AN ANALYSIS OF READING ERRORS OF DYSLEXIC READERS IN HINDI AND ENGLISH

Ashum Gupta* Gulgoona Jamal**

ABSTRACT

The present study examined the nature of reading errors made by dyslexic readers in Hindi and English. A detailed analysis of error type showed 60% and 57% of phonological errors; 15% and 35% of orthographic errors; 25% and 7% of mixed errors; and 0.38% and 0.94% of unrelated errors in Hindi and English, respectively. Further, in both Hindi and English, the majority (65% & 69%, respectively) were the scaffolding errors, followed by the errors preserving the initial phoneme (22% & 23%, respectively), errors preserving the final phoneme (9% & 6%, respectively) and errors with orthographic overlap (4% & 2%, respectively). In Hindi, a far greater percentage of nonword (89%) than word (11%) errors was found, whereas in English, 54% of nonword and 46% of word errors was found. A significant correlation was found between reading accuracy in Hindi and in English. The findings are discussed in terms of linguistic interdependence hypothesis and orthographic transparency.

INTRODUCTION

Reading errors may represent an important window into the kind of reading strategies that children use to read words (1). Following greater awareness of the importance of word recoding skills in fluent reading (2), developmental psychologists have attempted to develop detailed accounts of single word reading errors. Thus, it has been argued, for example, that single word reading errors which are phonologically similar to target words are important as they may suggest use of processes involving grapheme to phoneme correspondences, whereas pronunciations which are phonologically dissimilar to target words suggest that other processes may have been used to generate word pronunciations (1).

Some longitudinal studies of word reading errors have attempted to investigate which kinds of reading errors are most strongly correlated with successful reading development. For example, one such study reported that the scaffolding errors (errors which accurately represented the initial and final letters but not the vowels of words, e.g., ‘bat’ for ‘boat’) were positively correlated with accurate word reading ability, whereas other responses such as non-phonological errors (such as ‘milk’ for ‘lorry’) were not correlated with accurate word reading ability (3). These results have also been broadly replicated in subsequent correlational studies (4).

In theoretical terms, partial representations of word structure are consistent with models of word recognition, which propose a highly interactive relationship between orthographic and phonological skills. In Ehri’s model of word reading (5), early partially specified representations of words represent a ‘phonetic cue’ stage of reading. In the phonetic cue stage, children use letters for the first time to represent printed word knowledge in lexical memory. Such a stage is held to be qualitatively different from, and developmentally preceding, the fully formed ability to decode words. In Ehri’s model, the more systematic use of grapheme to phoneme recoding strategies has been termed ‘cipher reading’.

Stuart and Coltheart (3) also described an interactive model incorporating evidence from early reading errors. In their account, full left to right grapheme to phoneme parsing ability might ultimately emerge from the establishment of such partial units earlier in reading development. For example, knowledge of simple letter- sound rules such as l - > / l / and t - > /t / along with some explicit phoneme awareness may allow children to initially establish the partially specified word recognition unit ‘l…t’ for the word ‘light’. Subsequent exposure to the printed word ‘light’ may then allow children to infer that ‘igh’ represents the medial vowel sound. In such a model, scaffolding errors thus aid the development both of accurate word-specific representations and of graphemic parsing abilities for complex CVCs (6).

While the knowledge and use of one-to-one letter to sound consonant correspondences implicated in scaffolding errors may be a prerequisite for reading development, the role of orthography in reading cannot be ignored. It is important to discover whether the transparency of an alphabetic orthography has any effect on the way in which children learn to read. The idea that reading acquisition may differ according to the nature of the orthography has been referred to as the ‘Orthographic Depth Hypothesis’ (7). Most alphabetic orthographies, including German, Spanish, Dutch and Italian, are said to be 'shallow' or 'transparent' in that graphemes in these systems generally represent only one phoneme. However, some alphabetic systems, including English and French, are said to be 'deep' or 'opaque'. This means that individual graphemes represent a number of different phonemes in different words, and there are many exceptions to grapheme-phoneme correspondence rules. In a transparent orthography, the mappings from letters to sound are much more consistent, and there are very few irregular words. According to Wimmer and Goswami (8), the transparency of orthography has a direct effect on reading development. If an orthography is highly transparent, with very consistent mappings from spelling to sound, then grapheme-phoneme correspondences should be easier to detect and use: a direct effect. In a less transparent orthography, the underlying rules will be less consistent, and may be more complex in terms of being context-sensitive and operating at different phonological levels. With such orthographies, it may be more adaptive initially to learn spelling patterns for individual words, and then to use various strategies such as analogy to try and read new words. As an evidence, Wimmer and Hummer (9) found that the majority of errors made by children learning to read German were nonsense words, in marked contrast to children learning to read English, whose errors were largely (the wrong) real words. The preponderance of nonsense word errors in German implies that the children were reading words indirectly by assembling pronunciations from grapheme-phoneme correspondences. The English children were apparently attempting to use direct access strategies to read words, resulting in real word rather than nonsense word errors. Similar findings have been reported in other studies comparing reading acquisition in languages differing in orthographic transparency. For example, Ellis and Hooper (10) found that Welsh readers were more reliant on an alphabetic decoding strategy as the Welsh reading errors were longer and more complete attempts to represent the sounds in the stimulus word than English errors. Additionally, Welsh reading errors tended to be nonword mispronunciations, whereas English children made more real word substitutions. In yet another study, Spencer and Hanley (11) reported that Welsh children made over three times as many nonword responses when reading real words as the English children.

To summarise, recent research has suggested that scaffolding errors represent a significant qualitative indicator of later word reading success. There is also evidence that the errors made while reading real words are qualitatively different for children reading transparent orthographies as compared to those reading opaque orthographies. Following the same line of research, the present study attempts to compare the errors produced by dyslexic children in Hindi and English word reading. 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. The arrangement of the alphabet is strictly phonetic, with letters classified by place of articulation: vowels and diphthongs first, then consonants with an inherent implicit schwa vowel, which does not have an independent graphemic form (12). Consonant clusters are written either one above the other, or by having, a special sign added to indicate the absence of the schwa. Vowels are graphemically marked for length and appear in full form in word- initial positions or as diacritical signs (*matras*) in medial or word-final positions. The Hindi script has syllabic as well as alphabetic properties. The fact that phonemes are graphemically marked, aligns it with other alphabetic scripts. However, unlike most alphabetic scripts in which consonants typically stand alone as phonemes, consonants in Hindi have an inherent associated vowel and as Vaid and Gupta (13) have noted, Hindi resembles a syllabary. Children need to learn the specific features of Hindi script in the course of reading acquisition. For example, consonant clusters may occur in word-initial and medial positions, which present a lot of difficulty to learners of Hindi. According to Gupta (14), another complexity of Hindi orthography concerns the orthographic markings of Hindi vowels varying in length. Gupta (14) has shown that despite the transparency of the Hindi script, dyslexic readers of Hindi have difficulty in developing high-quality, segmentally organised phonological representations of words and display poor blending skills. Gupta and Jamal (15) have reported similar findings in studies comparing reading and spelling skills of normal and dyslexic readers in Hindi and English. In view of the existing evidence, the authors decided to explore the errors shown by dyslexic children in Hindi and English word reading, in order to understand the kind of reading strategies that such children use while reading two orthographically different languages.

METHOD

Sample

Participants were 30 dyslexic readers (18 boys, 12 girls) with a mean age of 103.07 months (range: 90 -116months; SD = 6.23 months) from three English medium public schools in central Delhi. Consent from parents and school authorities to participate was obtained for all children. Suspected cases of dyslexia were obtained by asking teachers of third and fourth grade classes whether they had any students with unexpected difficulties in reading and/or spelling in Hindi as well as in English. Individuals were termed dyslexics in the present study if they had an intellectual level within the normal range but if their reading skills were significantly far below that of their chronological age counterparts. Nonverbal intelligence of all the children participating in the study was in the normal range as tested with Raven's Coloured Progressive Matrices (16), with their mean nonverbal IQ being 102 (range 90-112). Classification of dyslexia was based on several criteria including children's performance on a Hindi word reading test developed by Gupta (17), performance on an English word reading task, teachers' reports, and the authors' observations over a period of time of the children's spelling errors from their school notebooks. Teachers' judgement regarding dyslexic readers' poor reading performance was further confirmed by their significantly lower score as compared to skilled readers on an individual Hindi Word Reading Test (17) and an English Word Reading Task, $t(58) = 32.79$, $p<.00$; $t(58) = 23.01$, $p<.00$, respectively. The dyslexic readers' word reading in Hindi and English was further characterised by distortions, substitutions and /or omissions. All the children had to study Hindi and English since the beginning of their schooling. All were bilingual with their native language being Hindi, which they spoke at home and with peers in the school. The participating schools provided similar kinds of language training activities, such as storytelling, singing, dramatics, etc. to their pupils, both in Hindi and in English. All the schools were located in central Delhi, and children in this study lived in areas which were considered equivalent from a socio-economic point of view.

Materials

Hindi word reading task: Fifteen words were taken from Hindi Word Reading Test (17) for this study. The words of Hindi Word Reading Test had been rated earlier by the Hindi language teachers of the three participating schools in terms of high, medium and low spoken frequency of usage An equal number of words of high, medium and low spoken frequency of usage was taken for the Hindi word reading task. Some of these words were without matra (vowels), some were with matra, and some were consonant clusters with matra. All the words were presented in 20 points Devanagari font (this font was similar to the font used in the children's reading books). The words were presented in a column on a single page, and were to be read from top to bottom. Reading was evaluated in terms of number of words read correctly.

English word reading task: The task consisted of fifteen words taken from English Word Reading Task. The words of English Word Reading Task had been rated earlier by the English language teachers of the three participating schools in terms of high, medium and low spoken frequency of usage. An equal number of words of high, medium and low spoken frequency of usage was taken. Some of these words were regular and some were irregular. All the words were presented in 16 points Times New Roman font (this font was similar to the font used in the children's reading books). The words were presented in a column on a single page, and were to be read from top to bottom. Reading was evaluated in terms of number of words read correctly.

Procedure

Children were tested individually in a quiet room in their school by the second author. First, children were assessed on Hindi word reading, for which they were asked to read the words aloud as accurately as possible. The child's reading of each item was tape-recorded for later error analysis. After a gap of 10 minutes, the same procedure was followed to assess English word reading.

RESULTS

Reading Accuracy

A significantly greater accuracy for Hindi word reading (M = 6.33, SD = 1.84) as compared to English word reading (M = 4.43, SD = 1.70), was shown by dyslexic readers with the percentage correct being 42% and. 30%, respectively. A significant correlation was found between Hindi and English word reading, $r = 0.40$, $p<.05$.

Errors

A detailed analysis of error type for both Hindi and English was undertaken. Errors were classified into four types: (1) phonological, (2) orthographic, (3) mixed, and (4) unrelated errors. Phonological errors were responses that shared phonology with the target words, that is, these responses sounded similar to the target letters of the word, e.g., in Hindi, reading the target word *adarak* (ginger) *as ada:rak* (nonword response); in English, reading the target word *felt* as *filt*. Orthographic errors were incorrect responses that shared more orthography than phonology with the target words. These errors had a visual resemblance to some of the target letters of the word. For example, in Hindi, the target word *citr* (picture) was read as *mitr* (friend); in English, the target word *huge* was read as *hug*. Mixed errors were the responses that shared both phonology and orthography with the target words and so could not 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. Those responses in which the latter half of the target stimuli were deleted were also included as mixed errors. For example, in Hindi, *abhila:ša:* (aspiration) was read as *abhi* (nonword response); in English, *finger* was read as *fin*. Unrelated errors were the incorrect responses that shared neither phonological nor orthographic features with the target words. Examples of this included, in Hindi, *dhakana:* (cover) read as *ladakan* (nonword response); in English, *awake* read as *ox*.

The incorrect responses were further analysed by following the error classification proposed by Savage, Stuart and Hill (18), who classified the errors into four types:

(1) Errors sharing orthographic overlap: Errors in this category retained at least one letter from target words but did not necessarily share common pronunciations. Target and error pronunciations did not share initial or terminal position phonemes, for example, in Hindi, reading the target word *gubba:ra:* (balloon) as *bhu:b* (nonword response); in English, reading the target word *weather* as *anywhere*. (2) Errors preserving the initial phoneme of the target words; for example, in Hindi, misreading the target word *atithi* (guest) as *ati* (nonword response); in English, misreading the target word *weather* as *watering*.

(3) Errors preserving the final phoneme of the target words; for example, in Hindi, misreading the target word *pašcim* (west) as *ši:cam* (nonword response); in English, misreading the target word *struck* as *truck.*

(4) Errors preserving both the initial and final phoneme (scaffolding errors): These errors preserved both the initial and final boundary phonemes of the target word, but the vowel digraphs which made up the middle phoneme of the target words were inaccurately

pronounced; for example, in Hindi, misreading the target word *parishram* (diligence) as *paši:šam* (nonword response); in English, misreading the target word *spell* as *sapil*.

Errors were also examined to see whether they were mainly nonword or word responses. A sample of all these errors in Hindi and English is provided in Appendices A and B, respectively.

Of the total errors made by the dyslexic readers in reading Hindi words, 60% comprised phonological errors, 15% were orthographic errors, 25% errors were mixed while only 0.38% were unrelated errors. Of the errors made by the dyslexic readers in reading English words, 57% were phonological errors, 35% were orthographic errors, 7% errors were mixed, while only 0.94% errors were unrelated.

An inspection of the errors further revealed that in case of Hindi words, 4% errors showed orthographic overlap with the target stimuli, 22% errors preserved the initial phoneme and 9% errors preserved the final phoneme of the target stimuli, while the majority (65%) were the scaffolding errors. In case of English words, only 2% of the errors showed orthographic overlap with the target word stimuli, 23% errors preserved the initial phoneme and 6% errors preserved the final phoneme of the target stimuli, while the majority (69%) were the scaffolding errors. Interestingly, most of the scaffolding errors in Hindi were nonword (99%) than word (1%) responses, whereas in English, 62% were nonword and 38% were word responses. Table 1 shows the percentages of different types of errors.

Table 1. Percentages of types of reading errors

Tasks	Types of reading errors							
	Phono-logical	Ortho-graphic	Mixed	Unrelated	Ortho graphic overlap	Initial phoneme	Final phoneme	Scaff-olding
Hindi words	60.00	14.62	25.00	0.38	3.85	21.54	9.23	65.38
English words	57.10	34.70	7.26	0.94	1.90	23.66	5.99	68.45

Error analysis was also done to see the overall distribution of nonword and word errors made by the dyslexic readers in Hindi as well as in English. In Hindi, a far greater percentage of nonword (89%) than word (11%) errors was produced, while in English, 54% were nonword and 46% were word errors. Table 2 shows the percentages of nonword and word errors.

Table 2. Percentages of nonword and word errors

Tasks	Types of errors	
	Nonword	Word
Hindi word reading	89.23	10.77
English word reading	54.26	45.74

DISCUSSION

In the present study, dyslexic readers could read only 42% of the Hindi words and 30% of the English words correctly. Greater accuracy in Hindi word reading may be due to the fact that Hindi is a transparent orthography with consistent mappings from spelling to sound, allowing children to follow GPC rules. On the other hand, English being an opaque orthography, children have to operate at different phonological levels, thereby making greater mistakes. A significant correlation between Hindi and English word reading indicates that children were poor readers in both the languages. This finding supports the linguistic interdependence hypothesis, which holds that there is a significant relationship between the skills in the two languages learned by the children (19). Besides, it's corollary, the central deficit hypothesis, holds that children who have learning problems in their second language will also manifest similar difficulties in their first language. Therefore, children with deficient linguistic skills will experience problems regardless of the language. The available studies of bilingual or multilingual children have indicated a correlation between reading skills in two languages. For example, levels of performance on word identification, pseudoword reading, working memory, and syntactic awareness tasks appeared to be highly correlated in English and Hebrew for English-speaking children who were learning Hebrew as a second language (20).

In Hindi, a far greater percentage of phonological than orthographic errors indicates dyslexic readers' reliance on sublexical process for word reading. Apparently, they used knowledge of regularities in the relationship between orthography and phonology to convert the representation of the stimulus into a phonologically plausible sequence of phonemes (21). In English, although a greater percentage of phonological errors indicates that children were trying to read words predominantly by assembling phonology, at the same time, a substantial presence of orthographic errors suggests that along with assembling pronunciations via GPC rules, children were also using visual cues partially to read words. Presence of mixed errors in both the languages suggests that some of the target words were processed superficially without paying attention to individual letters from the beginning to the end. According to Gupta (14), dyslexic readers were perhaps less aware of script-sound regularities and seemed to process some of the phonemes globally on the basis of partial cues. Had they read only by following grapheme-phoneme conversion rules, they would have succeeded in reading all the letters of all the target stimuli. A negligible presence of unrelated errors suggests that all the dyslexic readers possess rudimentary word recognition skills that enable them to give incorrect but phonologically or orthographically similar responses to the target stimuli.

In both Hindi as well as English, a small percentage of errors showed orthographic overlap with the target stimuli, which suggests that children were not just abruptly picking out any letter(s) of the target word to give a response, but were trying to read words through sequential letter-by-letter decoding in left-to-right direction. In both the languages, errors preserving the initial phoneme outnumbered errors preserving the final phoneme of the target words, 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. Our finding is in line with a study by Wimmer and Hummer (9), who also found a preponderance of errors beginning with the first letter(s) of the target word while the errors that shared the final grapheme(s) with the target word were nearly absent. In Hindi as well as in English, a majority of scaffolding errors revealed that these children read words mainly by sequential elaboration of graphemes, through an orthographic-phonological conversion process. As suggested by Gupta (14), apparently they tried to apply GPC rules in the perception of the initial and the final segments of the target words, but the middle letters of the target words were perhaps treated as pictures without exhibiting phonemic awareness.

We found an interesting contrast in case of scaffolding errors in the two languages. In Hindi, a far greater percentage of scaffolding errors was nonword than word responses, which indicates that children were reading target words mainly by attempting to follow GPC rules. In English, although a greater percentage of scaffolding errors was nonword responses, a substantial presence of word responses indicates that along with GPC rules, children were also making use of partial visual analysis of the target word to produce a response. As suggested by Wimmer and Hummer (9), a common strategy underlies both words and nonword errors that begin with the first grapheme(s) of the target word. The common strategy is that the child begins to recode the grapheme sequence of the target word. In the case of a word error, a guess about the target word's identity is ventured before the recoding process is completed. In the case of a nonword response, the child does not guess, but utters the unfinished or erroneous recoding result.

For both the languages, errors were also examined to see whether they were mainly nonword or word responses. In Hindi, a far greater percentage of nonword than word errors indicates that the children were trying to read words mainly by assembling pronunciations from grapheme-to-phoneme correspondences. Even among scaffolding errors, most of the responses were nonword than word errors. According to Wimmer (22), nonword responses may be expected if children attempt to recode the grapheme sequence of a word from left to right and fail either because they do not have a complete knowledge of grapheme-to-phoneme correspondences or because they have difficulties with pronunciation assembly. In this study, apparently children were predominantly relying on the sublexical route for reading Hindi words. This finding is supported by Gupta (14) who reported that children with dyslexia as well as reading-age (RA) and chronological- age controls, showed a greater percentage of nonword than word errors on Hindi word reading. Support for these findings also comes from a study by Zoccolotti, DeLuca, DiPace et al. (23), who examined surface dyslexia in Italian, a language with high grapheme-phoneme correspondence. In their study, Zoccolotti et al. (23) reported that parallel visual processing of words was impaired in dyslexic children and that they analysed words sequentially, presumably through an orthographic-phonological conversion. In English, a greater percentage of nonword than word errors implies that the children were trying to read words mainly by assembling pronunciations from grapheme-phoneme correspondences. However, a substantial presence of word errors also indicates a deviance from a purely synthetic assembly strategy. It appears that children also attempted to use lexical route to read the target words. Furthermore, a similar distribution of nonword and word responses was found in case of the scaffolding errors.

The discussion here provides evidence that the nature of reading strategies used for word recognition in Hindi and in English is different. The results suggest that in Hindi, dyslexic readers were reading mainly by following grapheme-phoneme conversion rules. Evidence of this is provided by a majority of phonological errors as compared to a small percentage of orthographic errors and is substantiated by a far greater percentage of nonword errors. Further support for the dyslexic readers' reliance on GPC rules comes from scaffolding errors that were mostly nonword errors. In English, by contrast, dyslexic readers showed a deviance from a purely synthetic assembly strategy as they also relied on partial visual analysis of the target words. Evidence for this is provided by a substantial presence of orthographic errors along with a greater percentage of phonological errors. Besides, in addition to a greater percentage of nonword errors, a substantial percentage of word errors indicates that dyslexic children were not reading words purely by assembling phonology but were also using partial visual cues. Thus, the results of the present study support the claim that the transparency of the orthography affects the reading strategies employed. Several studies have reported the use of direct access strategies in orthographically opaque languages such as English and French, that result in real word errors and use of indirect strategies in orthographically transparent languages such as German, Spanish that result in nonword errors (8,9,10,11).

Yet, another important finding is the presence of a large percentage of scaffolding errors in both Hindi and English. As suggested by Savage et al. (18), scaffolding errors represent a significant qualitative indicator of later word reading success. Hence, it suggests that these children already possess a rudimentary alphabetic strategy and so they could be immensely helped by training that helps them to gain better conscious access to phonological structures at the phoneme level.

CONCLUSION AND 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 a 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 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.

* Professor, Department of Psychology
Arts Faculty Extension Building
University of Delhi
Delhi- 110 007, India
e-mail: dr_ashumgupta@yahoo.com

** Research Scholar, Department of Psychology
Arts Faculty Extension Building
University of Delhi
Delhi- 110 007, India

REFERENCES

1. Chiappe P, Siegal LS. ***Phonological Awareness and Reading Acquisition in English and Punjabi-Speaking Canadian Children.*** Journal of Educational Psychology 1999; 91: 20-28.
2. Gough PE, Ehri LC, Treiman R. ***Reading Acquisition.*** Hillsdale, NJ: Lawarence Erlbaum Associates, 1992.
3. Stuart M, Coltheart M. ***Does Reading Develop in a Sequence of Stages?*** Cognition 1988; 50: 139-181.
4. Savage RS. ***The Nature and Use of Sublexical Inferences.*** Unpublished Ph.D Thesis, University of London, 1998.
5. Ehri LC. ***Phases of Development in Learning to Read by Sight.*** Journal of Research in Reading 1995; 18: 116-125.
6. Seymour PHK. ***Foundations of Orthographic Development.*** In Perfetti CA, Rieben L, Fayol M eds. Learning to Spell: Research, Theory, and Practice Across Languages. London, Lawrence Erlbaum Associates, 1997: 319-337.
7. Lukatela K, Carello C, Shankweiler D. et al. ***Phonological Awareness in Illiterates.*** Applied Psycholinguistics 1995; 16: 463-487.

8. Wimmer H, Goswami U. ***The Influence of Orthographic Consistency on Reading Development: Word Recognition in English and German Children.*** Cognition 1994; 57: 91-193.
9. Wimmer H, Hummer P. ***How German Speaking First Graders Read and Spell: Doubts on the Importance of the Logographic Stage.*** Applied Psycholinguistics 1990; 11: 349-368.
10. Ellis NC, Hooper AM. ***Why Learning to Read is Easier in Welsh than in English: Orthographic Transparency Effects Evinced with Frequency-Matched Tests.*** Applied Psycholinguistics 2001; 22: 571-599.
11. Spencer LH, Hanley JR. ***Effects of Orthographic Transparency on Reading and Phoneme Awareness in Children Learning to Read in Wales.*** British Journal of Psychology 2003; 94: 1-28.
12. Bright W. ***The Devanagari Script.*** In Daniels P, Bright W eds. The World's Writing Systems. New York, Oxford University Press, 1996: 384-390.
13. Vaid J, Gupta A. ***Exploring Word Recognition in a Semi-Alphabetic Script: The Case of Devanagari.*** Brain and Language 2002; 81: 679-690.
14. Gupta A. ***Reading Difficulties of Hindi-Speaking Children with Developmental Dyslexia.*** Reading and Writing: An Interdisciplinary Journal 2003; 00: 1-21
15. Gupta A, Jamal G. ***Reading, Spelling Production and Bilingualism.*** Poster presented at International Conference on Cognitive Science. University of Allahabad, Allahabad, India, 2004
16. Raven JC, Court JH, Raven J. ***Coloured Progressive Matrices.*** Oxford, Oxford Psychological Press, 1992.
17. Gupta A. ***Reading Test in Hindi.*** Unpublished Report, Department of Psychology, University of Delhi, India,1997.
18. Savage R, Stuart M, Hill V. ***The Role of Scaffolding Errors in Reading Developmental: Evidence from a longitudinal and a Correlational Study.*** British Journal of Educational Psychology 2001; 71: 1-13.
19. Cummins J. ***Linguistic Interdependence and the Educational Development of Bilingual Children.*** Review of Educational Research 1979; 49: 225-251.
20. Geva E, Siegel LS. ***Orthographic and Cognitive Factors in the Concurrent Development of Basic Reading Skill in Two Languages.*** Reading and Writing: An Interdisciplinary Journal 2000; 12: 1-30.
21. Rapp B, Folk JR, Tainturier MJ. ***Word Reading***. In Rapp B ed. The Handbook of Cognitive Neuropsychology: What Deficits Reveal about the Human Mind. Psychology, US Press, Taylor & Francis Group, 2001; 233-262.
22. Wimmer H. ***The Nonword Reading Deficit in Developmental Dyslexia: Evidence from Children Learning to Read German.*** Journal of Experimental Child Psychology 1996; 61: 80-90.
23. Zoccolotti P, DeLuca PM, DiPace E. et al. ***Markers of Developmental Surface Dyslexia in a Language (Italian) with High Grapheme-Phoneme Correspondence.*** Applied Psycholinguistics 1999; 20: 191-216.