EFFECTS OF VISUAL PERCEPTION TRAINING ON LEGIBILITY OF URDU HANDWRITING

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ABSTRACT: *The present study observed the effects of training for Visual Perception (VP) on legibility of Urdu handwriting. 40 students, having poor handwriting, were taken from the 4th and 5th class of general education schools. The VP was measured by using Beery Baktinica test for Visual Perception. Handwriting was assessed with the helped of eleven proposed items of legibility by literature and researchers. The standardization of the assessment tools was ensured. Two group Pretest-Posttest Designed was used. The students were divided into experimental and controlled groups by using random sampling technique. The nominated students in experimental group were trained for six weeks in order to improve VP while the second was a control group without any treatment. A vigorous training for the improvement of VP was provided to the students in the experimental group. The overall score of VP and legibility was increased as a result of training provided to the students in the experimental group. It was also noted that the participants in the experimental group presented a significant enhancement in legibility of handwriting when compared with control group. Recognition, Alignment, Readability, Line, Size, Margin and Similarity were enhanced as a result of exercises provided to the individual.*

Key Words: Handwriting, Learning, Legibility, Visual Perception (VP)

INTRODUCTION

Reading and writing assignments are provided to the students in the schools. Handwriting is involved in most of the assignments of the teachers. The neat and clean handwriting is a demand of teachers and parents. It considers the refection of intellect. Because of their good handwriting, students are considered shining by the examiners and teachers as well. This shows the teachers positive reaction towards legible handwriting [1]. Furthermore, good handwriting impacts positively over academic achievements, behavior, self-image and attitude of children [2]. Deficiencies in production of good handwriting originate to low efficacy and self-esteem students [3].

Certain perceptual, motor and visual variables are important for the growth of handwriting skills. It is a blend of many factors including cognitive, motor and sensory elements. Dearth of these elements reduces perceptual and expressive capacities of the students and eventually touches handwriting negatively [4]. Visual Perception (VP) is one of vital elements of complex handwriting mechanism [5-7] and its development is considered crucial for improvement of handwriting [8, 9]. It organizes visual evidences with motor reactions, letting a child to copy numbers and letters for written assignments [10]. Copying, coloring shapes and writing jobs directed by the eyes of the writers. There is strong relationship between the handwriting legibility and Visual Motor Integration (VMI) and VP [1, 11].

A number of the researches were conducted with native English speakers and atypically developing students. Typically developing and bilingual students were less considered for researches under this title even though they come through many problems in evolving this ability [12]. Very few researchers studied handwriting in other languages also i.e. Chinese & Hebrew [1, 11]. Unluckily, no research effort had been documented in Pakistan to evaluate handwriting skills of students of elementary classes in Urdu language. Every language has its particular exceptional written features of latter formation and their smoothness [13]. There was requirement of a similar research work in which VP might be improved and their outcomes might be followed on Urdu handwriting. In recent study, typical students with poor handwriting were involved in the improvement of VP to see its possessions on legibility of Urdu handwriting and its constituents. This may be an optimistic addition in the typical and special handwriting classes of elementary children. School teachers may find novel opportunities in the form of activities and exercises to improve the handwriting legibility of the students. This research may discover the approaches to rise Urdu legibility and VP for typical children particularly.

Objectives of the Study

This study has following objectives.

1. To find out effects of exercise on VP skills of typically developing children of elementary classes.
2. To identify the effects of VP drill on Urdu handwriting and its components of students of elementary schools.

MATERIAL AND METHODS

The study in hand was an experimental study with two group pretest, posttest designed.

Participants

The present study was conducted in an elementary school name Govt. Elementary School, Samanabad, Faisalabad after the approval of the Headmistress. There were 147 students in the 4th and 5th grade in that school. The students of above mentioned classes were asked to copy a paragraph of Urdu language containing 160 -170 words. 46 students with poor handwriting were selected for this study. Research plan was discussed with these 46 students as well as with their parents, out of whom 6 students were not convinced. Resultantly, 40 students were become the final participants for this study. Subsequently, a session was organized with the selected participants to develop their rapport with the research team. Each student was asked to pick a card mentioned the with control and experimental group. So, each group has 20 students.

Instruments

Visual Perception and handwriting were assessed as under

Evaluation of Visual Perception

For this study, VP was measured by Beery Baktinaca's Developmental Test of VP [14]. Beery VP (2004) is a non-cultural, norm reference and standardized and test to quantity VP abilities. The students recognized the 24 geometrical shapes organized from easy to difficult. This test appropriate for children from 2 to 18 years of age. Test-retest reliability (r = 0.75 to 0.92) and inter-rater reliability (r = 0.93) for this test has been proven [14].

Evaluation of Handwriting

Legibility is a capacity to read a handwritten character on the basis of its apparent forms. Global legibility measurement means evaluation of general readability of handwriting. It is an easy and appropriate to assess the functional handwriting of children in a classroom setting [15]. Global legibility was measured for this research work. A questionnaire was prepared to evaluate the handwriting capability on the basis of indicators of good and bad handwriting. In expressions of legibility components of handwriting utmost frequently measured with every handwriting referral, more than 80% of the therapists evaluated formation of letters, alignment of words, spacing and size and letter slant was 'always' assessed by 57% of therapists of handwriting evaluators [16]. Urdu language teachers, therapist, raters and researchers were involved during preparation of questionnaire. It assessed handwriting on the basis 11 indicators of good handwriting including overall readability (Readability), use of margin (Margin), similarities among writing (Similarity), use of line (Line), presence of appropriate spaces (Space), overall size of letters (Size), shapes of words (Shape), slants of words (Slant), roundness of words (Roundness), alignment of words (Alignment), and recognition of words (Recognition). It assessed the Urdu handwriting on 5-point Likert scale. One to five scores were given to poor and excellent legible handwriting, respectively. Test-retest reliability ($\alpha = 0.884$ to $\alpha = 0.890$) was ensured by Cronbach alpha statistics. A training session was arranged to develop the consensus on the scoring criteria. In case of any ambiguity in the scoring, re-evaluation was made until the scoring process become uniform.

Interventions

Experimental group was treated for 45 minutes for 3 days a week for 6 weeks. Eighteen sessions were given to improve VP of experimental group for 45 minutes per day for 3 days a week for 6 weeks. Eight sessions (one session per week) were administered to improve the VP in a similar study previously [1]. The activities and exercises were conducted in individual and group forms. Exercises and activities were selected from well-recognized and authentic resources. Treatment was provided by first author who is registered physiotherapist with the help of two physiotherapists and their team. Uniformity in treatment and evaluation was ensured. Intervention were provided in 3 phases.

DATA ANALYSIS

Statistical Analysis of Social Sciences (SPSS 16) and statistical package R 3.2.3 were used for the data analysis. Significance of the treatment was measured by using independent sample t test on the post test scores of VP and legibility variables of the experimental and score groups and paired sample t test on the post measurement of VP and legibility of the experimental group (Table 1 & 2). The joint effects of intervention on the variables was observed by principal component analysis. The joint effects of intervention were seen by using Principal Component Analysis (PCA) with Varimax rotation (Table 3) with 11 legibility components of Urdu handwriting. A path diagram was drawn to see weight of the individual legibility components from control to experimental groups by using fa functions.

RESULTS

Data of 40 students were analyzed (20 from treatment and control group each). Before the start of experiments, on an average participants of the study didn't show any significant difference to experimental group (M = 17.25, SE = 0.82) than to control group (M = 16.80, SE = 0.73), t (38) = 0.41, p > 0.05 for Visual Perception. Similarly, no significant difference to experimental (M = 32.25, SE = 0.50) than to control group (M = 2.00, SE = 0.75), t (38) = 0.28, p > 0.05 for legibility of handwriting.

Table 1: Characteristics of Participants of Both Groups

		Experimental Group		Control Group	
Variables		Pre Test	Post Test	Pre Test	Post Test
Visual Perception	M	17.25	19.05	16.80	17.15
	SD	3.65	3.29	3.29	3.04
	SE	0.82	0.73	0.73	0.68
Legibility	M	32.24	39.25	32.00	34.45
	SD	6.36	5.15	3.01	0.81
	SE	0.33	0.67	0.85	0.67

Note: M = Mean, SD = Standard Deviation, SE = Standard Errors

Visual Perception and Legibility of handwriting in experimental and control groups were similar before intervention.

After the experiments, on an average there was a significant difference scores of the participants of the experimental group (M = 19.20, SE = 0.70) than to control group (M = 17.15, SE = 0.68), t (38) = 2.10, p < 0.05 for Visual Perception. Similarly, a significant improvement to experimental (M = 42.40, SE = 0.90) than to control group (M = 34.45, SE = 0.81), t (38) = 6.59, p < 0.01 for legibility of handwriting.

Table 2. Comparison of Pre-Test Post-Test Scores by Suing t Test

	Independent Sample t Test		Paired Sample t Test	
Variables	t*	r	t**	r
Visual Perception	2.10	0.32	5.49	0.78
Legibility	6.58	0.73	17.73	0.96

Note: t* = t test on pre-test and post-test scores of both control group with df (38) and p < 0.05, t** = t value with df = 19, p < 0.05 on pre and post scores of experimental groups

Visual Perception and overall Legibility of handwriting in experimental group improved as a result of training provided to the participants of the experimental group. Similar finding had been observed in a VP training of the students with special needs in a previous research (Case-Smith, J., 2002).

Factor Analysis of Urdu Data

For control and experimental groups, principal component analysis was conducted on 11 items of legibility of handwriting with orthogonal rotation using Varimax method as explained in Table 3

Table 3: Combine effects of items legibility by using principal component analysis (PCA) with Varimax rotation

No	Variable	Before Intervention			After Intervention		
		W	h^2	μ^2	W	h^2	μ^2
1	Readability	0.40	0.16	0.84	0.74	0.55	0.45
2	Margin	-0.39	0.15	0.85	0.34	0.12	0.88
3	Similarity	-0.40	0.16	0.84	0.27	0.07	0.93
4	Line	0.26	0.07	0.93	0.32	0.10	0.90
5	Space	0.69	0.47	0.53	0.65	0.42	0.58
6	Size	-0.46	0.21	0.79	0.65	0.42	0.58
7	Shape	0.71	0.51	0.49	0.73	0.53	0.47
8	Roundness	0.45	0.21	0.79	0.38	0.14	0.86
9	Slant	0.69	0.47	0.50	0.44	0.19	0.81
10	Alignment	0.37	0.14	0.86	0.61	0.38	0.62
11	Recognition	0.62	0.38	0.62	0.80	0.63	0.37

Note: W = Weight of individual items, h^2 = Communalities,

Only one factor was formed in both experimental and control groups to see the weight so each item on its relevant factor. There was an increase of weight of items in the relevant factor. This situation was represented in the path diagram Figure 1

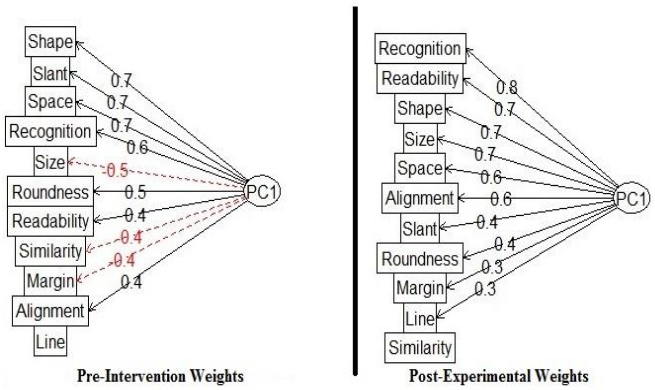

Figure 1: Effects of Visual Perception Training on Components of Legibility

It was indicated that Recognition (0.6 to 0.8), Alignment (0.4 to 0.6), Readability (0.4 to 0.7), Line (0.0 to 0.3) and Size (-0.5 to 0.7), Margin (-0.4 to 0.3) and Similarity (-0.4 to 0.0) were increased as a result of training provided to the students. The improvement in the overall legibility had been documented previously (Daly, C. J., Kelley, G. T., & Krauss, A. 2003).

DISCUSSION

This study was intended to note effect of VP training for VP on legibility of Urdu handwriting with comparison of experimental and control group. Initial assessment indicated that there was no significant difference between both groups before the start of experiment. Control and experimental groups were statically equal in VP and handwriting legibility of Urdu.

Effects of Intervention on VP Ability of Children

Post experiment results indicated the improvement in VP skills of students in the experimental group. Previous studies reported related improvement in VP of children with motor coordination issues and difficulties in handwriting [7, 17]. A study on typically developing students showed that students' persistent or enhanced the performance scores of visual-motor and visual-perceptual as a result of training provided by the occupational therapist in the school [18]. We were expecting the similar results, after intensive training of 30 sessions for the improvement of VP. This improvement revealed the efficacy of the treatment given to students for improvement of the VP. There was no significant effect of training on the gender in improvement of VP and legibility of handwriting.

Effects Intervention on legibility of Handwriting

Result of post experimental assessment indicated that students of experimental group showed significant improvement in overall legibility of Urdu handwriting. This supported the previous results of the researches which showed an enhancement in English handwriting legibility after VP drill. We may accomplish from our outcome that VP is an effective training for the improvement of Urdu handwriting legibility in typically developing children as appealed in former studies. A relationship is stated between VP and legibility of handwriting [19]. Similar outcomes are described in a earlier study, in which student's functional handwriting were upgraded as a reflection of exercise provided for enhancement of VP [18] exposed the enhancement of It was indicated that Recognition, Alignment, Readability, Line, Size, Margin and Similarity Urdu handwriting of children as a result of VP training provided to students.

CONCLUSIONS

In the present study, the students in experimental group improved in VP and legibility and its constituents. Recognition, Alignment, Readability, Line, Size, Margin and Similarity of Urdu handwriting were improved as a result of VP training provided to the students. This study is significant to practice for enhancement of Urdu handwriting of the typically developing children.

Limitation and Direction for Further Research

Unavailability of a tool for evaluation of Urdu handwriting was a basic limitation for this study. Eleven combined components were nominated by the researchers and experts for the assessment of Urdu. Other components are expected in under the umbrella of legibility of Urdu handwriting. We believe that more variables may be discovered for the future researchers interested in Urdu handwriting.

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