

Importance of Inclusive education in Indian Schools: Special focus on Dyslexic Children

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Abstract

The question of why some children have difficulty learning to read has been the focus of a great deal of research over the past four decades and much has been learnt about the probable and improbable causes of such difficulty. It is increasingly recognized that reading problems in such children are manifested in extreme difficulties in acquiring basic reading sub skills such as word identification, and phonological letter-sound decoding. In order to assist these students, CBSE has introduced an Inclusive Education Program wherein the students' need were used to cater with the qualified special educators and occupational therapist that use to deal with sensory issues of the differently-abled children. The present paper focuses on the cognitive markers of reading disability which incorporate phonological awareness, rapid automatization naming and working memory. As from the past researches it has been documented that dyslexics have a difficulty in developing conscious sensitivity to basic speech units (phonemes), and manipulating them (phonological awareness). From this study it has been proved that Dyslexics have difficulty in retaining the information for a brief period of time and this has been proved by the working memory test. Another significant finding which came into light was that dyslexic children have difficulty in reading words accurately and fluently and this is because the dyslexic children are phonologically deficit. The results suggest that dyslexic children have auditory processing deficits for phonological awareness tasks, rapid naming task and working memory.

Keywords: Dyslexia, Phonological awareness, working memory, rapid automatization naming.

1. Introduction

Dyslexia is a specific reading disability in which children fail to acquire language skills like reading, writing, and spelling commensurate with their intellectual abilities, despite conventional classroom experiences, adequate instruction, adequate socio-cultural opportunities, and the absence of sensory deficits in vision and hearing (DSM-IV, 1994). This reading disability comes under intellectual disability in DSM V. The difficulty mainly refers to impaired decoding, namely mapping between visual symbols and sequences of speech sounds. The decoding deficit is related to a difficulty in manipulating speech sounds rather than a difficulty in identifying visual symbols. Thus, dyslexics have a difficulty in developing conscious sensitivity to basic speech units (phonemes), and manipulating them (phonological awareness) (Demonet, 2004).

Because of the abstract nature of phonology, children are often unaware of some phonological aspects of language until their attention is directly drawn to these features of language. The knowledge that words are composed of individual phonemes does not become apparent to most language users until these units are explicitly highlighted through instruction and practice. Pre-schoolers as well as illiterate adults are generally unable to perform tasks that require the explicit segmentation of words into individual phonemes (Lundberg and Høien, 1991).

Differences between normal and poor readers have been consistently found on tasks that require rapid retrieval of names for common, serially presented letters, numbers, colors and simple objects. The difficulty poor readers have on these tasks cannot be attributed to differences in articulation rates, short-term memory difficulties, or visual scanning problems (Wolfe et.al, 2000). A growing body of literature has found that when children have phonological awareness and naming speed deficits, they are more impaired in reading than children with only a single deficit. Naming speed deficit should no longer be subsumed under phonological processing deficits because rapid naming not only involves accessing a phonological code but also a demanding array of attention, perceptual, conceptual memory, lexical and articulatory processes (Wolfe et. al, 2000).

The present paper focuses on the cognitive markers of reading disability which incorporate phonological awareness, rapid automatization naming and working memory. As from the past researches it has been documented that dyslexics have a difficulty in developing conscious sensitivity to basic speech units (phonemes), and manipulating them (phonological awareness). A handful of researches have well documented that Dyslexics have difficulty in rapid automatization naming, and verbal working memory.

1.1 Characteristics of Dyslexia

- i. Slow Word Recall
- ii. Average or Above Intelligence
- iii. Beyond third grade continuing to reverse and invert letters and transpose words
- iv. More difficulty decoding nonsense words than content words
- v. Difficulty decoding single words in isolation
- vi. Difficulty with letter/sound relationships
- vii. Confusing small words such as *at for to, said for and, does for goes.*
- viii. Transposes number sequences and arithmetic signs (+, -, x, =) although math skills are typically a strength
- ix. May have difficulty in learning to tell time
- x. Spelling is usually difficult, frequently spells the same word differently in a single piece of writing
- xi. Frequently able to decode a word they cannot spell
- xii. Listening comprehension is usually a strength and the student typically can comprehend at grade level what he hears orally
- xiii. Poor grasp of abstract concepts
- xiv. Difficulty in telling or retelling a story
- xv. Difficulty with rhyming words

Taking into account these characteristics of Dyslexia, CBSE has made certain provisions to cater to the needs of the special children into the main stream. CBSE has given the published latest circular under the ACT 2016 on 28th Dec, 2016 stating that there is need to extend the facilities to candidates with specified 21 disabilities as listed in the schedule of the said notification. Few of these provisions are mentioned as under:

1. Scribe and Compensatory time
2. Exemption from third language
3. Flexibility in choosing subjects

1.2 Objectives of the Study

This study was undertaken to investigate the following objectives:-

- i. To explore the markers of reading disabilities specific to reading domain.
- ii. To study the errors in English and Hindi Language. As Hindi is L1 and English is L2 in language acquisition. The possibility is that there are more errors in L1.

- iii. To examine the reading strategy of children.
- iv. To study the nature of errors made by poor readers.
- v. To understand the phonological awareness of the children.

1.3 Hypothesis

Based on the above objectives the following hypothesis has been formulated for this study:-

- i. The children with reading disability will perform poorly in speed naming tasks as compared to non dyslexic children.
- ii. Dyslexic children will commit more errors in phonological awareness tasks as compared to non dyslexic children.
- iii. The Dyslexic children will make more errors in terms of phonemic discrimination and orthographic coding.

2 Methodology

2.1 Sample

The sample included 130 children which comprises 65 Dyslexic children and 65 Normally progressing readers. Amongst 65 Dyslexic children (50 were males and 15 females) and within normally progressing readers (33 were males and 32 females). From the researches it became evident that the boys are more susceptible or vulnerable to dyslexia. The mean age of both the groups were 9.34 and 9.15 respectively. The first group of study sample were taken from ORKIDS Multidisciplinary Clinics which has five branches in Delhi, and another school from which data has been collected is Bal Vidya Bhawan, Connaught Place, New Delhi where there is a special wing for Dyslexic children. For the second group of sample i.e. Normally Progressing Readers, data was collected from ApeeJay School, Sainik Vihar, Pritampura, North West Delhi., India. Most of these children who have participated in the study were from middle to high socio-economic status background. The Demographic variables of each participant has been clearly noted by the researcher which includes all the details about their family, siblings and socio economic status, parental education and complaints reported by the teacher.

2.2 Phonological awareness tasks:

Here the researcher has aimed to investigate the phonological sensitivity in Hindi and English language of both the normal and dyslexic biliterate readers. It was hypothesized that dyslexic readers will perform poorly on phonological awareness tasks equally for both Hindi and English language and that difficulties with respect to phonological awareness will be related to difficulties in rapid naming tasks. The researcher has also examined if rapid naming would differentially predict difficulties with phonological awareness. Scientifically Based Reading Research (SBRR), (Adams, 2009) has developed these Phonological awareness tasks with English orthography which comprises of six tests: Rhyme Identification, Rhyme Production, Syllable Blending, Phoneme Deletion, Phoneme Substitution, and Syllable Deletion.

2.3 Phonological awareness Tasks with Hindi orthography:

This measure has been designed and developed at the Centre for Behavioural & Cognitive Sciences (CBCS), Pal, A., Kar, B.R. (2010). With respect to Hindi orthography four subtests has been developed.

- i. Phoneme deletion
- ii. Phoneme substitution task
- iii. Syllable Deletion task
- iv. Syllable Substitution

2.4 **Rapid Automatization Naming (RAN):** Developed by teachers' and experts rating. Rapid Automatization Naming (RAN), this test has been developed because a need was felt, that reading ability is one of the strong predictors of later reading success. It was developed by teachers' and experts rating. Rapid naming as the name suggests means reading the words accurately and fluently. Under the RAN test five subtests have been developed which are listed as under:

1. Word Reading in Bilingual Language
2. Non-Word Reading in Bilingual Language
3. Number naming
4. Irregular words

2.5 **Verbal Working Memory** (Kar, B.R., Rao, S.L., Chandramouli, B.A. &Thennarasu, K. 2004): Verbal working memory has three important components i.e. storage, manipulation of information and rehearsal. N back Task is based on the theoretical premise that two variables can affect verbal working memory i.e. word length and phonemic similarity. It consists of a '1 back task' and a '2 back task'. The '1 back task' consists of a list of phonemes. The list of phonemes is kept out of the subject's view. Each phoneme is presented at the rate of one phoneme per second. The subject is required to respond in terms of Yes or No for phonetically similar and dissimilar sounds respectively. The subject has to say 'yes' for each consecutively repeated sound and for the other sounds the response is 'no'.

2.6 Procedure

Before data collection the consent was taken from the head of the Institute ORKIDS, Multidisciplinary Clinics which consists of five branches all over Delhi. The children who fulfilled the above criteria were selected and a consent form was filled from their parents and their respective teachers. Followed by this, these children were further taken for assessment of several cognitive measures. These children were allowed for assessment from their respective teachers and their ORKID HEADS. The researcher appraised the owner of the ORKIDS Multidisciplinary Clinics and teachers for their vital contribution because without them the study would not have been accomplished. The researcher explained about the study to the teachers and the concerned parents on how their children would be benefitted from this study and in which aspect it will help to further strengthen their skills. In order to familiarize with the tests, which has been used in the study, the researcher has explained each and every measure to the parents as well as their teachers. Children were individually tested in a quiet room by the researcher.

2.7 Statistical Analysis

Statistical analysis was carried out using Statistical Package for Social Sciences (SPSS ver.17.0) and Qualitative, content analysis was also carried out in order to investigate the error pattern of the Dyslexic children in following steps.

- Step I** : Description of sample characteristics with descriptive statistics –percentage, mean, and standard deviation.
- Step II** : Group differences for sample characteristics were examined with independent t-test.
- Step III** : One-way ANOVA was employed to see the differences across grades and ages.
- Step IV** : Correlation was done to see the relation of Phonological awareness and RAN task.

Step V : One-way analysis of variance (ANOVA) was performed to compare the performance of good readers and poor readers to investigate the performance on each of the reading tasks and phonological awareness

3 Results

Table no. I shows the demographic composition of the sample, first variable in the given table, that is gender (male and female). It clearly shows that 78% of the boys are dyslexic and only 22% of the females are dyslexic. This data clearly depicts that boys are more vulnerable to be Dyslexic and this data is in line with the previous researches which shows that classroom behavioural observations of students which were recorded from the investigators have concluded that there is greater frequency of behavioural manifestations in boys with reading disability. (Mayo,2001). Other demographic variables viz., family income, socio economic status and parental education do not contribute much in differentiating between dyslexic and non-dyslexic children. These variables does not prove to be significant in the difference between the dyslexic and non dyslexic children. The important factor which needs to be brought to notice is the complaints or observation reported by the teachers. These are enlisted in Table 2. Phonological error, orthographic error, mixed errors, reading errors, problem with working memory and overlap with phonology and orthographic error. Phonological error accounts for 4.6% which implies that Dyslexic children are phonologically deficient and this difficulty stems from letter identification to assembling of the phonemes and utterances of the word. This finding is in tune with the phonological module which is dedicated to processing the distinctive sound elements that constitute language. This deficit impairs the ability to segment the written word into its underlying phonologic elements. Another error which has been reported by the teacher is the orthographic errors which accounts for 30.8% for Dyslexic and 26.2 % for non-dyslexic children. This indicates the dyslexic readers' reliance on sublexical process for word reading. Orthography is a graphic representation of language. Hindi is a transparent orthography where the mapping from grapheme to phoneme is largely consistent. However, it poses difficulty to the readers because of its complex graphemic features. Hindi is written in the Devanagari script. It consists of 48 letters and additional diacritical signs (Gupta & Jamal, 2006). Although Hindi is a transparent language and for most children, Hindi is L1 in language acquisition still they face difficulty in writing and reading this transparent script due to the diacritical signs and diphthongs (Gupta & Jamal, 2006). Several researches have been conducted in this domain from which it can be concluded that despite its transparency in nature the dyslexic children fail to read Hindi language successfully. Another problem which has been reported by the teachers is the mixed errors and it accounts to be 50.8%. Mixed errors are those errors where the responses that share both orthography and phonology with the target words cannot be placed in the category of either phonological or orthographic errors. For example, in Hindi, the target word *gubba:ra:* (balloon) was read as *doba:ra:* (again); in English, the target word *fright* was read as *fight*, i.e.the responses had phonetic as well as visual resemblance to the target words.

Table 1. Demographic composition of the sample.

Variables	Dyslexic Readers (n=65)	Non-Dyslexic Readers (n=65)
Gender		
Male	78%	50.8%
Female	22%	49.2%
Family income per month		
>70, 000	15%	24.6%
51,000-70,000	40%	30.8%

31,000-50,000	42%	33.8%
<30,000	3%	10.8
Socio economic status		
High	27.7%	29.2%
Medium	50%	50.8%
Low	21.5%	20.0%

Table 2. Complaints reported by the teacher

Complaints reported by the teacher	Dyslexic Readers (n=65)	Non-Dyslexic (n=65)	Readers
Phonologically deficit		---	
Orthographic deficit	4.6%	---	
Mixed errors	30.8%	1.5%	
Reading errors	50.8%	26.2%	
Problem with working memory	6.2%	---	
No specific problem	6.2%	60.0%	
Phonology & orthographic deficit	---	12.3%	

Table 3 presents the mean comparisons of the two groups on all the reading measures, phonological awareness, working memory, CPM and laterality. The results displayed in table 3 presents mean comparison between dyslexic readers and non dyslexic readers on study variables. From the table it clearly depicts that there is significant mean difference of group in all the tasks. There is no significant difference of group in Syllable Blending task since this task is part of the curriculum of dyslexic readers and it is regularly being practiced in their school setting and is also a part of their educational therapy.

Results displayed in Table 4 compares the performance speed of both groups i.e. dyslexic readers and non-dyslexic readers. From the table it is evident that both the groups shows the significant difference in performing all the tasks thereby it proves that there is significant difference of group between the dyslexic readers and non-dyslexic readers.

Table 3. Mean comparisons between Dyslexic Readers and Non-Dyslexic Readers on Study Variables

Tasks	Dyslexic Readers (Mean, SD)	Non- dyslexic Readers (Mean, SD)	F Ratio
VWM (1BACK)	6.95(1.12)	7.95 (.92)	66.96**
VWM (2BACK)	5.74(1.14)	7.29 (1.02)	18.75**
RI	17.38(2.61)	19.36(1.01)	32.61**
RP	10.72(3.82)	15.43(3.45)	53.57**

SB	19.61(1.13)	19.69(1.09)	.229
SD	17.35(3.26)	19.39(1.22)	22.10**
PD	14.40(5.41)	17.93(2.63)	32.24**
PS	14.09(4.65)	18.21(2.65)	34.48**
SDH	14.67(4.47)	17.12(2.96)	12.55**
SSH	10.78(4.64)	15.72(3.72)	39.62**
PDH	9.32(5.07)	14.95(4.39)	43.62**
PSH	12.04(6.16)	18.05(2.49)	50.00**

Note: -*Indicates $p < .05$ and ** indicates $p < .01$

CPM = Coloured Progressive Matrices ; VWM= Verbal Working Memory (1&2 BACK);RI = Rhyme Identification, RP= Rhyme Production, SB= Syllable Blending, SD= Syllable Deletion, PD= Phoneme Deletion, PS= Phoneme Substitution, SDH= Syllable Deletion (Hindi), SSH= Syllable Substitution (Hindi), PDH= Phoneme Deletion(Hindi), PSH= Phoneme Substitution (Hindi).

Table 4 Comparing Dyslexic Readers and non-Dyslexic Readers on Study Variables with respect to Speed

Tasks	Dyslexic Readers (Mean, SD)	Non- dyslexic Readers (Mean, SD)	F Ratio
RI	133.81(72.36)	82.32(47.52)	17.13**
RP	214.98(101.76)	164.40(84.29)	7.88**
SB	103.28(48.41)	72.98(41.36)	9.95**
SD	173.67(94.27)	106.78(48.85)	13.52**
PD	252.81(163.34)	142.03(74.64)	12.74**
PS	262.70(154.27)	158.75(73.96)	12.75**
SDH	199.46(77.99)	137.23(53.10)	77.26**
SSH	292.18(97.63)	207.84(86.65)	53.26**
PDH	274.60(106.41)	196.23(87.84)	50.73**
PSH	260.95(131.48)	154.47(57.91)	66.88**

Note: - * Indicates $p < .05$ and ** indicates $p < .01$

RI = Rhyme Identification, RP= Rhyme Production, SB= Syllable Blending, SD= Syllable Deletion, PD= Phoneme Deletion, PS= Phoneme Substitution, SDH= Syllable Deletion (Hindi), SSH= Syllable Substitution (Hindi), PDH= Phoneme Deletion(Hindi), PSH= Phoneme Substitution (Hindi).

Correlation Analysis

Pearson product moment correlation coefficients was calculated to evaluate the strength of the linear relationships among the study variables. The inter correlations of the study variables are presented in table 7. Pearson’s product moment correlation coefficients were computed between working memory, laterality and phonological awareness tasks to investigate if working memory is correlated with the development of phonological awareness which may affect learning to read. Performance on different phonological tasks was found to be significantly correlated with the working memory test. Results indicate that phoneme deletion, phoneme substitution, syllable substitution and syllable deletion task (Hindi) were significantly positively correlated with the working memory test.

Table 5: Inter-correlation of the study variables (N=130)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	
VWM1BA	-	1.0											
CKCK	.16	0											
	9												
VWM2BA	.25	.85	1.0										
CK	3**	5**	0										
RI	-	.42	.47	.35	1.0								
	.17	3**	6**	3**	0								
	9*												
RP	.25	.37	.50	.42	.50	1.0							
	6**	2**	2**	2**	6**	0							
SB	.10	.14	.14	.15	.38	.22	1.0						
	2	2	2	2	6**	2*	0						
SD	-	.43	.41	.47	.43	.39	.29	1.0					
	.18	2**	3**	4**	9**	7**	1**	0					
	4*												
PD	-	.40	.45	.29	.59	.53	.21	.46	1.0				
	.22	4**	1**	1**	8**	0**	5*	8**	0				
	0*												
PS	-	.49	.54	.36	.64	.52	.26	.51	.79	1.0			
	.14	1**	7**	2**	9**	8**	1**	0**	2**	0			
	0												
SDH	-	.44	.43	.33	.37	.41	.28	.53	.43	.44	1.0		
	.17	5**	4**	0**	3**	2**	4**	3**	3**	6**	0		
	2												
SSH	-	.44	.54	.46	.51	.52	.16	.46	.55	.58	.62	1.0	
	.16	9**	7**	6**	4**	7**	3	4**	0**	6**	9**	0	
	3												
PDH	-	.35	.45	.26	.53	.49	.11	.40	.54	.53	.41	.63	1.0
	.22	3**	2**	8**	1**	6**	5	5**	1**	8**	4**	9**	0
	0*												

PSH	-	.41	.44	.40	.60	.50	.13	.50	.66	.65	.53	.64	.65	1.
	.20	0**	3**	6**	9**	9**	1	2**	4**	6**	4**	4**	6**	00
	5*													

Note: VWM = Verbal Working Memory, RI = Rhyme Identification, RP = Rhyme Production, SB = Syllable Blending, SD = Syllable Deletion, PD= Phoneme Deletion, PS = Phoneme Substitution, SD = Syllable Deletion Hindi, SSH = Syllable Substitution Hindi, PDH = Phoneme Deletion Hindi, PSH = Phoneme Substitution Hindi.

Note: *p <.05 **p <.01

4 Discussion

We examined reading accuracy and speed on various reading tasks with respect to their ability to identify children with reading difficulties in Hindi-English biliterates for whom exposure to English language is more due to English being the medium of instruction. Norms for reading accuracy and speed for each of the test scores were based on the criteria of mean minus two standard deviations. Reading accuracy and speed were measured for words, non-words and irregular words. These tasks were found to be sensitive in assessing children with reading difficulties increasing in grade level did not make a difference to the performance (accuracy and speed) of non-dyslexic readers for most of the reading tasks included word and nonword reading, working memory test and phonological awareness. Other studies on Indian languages have taken reading accuracy on a standardized word reading test in Hindi along with other measures like teacher's rating and spelling test as the criteria to identify children with dyslexia (Gupta, 1997). Studies on other Indian languages like Kannada and Telegu have also reported use of reading tests and tests of phonological awareness for the identification of dyslexia (Padakannaya et al., 2002). We have found that accuracy as well as speed on the tests of word and nonword reading along with tests on phonological awareness, working memory and laterality is sensitive to the reading difficulties observed in dyslexics. These tests together provide information about phonological deficits as well as semantics. We also observed that poor reading accuracy correlated with increased latencies on these tests among dyslexics. Similarly, non-dyslexic readers showed better reading accuracy and faster latencies as compared to dyslexics except on two tests. The two groups were not found to be significantly different with respect to the syllable blending task because this task was regularly being practiced in their schools and is a part of their curriculum. Results also indicates that dyslexic readers showed poor performance in phoneme deletion and syllable substitution task. Hence, both accuracy and speed are good measures of reading difficulties in dyslexia. Dyslexics showed an advantage with phoneme substitution task in Hindi, which could be due to better oral proficiency in Hindi. It is to be noted that Hindi was the first language and English was the medium of instruction for all the participants. Slow performance was observed pervasively on all the reading tasks for both the languages among dyslexics as compared to normally progressing readers. Even with regular grapheme to phoneme correspondence, reading speed in Hindi was also found to be slower than non-dyslexic readers as dyslexics have difficulties with the translation of orthographic representations to phonological representations. In case of English, it is the grapheme to phoneme inconsistencies and in case of Hindi it could be the perceptual complexity. Dyslexics tend to assemble phonemes following grapheme to phoneme correspondence rules.

We also examined the differences in performance with respect to the two different writing-systems being acquired at the same time by Hindi English biliterates. Overall accuracy was better and latencies were faster for Hindi as compared to English language among normally progressing readers as well as dyslexics. Greater accuracy in Hindi as compared to English has been reported by another study among normal readers as well as dyslexics which is explained on the basis of orthographic transparency in Hindi and orthographic ambiguities of English (Gupta & Jamal, 2007). Dyslexics

showed difficulties on reading accuracy and speed for both Hindi and English as compared to normally progressing readers, however, Hindi had an advantage on most of the tests like word and nonword reading, listening and reading comprehension. We tested language effects for each type of reading stimuli (for example word reading Hindi versus word reading English) as well as within language effects between different reading stimuli (for example, word reading Hindi versus nonword reading Hindi). We observed different patterns of such interactions and differences between the two languages and within each language across tasks and between the two groups. Within language comparisons across reading stimuli were made for words and nonwords and the performance was further compared with the phoneme deletion task. Between-language comparisons were made for letter identification, word and nonword reading, listening and reading comprehension, spelling, and phoneme deletion.

5 Conclusions

The current study demonstrates that children with reading disabilities have poor cognitive skills compared to the Normally Progressing Readers as a result of which they performed poorer in reading. From the Rapid Naming tasks it can be inferred that Dyslexic readers were subject to more errors in comparison to Non-Dyslexic children. The nature of errors falls under several categories like Phonemic Discrimination, Deletion of the letter, orthographic error, omission and sight reading. Phonemic discrimination error was found to be the most frequent error committed by poor readers. The findings support the linguistic interdependence hypothesis which holds that there is a significant relationship between the skills in two languages learned by the children. The findings also support the Phonological deficit hypothesis which posits that phonological processing tasks depend upon the strength of phonological representations. These phonological representations are thought to be weaker, or 'less specific' in individuals with dyslexia. From the phoneme deletion and phoneme substitution tasks with English orthography it can be inferred that scaffolding errors (errors which accurately represented the initial and final letters but not the vowels of words, e.g., 'bat' for 'boat') were more frequently committed by the dyslexic readers than the non dyslexic readers. From the Rhyme Production task it can be inferred that Dyslexic children have committed more errors whereby, they tend to change the target word (e.g., 'plain' for 'trade') this is because difficulty with rhyming may signal a more generalized problem with phonological awareness and also due to the lack of vocabulary. From the phonological awareness task it can be inferred that the Dyslexic readers have committed more errors in initial and final phoneme which indicates an incomplete elaboration of graphemes that in most cases began with the initial grapheme and terminated in the middle of the target word leading to a guessed word or nonword response. From the verbal working memory '2 Back' test it can be inferred that dyslexic readers performed significantly poor in comparison to non dyslexic children which indicates that Dyslexic readers have difficulty in holding the information for periods of time. The nature of errors which have been found in reading tasks were consistent across all the grades. Phonemic discrimination with English orthography was found to be most frequent and consistent error which has been found across all the grades. This indicates that English is said to be 'deep' or 'opaque' where individual graphemes represent a number of different phonemes in different words so the child has difficulty with grapheme to phoneme correspondence (GPC) rules.

6 Implications

The results are in line with the existing evidence which supports the claim that the reading strategies are affected in part by the orthographic transparency of the language. In case of orthographically transparent Hindi, dyslexic readers attempted to read words mainly by using phonological strategies,

whereas, in the case of orthographically opaque English, they attempted to read words by employing a combination of phonological and visual strategies. Further, a majority of scaffolding errors in both Hindi and English, can be good prognostic indicator for the dyslexic readers in the present study. This study has important implications for training the children with dyslexia. In the case of Hindi, an emphasis on a phonics approach as well as awareness of diacritical signs would help dyslexic readers gain better knowledge of letter-to-sound correspondences, whereas in the case of English, a phonics approach could be buttressed with other direct access strategies, such as word analogy training, in order to enable dyslexic readers cope with the orthographic inconsistencies of English. The broad implication of the present study is to be carried out in the school settings as well as in the assessment procedure.

7 Limitations and Future Directions

Although the present study contributed valuable information to the current literature, the following are its major limitations followed by directions for future research:

Firstly, due to small sample size the classification of handedness in all the three categories was not equal and this affects the results of the study. Because a large sample would have yielded better results and a better generalization effect. Secondly, the cognitive markers which were taken were only pertaining to reading and not considered from other domains like Psycho-social and genetic basis. Thirdly, due to small sample size the analysis could not be carried out across different grades which would have helped in understanding the progressive nature of this concept.

Future research could be done taken into consideration all markers pertaining to cognitive, genetic and behavioural domains. Another study could have been done in interventions and coping styles whereby child would be able to learn different strategies and techniques through which the dyslexic children could be able to overcome this problem and will try to mingle with the main stream and peer group children. Story listening could be another intervention technique through which the child's thought processes and cognitive ability can be enhanced. Instruction method could also be studied as another intervention technique for those phonological dyslexic children.

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