.
13	सोनी ने राम को पैसे दिए।
	Soni ne ram ko pəse diye.
	Soni gave money to Ram.
14	कुत्ता रोटी लेकर भाग गया।
	Kutta roṭi lekər bhag gəya
	Dog took the bread and ran away.
15	मैंने आज नए कपड़े पहने हैं।
	Məne a:j nəye kəpṛe pəhne hæ~
	Today I have worn a new cloth.

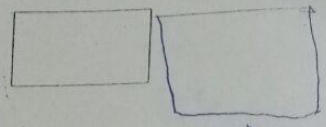
Appendix III
SAMPLE PAPER

problem with number sequencing.

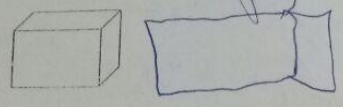
1. वाक्य	x	20. 24 वाक्य	x	40. वाक्य	x
2. पंक्तियाँ	x	21. वाक्य	x	41. वाक्य	x
3. पंक्तियाँ	x	22. वाक्य	x	42. वाक्य	x
4. वाक्य	x	23. वाक्य	x	43. वाक्य	x
5. वाक्य	x	24. वाक्य	x	44. वाक्य	x
6. वाक्य	x	25. वाक्य	x	45. वाक्य	x
7. वाक्य	x	26. वाक्य	x	46. वाक्य	x
8. वाक्य	x	27. वाक्य	x	47. वाक्य	x
9. वाक्य	x	28. वाक्य	x	48. वाक्य	x
10. वाक्य	x	29. वाक्य	x	49. वाक्य	x
11. वाक्य	x	30. वाक्य	x	50. वाक्य	x
12. वाक्य	x	31. वाक्य	x	51. वाक्य	x
13. वाक्य	x	32. वाक्य	x	52. वाक्य	x
14. वाक्य	x	33. वाक्य	x	53. वाक्य	x
15. वाक्य	x	34. वाक्य	x	54. वाक्य	x
16. वाक्य	x	35. वाक्य	x	55. वाक्य	x
17. वाक्य	x	36. वाक्य	x	56. वाक्य	x
18. वाक्य	x	37. वाक्य	x	57. वाक्य	x
19. वाक्य	x	38. वाक्य	x	58. वाक्य	x
		39. वाक्य	x	59. वाक्य	x
		40. वाक्य	x	60. वाक्य	x
		41. वाक्य	x	61. वाक्य	x
		42. वाक्य	x	62. वाक्य	x
		43. वाक्य	x	63. वाक्य	x
		44. वाक्य	x	64. वाक्य	x
		45. वाक्य	x	65. वाक्य	x
		46. वाक्य	x	66. वाक्य	x
		47. वाक्य	x	67. वाक्य	x
		48. वाक्य	x	68. वाक्य	x
		49. वाक्य	x	69. वाक्य	x
		50. वाक्य	x	70. वाक्य	x

SUN ✓	green ✓	5/9	pot ✓
MOON ✓	yellow ✓		pet ✓
Star ✓	Wather ✓	x 1/2	SOB ✓
Water ✓	Pinkay ✓		Bat ✓
Food ✓	Brown ✓		ink ✓
Tea ✓	Black ✓		Ball ✓
Milk ✓	rotor ✓		pot ✓
Coffee ✓	Suteday ✓		litter ✓
Table ✓	Seater ✓		Rag ✓
Chair X	Bags ✓		Bad ✓
Pen ✓	sun ✓		SOB ✓
Colours ✓	man ✓		Fate ✓ (Fan)
R	Sais ✓		Saff ✓
Blush ✓	Wather ✓		Rag ✓
Print ✓	FUN ✓		Fish ✓
Red ✓	Love ✓		SHAP ✓
	SEL ✓		SHAP ✓
	COY ✓		Pin ✓
	clap ✓		SHAP ✓
	Dog ✓		Peart ✓

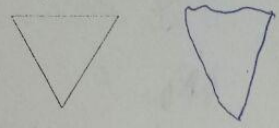
c)



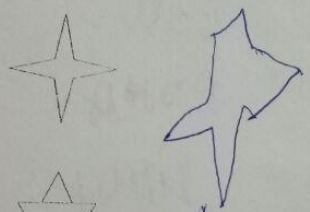
f)



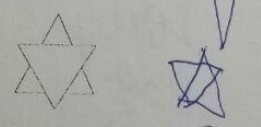
g)



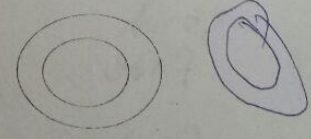
h)



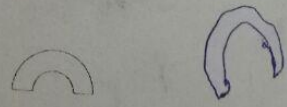
i)



j)



k)



3

Camden

Maths Test

12

$$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$$

i) Add

a) $6+6 = 6$ ✓ $6+7 = 13$ ✓ $8+6 = 14$ ✓

$9+4 =$ $4+8 =$ $3+2 =$

b) $24+69 =$ $72+89 =$ $36+69 =$

c) $124+167 =$

$368+936 =$

$286+893 =$

$$\begin{array}{r} 6 \\ + 7 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 6 \\ + 6 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 24 \\ + 69 \\ \hline 93 \end{array}$$

ii) Subtract

a) $8-4 =$ $9-6 =$ $6-3 =$

b) $39-16 =$ $26-8 =$ $15-14 =$

c) $261-132 =$ $328-264 =$ $936-836 =$

$$\begin{array}{r} 8 \\ - 4 \\ \hline 4 \end{array}$$

iii) Multiply

a) $2 \times 3 = 6$ ✓ $3 \times 3 = 9$ ✓ $4 \times 3 = 12$ ✓ $5 \times 6 = 30$ ✓

b) $24 \times 3 =$ $13 \times 6 =$ $19 \times 6 =$

$154 \times 5 =$ $268 \times 6 =$ $344 \times 3 =$

0/2