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INTRODUCTION

REVIEW OF LITERATURE

NEED/IMPORTANCE OF THE STUDY

STATEMENT OF THE PROBLEM

OBJECTIVES

HYPOTHESIS (ES)

RESEARCH METHODOLOGY

RESULTS & DISCUSSION

FINDINGS

RECOMMENDATIONS/SUGGESTIONS

CONCLUSIONS

LIMITATIONS

SCOPE FOR FURTHER RESEARCH

REFERENCES

APPENDIX/ANNEXURE

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CONTRIBUTIONS TO BOOKS

- Sharma T., Kwatra, G. (2008) Effectiveness of Social Advertising: A Study of Selected Campaigns, Corporate Social Responsibility, Edited by David Crowther & Nicholas Capaldi, Ashgate Research Companion to Corporate Social Responsibility, Chapter 15, pp 287-303.

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- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

CONFERENCE PAPERS

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- Garg, Bhavet (2011): Towards a New Gas Policy, Political Weekly, Viewed on January 01, 2012 http://epw.in/user/viewabstract.jsp

COMMON DENOMINATORS OF WRITING DISABILITY

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ABSTRACT

The present paper explores case studies of children with writing difficulty (dysgraphia), Whose speech development and reading is normal, but writing is seriously affected. When speech and reading are controlled, the underlying causes associated with writing difficulties are fine-motor difficulties and visual-motor integration difficulties. Out of six cases analysed, one could be considered a pure case of dysgraphia. In this case, visual motor translation difficulty was observed. Copying was more difficult than spontaneous writing and dictation. Difficulties in visual perception and problems in fine motor activities were observed in four cases. Another child showed a severe 'slowness'- slow paced in writing, but with well formed letters and words. He was slow in several other activities as well. This study also suggestes that the problem of each child is unique. Writing disability is not a homogeneous category, so interventions have to be individually tuned and designed with a clear focus on the underlying difficulties of each child. Studies in the area of intervention for each type of writing disability are suggested.

KEYWORDS

visual motor, visual spatial, visual organization, writing disability/dysgraphia.

INTRODUCTION

Writing is a highly complex process. It is one of the highest forms of language and hence the last to be learned. Writing is a form of expressive language, a visual symbol system for conveying thoughts, feelings and ideas. The fine discrimination, integration, memory and co-ordination of hand, mind, and eye required for the act of writing are infinitely complex (Webster, 2004). Smooth motor coordination of the eyes and hands, and control of the arms, and finger muscles are acquired in the process of learning to write and are needed to produce legible results (Demonent, Humphreys, Kaufman, Galaburda, and Paulesu, 2004). The absence of prewriting skills is a major reason why children fail to write correctly. Fine motor coordination is a very essential prerequisite for writing development (Johnson and Myklebust, 1997).

Kaminsky and Powers (1981 cited by Nakra, 1998) identified three problems that may lead to poor writing: a) disorders of visual perception. b) poor efficiency and control of the intrinsic muscles in the hand. c) faulty motor memory related to the storage of motor information in the brain. Persons with writing problem may experience difficulties in the areas of discrimination, coordination or sequential perceptual processing. For this reason, perception probably has been the most heavily researched areas in writing problems (Raymond, 1998). Poor quality of handwriting of children with writing difficulties may be attributed to the deficiency in visual-motor integration (Volman, 2006). Improper functioning of visual processing including difficulties in transilating information from visual to fine motor domain can lead to dysfunction in writing. (Sreedevi and Sasidharan, 2010).

The present study attempts to undertake an in-depth analysis of subjects who face serious difficulty in writing and how these difficulties are related to their cognitive functions. There exist two dominant theoretical explanations for the problems in writing. One group of theorists argues that the primary problem is in the area of language (Pennington and Welsh, 1995). Another group attempts to locate the underlying problem in the processes of visual perception and motor function (Wong, 1996). The present study concentrates on the non-linguistic aspects associated with problems in writing. Compared to the amount of research done on reading, surprisingly little work has been done on the psychology of how our writing evolves (Moats, 1996).

OBJECTIVES OF THE STUDY

i. To identify a sample of students who have serious difficulties in writing, but do not have problems in either speech or hearing and reading.
ii. To conduct a detailed analysis of their issues and errors with respect to writing.
iii. To identify and study the underlying difficulties in the areas of perceptual, intellectual and motor functions.
iv. To trace the developmental history of these identified underlying difficulties.

METHODOLOGY

DESIGN

An exploratory design with case study analysis approach was followed.

SAMPLE

Using the judgment sampling procedure, six cases were selected from the children who were diagnosed as writing disabled by a team of experts consisting neurologist, pediatrician, physiologist, psychologist, linguist and speech pathologist working in an institute specialized in neuroscience disciplines. All these children were evaluated by the speech pathologists and the linguist and it was reported that they had normal language development and communicative skills. Moreover, it was also found that they had adequate Phonetic skills and powers of comprehension. The researcher also verified these observations, and made sure that their writing problem was not related to language problem. The children in the sample had average IQ, and good skills in reading as well as, in mathematics. All children belonged to families with above average socio-economic status.

TABLE - 1: SAMPLING BREAK UP

Sl NO	Sex	Age	Class	Medium of instruction
1	M	9	4	English
2	F	8	4	English
3	M	7	3	English
4	M	11	6	Malayalam
5	M	10	5	English
6	M	10	5	English

The data collection procedure involved in two steps

1. Administration of the following tools.

TOOLS

a) Malin's Intelligence Scale for Indian Children (MISIC) (Malin, 1959).
b) Test of Memory for children (Uma et al., 2002).
c) Quick Neurological Screening Test revised edition (QNST) (Mutti et al., 1998).
d) Symptomology check list of learning disabilities (Harwell, 1989).

a) Interview with parents regarding present problems, academic and personal history and developmental problems observed, if any.
b) Unstructured cognitive function tasks developed by the researcher and when necessary.

DESCRIPTION OF THE TOOLS

Psychometric Information regarding Intelligence, Memory and Motor function was collected using standardized tests. A Symptomology Checklist of Learning Disabilities was used for collecting information regarding Perceptual, and Conceptual Problems. In the areas identified from these tests, more in- depth information was collected by the researcher using self developed task. Detailed information on these tools is presented below.

MALINS INTELLIGENCE SCALE FOR INDIAN CHILDREN (MISIC)

Malin's Itelligence Scale for children (MISIC) is the Indian adaptation of WISC (MALIN, 1959). The original Wechsler Intelligence Scale for Children is an individual test for children from the ages of 5 to 15. The Indian adaptation covers only ten years from 6 to 15.

The scale comprises eleven sub-tests divided into verbal and performance groups as follows.

Verbal Tests - 1. Information, 2. Comprehension, 3. Arithmetic, 4. Similarities, 5. Vocabulary, 6. Digit span.

The Performance Tests – 7. Picture Completion, 8. Block Design, 9. Object Assembly, 10. Coding, 11. Mazes.

SCORING

Scoring was done as per the manual. After raw scores were obtained for each sub-test, they were transformed into standardized IQ scores. Further Verbal IQ, Performance IQ, and Total IQ were also computed. The scores for the subtests were combined and grouped in four categories – (1) Spatial ability (2) Verbal conceptualization ability, (3) Sequencing ability and (4) Acquired Knowledge.

The Indian adaptation established its reliability with the test – retest method and yielded a product moment correlation coefficient of 0.91 for the full scale IQ results. The Indian adaptation has established concurrent as well as congruent validity.

TEST OF MEMORY FOR CHILDREN

For assessing memory, a test developed by (Uma et al., 2002) was used. The test of memory for children consists of 12 sub-tests, namely:

1. Personal Information.
2. Mental Control.
3. Sentence Repetition.
4. Logical Memory.
(a) Story Recall immediate.
(b) Story Recall delayed.
5. Word Recall meaningful.
6. Digit Span
(a) Digit forward.
(b) Digit backward.
7. Word Recall non-meaningful.
8. Delayed Response Learning.
9. Picture Recall.
10. BVRT.
11. Paired Associate Learning.
12. Cattell's Retentivity Test

SCORING

Scoring was done as per the manual. After raw scores were obtained for each sub-test, they were converted to percentile scores. To find out the toal memory score, the total raw score is converted to percentile. The Reliability (test-retest) of the whole battery has been found adequate, ranging from 0.51 to 0.97 for different sub-tests. Correlation coefficients of different sub-tests scores with a total memory score range from 0.27 to 0.78.

QUICK NEUROLOGICAL SCREENING TEST (QNST)

The Quick Neurological Screening Test (QNST) is composed of 15 tasks (these tasks are simple in nature and were adapted primarily from a typical pediatric neurological examination; however, a few were derived from developmental scales or neurological tests). Subjective scoring is required for the tasks, which include handwriting ability, perceptual ability for numbers written on the palms of the hands, eye tracking, finger to nose co-ordination, and rapidly reversing repetitive hand movements.

The cut- off scores for the full battery are as follows. H=High (>50), S=Suspicious (26-50) and N=Normal (0-25). Test re-test reliability coefficient of 0.81 is reported after a month interval for 33 learning disabled children who were tested by a single examiner. However, a lower reliability coefficient of 0.71was reported in another study after a one-month interval with two different examiners, implying that the individual examiners employed slightly different scoring criteria though both attempted to follow the instructions. The QNST seems to be best for matching the findings of a standard pediatric neurological examination.

SYMPTOMOLOGY CHECKLIST OF LEARNING DISABILITIES ADAPTED FROM HARWELL, 1989.

The checklist features:

: Visual perceptual/Visual motor deficits.
: Auditory perceptual deficits.
: Spatial relationship and body awareness deficits.
: Conceptual deficits.
: Memory deficits.
: Motor output deficits.
: Behavioural Components.

The rater simply puts either a tick mark or cross mark on the descriptive cues to indicate his view.

PROCEDURE

The study was conducted in four phases;

1. Exploratory analysis of the problem faced by children in writing.
2. Collection of detailed regarding academic and personal history.
3. Administration of standardised psychological tests and informal tests to find and bring out cognitive deficits features.
4. Collection and analysis of the developmental history of the identified underlying deficits/problems.

In the first phase, the reports obtained from the parents and children were crosschecked for congruence. Importance was given to finding out the actual difficulty of each child. In order to assess the child's writing ability, the child's way of writing was scrutinised. The writing and drawing samples were also filed.

In the next stage, the researcher explored the history of each child's current academic problems. The researcher extended the exploration of the school history of each child and studied the family history, medical history and the behavioural patterns of each student, including, social skills and daily life activities.

In the third phase of the data collection, the researcher gave the students psychological tests, to find out how the problems in writing were related to the peculiar problems in the specific areas of cognitive functions. The subcomponents of each test were given more importance. How the results of the subcomponents correlated with each subject's writing skill was scrutinized. If the results obtained from the psychological tests revealed any kind of difficulty in any area of psychological function, the researcher made the subject to perform self – developed unstructured cognitive function tasks (informal tests) related to that area, in order to study their difficulties closely. To be explicit, the student could perform some tasks within the boundary of problem –affected area, but could not perform some other tasks in the same area. The researcher attempted to find out the tasks they failed to perform and the reasons for their failure.

In the fourth phase, the detailed developmental history of each student was analysed to detect whether the results obtained in the psychological tests and unstructured tasks were reflected in the developmental stage of each child.

INTRODUCTORY INFORMATION

Writing is a complex activity that requires the use and coordination of multiple skills simultaneously. These includes organizing thoughts, choosing/recalling words, forming letters, spacing letters and words, recalling correct spellings, remembering and using the rules written languages and managing time when writing lengthy sentences.

Out of six children analysed for writing problems, the first case revealed reversed letters and was confused about small and capital letters. He had more difficulty in spontaneous writing than in the copying process. The difficulties of the second case, a girl were largely related to lack of spatial orientation. She could not keep margins and was also unable to draw or write in a straight line, and made spelling mistakes. She had to make a big effort to even read her own handwriting. The analysis of her handwriting showed that she had difficulty in holding the pencil and that the letters were very small and misshapen.

One of the most important observations in the third case was that he experienced of greater difficulty in copying written matter than in spontaneous writing or taking dictation. He was so bad at copying that his parents had to copy his notes for him. Some peculiarities were seen in the next two cases (Case No. 4 and 5), like omissions, substitution and spacing errors. Case No. 4 made spelling mistakes especially in secondary graphemes.

The last case (No.6) was distinct from all the other cases. He was very slow in writing (both spontaneous and copying) but his handwriting was legible. His major problem was centered on the difficulty in reproducing letters.

INVESTIGATION

The investigation comprises two parts included- Primary and Secondary. The primary parts include standardised psychological tests. The secondary part of the investigation includes various unstructured tasks (informal tests) related to cognitive function.

PRIMARY PART OF INVESTIGATION AND RESULTS

TABLE - 2: SUMMARY OF SCORES OBTAINED IN THE TEST OF MISIC

Sl.No.	Verbal items	Case No.1	Case No.2	Case No.3	Case No.4	Case No.5	Case No.6
1	Information	128	120	115	145	126	97
2	General comprehension	145	109	106	153	142	122
3	Arithmetic	100	94	90	115	100	92
4	Similarities	105	122	91	136	94	108
5	Vocabulary	114	100	98	144	110	124
6	Digit span	100	92	91	115	92	100
	Total VIQ Score	**115**	**106**	**98**	**135**	**111**	**107**
	Performance Items						
7	Picture completion	110	109	111	134	97	97
8	Block design	113	96	103	130	85	106
9	Object assembly	96	93	100	116	75	87
10	Coding	98	88	73	102	84	72
11	Mazes	94	98	93	124	121	121
	Total PIQ scores	**102**	**97**	**96**	**121**	**92**	**97**
	Mean score (full IQ score)	**109**	**102**	**97**	**128**	**102**	**102**

In the MISIC test, all cases scored average and above average scores in overall Verbal and Performance IQ. But they showed difficulties in subtests. In the subtests of MISIC, the Case No: 1 got very good scores in General Comprehension, Information, and Vocabulary. In the Performance test, he scored average and above average in all sub-items. Case No.2, had relatively superior informative skills. Her skills in General Comprehension, Vocabulary, Similarities and Arithmetic were average. In the Performance test, she scored evenly for Picture Completion, Block Design, and Object Assembly which explained that her perceptual, spatial and visual organization abilities were at an average level. The score of the Maze test revealed that her planning skills were average but she scored low score in Coding, which revealed that her capacity for new learning, eye motor-co-ordination skills were below average. Case No. 3's results showed that with the exception of Coding, he had average and above average scores in all other subtests. In Coding he scored poor score, which indicated that he had below average skills in eye-motor cordination task.

His overall IQ score put Case No. 4 on superior level. The result of the verbal IQ revealed that his General Comprehension, Information, Vocabulary and Similarities were at a superior level. In the performance tests, he had above average and superior scores in all other subtests except coding. In Coding he scored average score. Similarly, the Case No. 5 and 6 scored average scores in VIQ. But in the Performance test, they had below average scores in Object assembly and Coding, which indicated that their ability in general observation, visual organisation, and eye-motor co-ordination skills, were at below average. Moreover, the Case No. 5 scored below average score in Block Design, which suggested that his ability in visual-spatial construction was not an average level.

TABLE - 3: THE SCORES OBTAINED IN THE MEMORY TEST

Sl. No.		Case No.1 Percentile	Case No.2 Percentile	Case No.3 Percentile	Case No.4 Percentile	Case No.5 Percentile	Case No.6 Percentile
1	Personal information	50	100	10	100	60	50
2	Mental control	30	70	40	90	50	50
3	Sentence repetition	10	30	10	20	20	10-20
4	Story recall immediately Story recall delayed	100 90	90 80	70 60	100 60	90 90	100 80
5	Word recall (meaningful words)	40	80	20	40	80	30
6	Digit span forward Digit span backward	40 20	30 20	30 10	100 90	40 30	40 30
7	Word recall (Non meaningful words)	30	80	60	50	50	30
8	Delayed response learning	10	70	20	30	70	40
9	Picture recall	40	40	20	30	10	10
10	Benton Visual Retention Test	20	30	10	10	10	40
11	Paired associate learning	90	70	80	60-70	90	100
12	Catell's retentivity	10	10	20	40	20	40
	Total score	**50-60**	**70**	**30**	**60-70**	**70**	**50-60**

Overall the result of the Test of Memory for Children suggested that, among these groups, every child has satisfactory skill in auditory perceptual memory which was reflected in the scores of Story Recalled and Paired Associative Learning. These results revealed that they had good skill in recognition of auditory memory

and associative learning. At the same time, they showed difficulties in the sub-components of the Visual perceptual memory tasks. Detailed analysis indicated that the whole group scored below average in Picture Recall, BVRT, Cattell's Retentivity Test (sub test of visual perceptual memory) and Sentence Repetition task.

The lowest score in Picture Recall and BVRT suggested that they had below average skill in visual-scanning and visual-motor integration tasks. They scored below average in Catttell's Rentivity test, and this showed that they did not have sufficient visual-spatial memory skills. Beyond that, the low scores in the Sentence Repetition task indicated that they might have difficulty in the sequential reproduction of the sentence verbatim.

TABLE - 4: THE SCORES OBTAINED IN THE QNST TEST

Sl.No.	Items	Case N0.1		Case No.2		Case No.3		Case No.4		Case No.5		Case No.6	
1.	Hand skill	2	S	0	N	1	N	1	N	2	S	1	N
2.	Figure recognition & production	2	S	0	N	0	N	0	N	2	S	1	N
3.	Palm form recognition	3	N	7	H	4	S	0	N	4	S	4	S
4.	Eye tracking	2	N	3	N	4	S	4	S	2	N	0	N
5.	Sound patterns	6	S	6	S	0	N	3	N	1	N	3	N
6	Finger to nose	3	S	1	N	2	S	0	N	1	N	1	N
7.	Thumb & finger circle	3	N	2	N	2	N	0	N	0	N	1	N
8.	Double simultaneous stimulating of hand and cheek	3	H	0	N	O	N	0	N	0	N	0	N
9.	Rapidly reversing repetitive hand movement	3	S	3	S	3	S	3	S	5	H	2	S
10.	Arm & leg extension	3	S	3	S	3	S	3	S	4	S	3	S
11.	Tandem walk	1	N	4	S	2	N	1	N	6	S	2	N
12.	Stand on one leg	2	S	0	N	1	N	0	N	3	H	2	S
13.	Skip	2	S	2	S	2	S	2	S	3	S	2	S
14.	Left-right discrimination	0	N	0	N	0	N	0	N	3	S	2	S
15.	Behavioural irregularities	1	N	1	N	4	S	0	N	1	N	0	N
	Total score	**36**	**S**	**32**	**S**	**28**	**S**	**17**	**N**	**37**	**S**	**24**	**N**

H – high S – suspicious N - Normal

The overall result of QNST test suggested that out of six cases four children belonged to the suspicious group and two cases belonged to the normal group. The descriptive analysis indicated, that the whole group had motor cordination difficulties which was evident in the areas of Rapidly reversing repetitive hand movements, Arm and leg extension and Skip. However, all these children did not have any kind of apraxia.

On Symptomology Checklist for Learning disabled children were given have showed some difficulties in the visual perceptual area. The result of the tasks given in the visual perceptual area revealed that out of six children two showed letter reversal, slow in recognition of letters and words. Difficulty in spacing the letters and words appropriately (case No. 1 and 2). The case No.3 had difficulties in copying, and did not leave enough space between words. Visual discrimination difficulties were found in case Numbers, 4 and 5. The case No. 6 had visual sequencing problems like reading 'saw'as 'was' and 'no' as 'on' and he was slow in writing.

SECONDARY PART OF INVESTIGATION AND RESULTS

To study the subtleties of the problem of each child, the researcher gave them unstructured cognitive function tasks, (informal tests) related to different areas of Language function, Memory function (both Visual /Auditory memory), Perceptual function (Visual/Auditory perception), Motor Function (Gross /Fine) and Attention span. Visual perception tasks included Visual discrimination, Visual sequencing, Visual spatial, and Visual organization. The auditory perception task included auditory discrimination and auditory comprehension.

The detailed developmental history was analysed to detect whether the results obtained in the psychological tests and informal tests were reflected in the developmental stage of each child. Collected information from the parents whether the child had any kind of peculiarities from the prenatal period to the current stage.

The researcher observed all the selected cases for minimum three years. During that period, it was very clearly noticed that, the children showed attention deficit or restless behavior when they required to perform academic tasks, (especially in those related to writing). However, they showed a lot of interst in and attentively carried out all other cognitive function tasks as well as other activities like playing puzzles, games etc. Parents reports also suggested the same. Various attention – enhancing tasks were given to the student to help him/her sustain attention. His/her success in the task was monitored. It was ruled out that the children don't have attention deficit hyperactive disorder.

It was evident from the results of the informal tests, the out of six cases, four cases have fine motor difficulties and they had (case no 1, 2, 4 & 5) partially defective visual process function. Case No 3 and 6 needed another explanation for their writing difficulties. Certain types of writing difficulties were common in the developmental stages. All these children examined, belonged to the upper socio-economic strata. Their parents were well educated, and so the children had received proper academic training and attention from the early stages of their childhood, but the problems persisted. This indicates that the problems are not just those at the developmental stage.

TABLE - 5: SUMMARY OF THE SIX CASES WITH WRITING DIFFICULTIES

Main difficulties in writing skill		Psychological Test Results	Cognitive function Results
Case No:1	Orthographic problems, mirror writing, reversed letters, illigble handwriting. Difficulty to hold pencils. More problems in spontaneous writing rather than copying.	MISIC- Scored above average score for all subtests. Memory test- Low scores in Picture recall, BVRT, and Cattel Retentivity test. QNST test - belongs in Suspecious group. Checklist of learning disability- Slow in recognition of letters and words.	Difficulty in remembering the structure of any visual picture especially of structure of letters. Visual discrimination difficulty. Visuo-Motor and fine motor coordination difficulties.
Case No:2	Lack on Space orientation. Difficult to write on a straight line and unshaped letters. Unable to keep margin and punctuation.	MISIC-Low score only in Coding. Memory test- Low scores in BVRT, Cattel retentivity test and Picture recall. QNST test - Belongs in Suspecious group. Checklist of learning disability – Difficulty in spacing the letters and words.	Difficulty in visuo-spatial working memory and fine motor co-ordination.
Case No:3	Major Difficulties found in Copying rather than in spontaneous writing and taking dictation.	MISIC- Low score in Coding. Memory test- Low score in Picture recall, BVRT, and Catells retentivity. QNS test - Belongs in Suspecious group. Symptomology checklist of learning disability- Difficulty in copying.	Difficulty in translation of visual process to fine motor process.
Case No:4	Severe Spelling mistakes especially in secondary graphemes, omission and substitution, difficulty in all areas of writing which results in spontaneous writing, dictation and copying.	MISIC- Scored above average score in all subtests. Memory test- Low Score in Picturerecall, BVRTand Catells retentivity. QNSTtest- Normal Checklist of learning disability- Visual discrimination difficulty.	Visual discrimination problem and mild level fine motor difficulty.
Case No:5	Reversing letters, Mixed up with small, capital letters and poor drawing skill.	MISIC- Low scores in Block design, Object Assembly and Coding. Memory test-Low score in Picturerecall, BVRT, Cattels retentivity. QNST test- Normal. Checklist of learning disability– Visual discrimination difficulty.	Visuo-Spatial and visuo-organisation difficulties. mild level of fine motor problem.
Case No:6	Very slow pace writing, but very legible handwriting.	MISICtest- Low scores in Object Assembly and Coding. Memory test - Low score in Picture recall, BVRT, Cattels retentivity test. QNST test- Normal. Symptomolgy checklist of learning disability- Visual sequencing problem.	Difficulty in reproducing letters and problem in automatic word decoding skill.

DISCUSSION

The finding of this a detailed case analysis throw light on how developmental delays, writing difficulties and cognitive function are correlated within each case.

The result of the psychological tests indicated that the case NO.1 had deficits in visual process function and fine motor difficulties. Though he scored good scores in MISIC test, he showed some difficulties in subtests of Memory test. His writing sample disclosed a clear history of orthographic problems. This could be due to his lack of skill in comprehending the visual picture of the words. Visual-motor difficulties were reflected in his poor drawing skills. His visual process deficits were evident in his difficulty in understanding the difference between the two hands of a clock. He found difficulty to make out the front and back side of a shirts. He had visual discrimination difficulties like letter reversal and inversion of letters from the beginning of his school life. In addition to all this, he suffered from certain fine motor problems, which were reflected in his daily living activities. He could not hold food such as rice in his fist. When he tried to take and eat a pinch of sugar most of it got spilt. He had difficulty in brushing his teeth and washing his mouth. It can be concluded that the child's problem (Case No. 1) is not limited to the verbal area as a learning process but to the finemotor area. It can be said that he had problems in the area of visual-motor function. It could help the child if he were provided more training in this area.

The case No. 2 showed difficulties in motor coordination tasks. She had difficulties in catching balls, riding a tricycle, and was slow to learn the dance steps. The analysis of her handwriting showed that she had difficulty in holding the pencil and that the letters were very small and misshapen. She was very slow in drawing and painting. Her fine motor difficulties were related to fastening sheets of paper with a large paper clip, using a key to open a lock and buttoning her shirt. She found it difficult to thread a needle and also needed help with tasks taking off her socks and shoes. Her handwriting showed she had spacing problems, though the MISIC test did not give any evidence of this. She had a good score in Block design, but her scores on Cattell's Retentivity Test (sub-test of memory) was poor. This could be because of her difficulty in spatial memory. Study of (Zhang 2002) indicated that students with writing disabilities had difficulties in visual-spatial working memory. When her cognitive function developments were studied it was noticed that, she was slow to understand different shapes, and failed to properly grasp the concepts of time and quantity. In the visual memory test, her deficits were prominent in visual-motor and visual-spatial tasks. If these two cases (case No. 1 and 2) were given proper training in the area of fine motor and visual-spatial, they could vastly improve their writing skills.

The case No.3, had difficulty in copying notes which could be due to his visual to fine motor deficits. The child's visual to the fine motor problem were evident in psychological tests. He had difficulties in Coding and BVRT. To be more specifiey he did not have much of a problem in either fine motor function or visual process function, but faced complications during the translation of the visual process to the fine motor process. If he has given training in this area, he can definitively improve. The result of other unstructured tasks also shows that he had more of a difficulty in visual to fine motor tasks. His deficits in visual to fine motor skills were evident in his inability to cut, color, paste and copy. He faced difficulties in combing his hair properly. He lacked skill in games frequently seen in children's magazines like joining dotted lines (to form a picture), finding the path (to the finish point) etc. Further scrutiny of his writing skills revealed that his obvious problem was in copying rather than in spontaneous writing or dictation.

The case No 4, he had some peculiarities in the Intelligence test and he scored above average scores in all subtests of MISIC. However, the other informal tests revealed that he had a visual discrimination problem. Both the cases (case No 4 and 5) showed difficulties in all areas of writing skill. Their writing sample gave indications of this fact. Their deficits in visual discrimination skill was manifested in various type of writing difficulties. The letter confusion and spelling mistakes were reflected in their visual discrimination difficulties. The deficits in eye tracking movement co-related with making omissions while copying. Moreover, the case No.5, showed visual-spatial difficulties which were reflected in their poor performance in drawing tasks. He found drawing geometrical figures tedious. The below average score in Block design, Object assembly and Coding (sub test of MISIC). BVRT, Picture Recall and Catell's Retentivity test (sub test of Memory) indicated that he had difficulty in spatial organisation, visual-motor co-ordination and visual organisational skills. Eden (1996) reported that dysgraphic children were impaired in a number of visual tasks involving visual-motor, visual-spatial, and visual-organisational. The insufficient and inadequate learning processes, defects in certain areas of the visual process and mild deficits in fine motor development had also affected their writing ability. So it may be concluded that the subjects have multiple dysfunction of both these defects. If the children (case no 4 and 5) are given proper training in those areas they can improve.

The case No. 6, was very slow in writing but his handwriting was legible. It could therefore be concluded that the child did not lack in fine motor developments. After a detailed analysis of his handwriting sample, it could be understood that his letters were well shaped and had clarity. The difficulty of writing does not originate from a visual-motor problem or a fine motor problem. The problem is with the speed of performing writing tasks. Every time he wrote a word, he found it as a novel experience. He took time to recall letters. The non-existence of automatic registration of letters could be one of the reasons for his writing disability.

Sternberg (1996) suggested that the most automatic process govern relatively easy tasks. The difficult tasks require controlled processing, although with sufficient practice, even a complex task like writing can become automatic.

Out of the six children analysed for writing problems, only one case can be described as having 'pure' dysgraphia. Analysis of that case (Case No. 3) indicated that his primary difficulty lies in translating a visual information to a fine motor activity. The problem is matching with his specific extraordinary difficulty in copying. In two children, problems in fine motor activities seemed to be more dominant. For them, difficulties were evident in all the three forms of writing: spontaneous writing, dictation and copying. Problems in mastering fine motor activities were clearly evident in their developmental history. All possible errors like spelling problems, spatial errors, fine-motor difficulties and slowness were evident in most of the cases in varying degrees. These difficulties were clearly represented in the Coding test of MISIC. Moreover, all children scored low in BVRT. The writing performance of one child was generally good with a clear readable handwriting accompanied by well formed letters. The problem noticed was the speed of writing. He was so slow in writing that it seems writing was an effortful activity for him rather than an automatic easy one.

CONCLUSION

As it is evident from the present research that writing disability is not a homogeneous category, detailed classification schemes have to be prepared. For that, concentrated studies in pure cases are essential. The present findings brought some fresh insight regarding the relationship between cognitive functions, developmental hazards, difficulties in daily activities and writing difficulties. The present study reveals an important fact that translation of experiences from one domain to another (visual, verbal, fine motor) could be a possible factor in writing disability. The study also suggests that the problem of each child is unique. So interventions have to be individually tuned and designed by giving a clear focus to the underlying difficulties of each child.

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