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Normative Data of Motor Free Visual Perception Test among Indian Children.

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Abstract:
OBJECTIVE. The purpose of this study was to obtain normative data for Motor-Free Visual Perception Test (MVPT) in Chennai children.To find out the performance difference between genders. **METHOD.** Three Hundred and Thirty One typically developing children comprising of 167 girls and 164 boys were taken from normal school situated in various parts of Chennai. **RESULTS**. No significant difference ($F=0.150$, $p=0.698$) between gender on MVPT performance. Pearson correlation exhibits positive correlation ($r= 0.746$, $p<0.001$) between age and raw. **CONCLUSION**. Cultural influence has been scrutinized in visual perception. It also suggested that there was no gender difference and raw score increases as age matures. This study concluded that there is a strong need to ensure that norms for visual perceptual test are appropriate for specific cultural group being assessed. The norms produced in this study form the baseline for MVPT and can be used for screening and therapeutic purpose.

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I. INTRODUCTION

The development of visual perception changes through the course of lifetime from birth through adulthood, and then decline in old age. Visual perception develops as the child matures, with the bulk of it taking place by age 9 and generally develops in the following ways: General to specific, whole to parts, concrete to abstract and familiar to novel. Visual perception can be categorized into several areas like figure ground perception, size and shape constancy, position in space perception, visual discrimination, visual memory, visual closure and spatial relationships[1]

Figure-ground perception is the ability to differentiate a stimulus from its background or the ability to attend to one stimulus without being distracted by irrelevant visual stimuli around it. Children with figure-ground problems may have difficulty attending to a word on a printed page because they cannot block out other words around it. Size constancy enables a person to make assumption regarding the size of an object, even though visual stimuli may vary under different circumstances. A visual image of a car in the distance is much smaller than the image of the same car at close range, yet the person knows that the actual sizes of the cars are similar[2].

The perception of positions of two or more objects in relation to each other and to oneself is called spatial relationships. The child might have difficulty in catching a ball, because he cannot prepare his body in relation to the ball's movement through space. Adequate development of visual perception is crucial, not only for academic learning, but also for coping with and adapting to the environm

Significance for the study:

When there is dysfunction in visual perceptual skills in school going children, it can have a negative impact on a number of occupational performance and functional areas [4] like eating, dressing (e.g. using fasteners and tying laces), reading, writing, play activities like constructing with blocks ability to use tool, puzzle game etc.

Occupational Therapists focus on functional independence in the performance of activities of daily living, work and productive activities, play and leisure activities, so the focus on the performance component of visual perception is critically important. Many standardized tools have been developed to assess visual perception. They are developmental test of Visual Motor Integration [5](Berry, K.E.1996), Developmental Test of Visual Perception[6] (Frostig, M. 1966), Motor-Free Visual Perception Test [7]Colaursso , R.P. and Hammill, D.D. 1972), Sensory Integration and Praxis Test [8](Ayres, A.J. 1989). Motor-Free Visual Perception Test is used in this study because it is motor free and can be used for children with motor disabilities.

Statement of the research problem:

Since the influence of culture on visual perception [9] has been reported, hence this study is undertaken to establish normative reference data for Motor-Free Visual Perception Test in Chennai Children. The following research questions were:

- Is there any difference in performance on MVPT in Chennai and Western Children?
- Is there any performance difference between genders?
- Is there any increase in raw score of MVPT as age matures?

Aim and Objectives:

Aim:

- To find out the normative data of Motor-Free Visual Perception Test in Chennai Children.

Objectives:

- To identify the performance difference between the gender.
- To determine the correlation between the age and raw score.

II. METHODOLOGY

Research design:

Quantitative research design –cross section study.Ethical clearance is obtained from SRM University Ethical clearance committee. Consent forms was obtained from concerned parents.

Participants:

The participant were selected from seven normal schools situated in North, South and Central zones of the Chennai through convenience sampling method inorder to maintain the geographical distribution.
This study consists of 331 participants with 164 boys and 167 girls from age groups 4 to 8 years.

Screening criteria:

The inclusion criteria were: Children with age group of 4 to 8 years; both genders; Normal and corrected vision; Normal and corrected hearing. Children with intellectual impairment were excluded from the study.

Instrument used:

1. Description:

Motor-Free Visual Perception Test was developed by Ronald R. Colarusso and Donald D.Hammill[10]. The test consists of 36 items, two-dimensional; multiple choice format in a horizontal manner designed to evaluate visual perception as a whole. It measures spatial relationship, figure-ground perception, visual memory, visual closure and, visual discrimination. This test is commonly used by Occupational Therapist to assess visual perception. It is easy to administer and takes 10-15 minutes.

2. Scoring Procedure:

0 - Inaccurate response.
1 – Accurate response

3. Reliability and Validity:

Reliability:

Test-retest reliability was 0.77 – 0.83 for different age groups and total test-retest reliability was 0.81. Spearman Brown Split Half reliability was 0.81 – 0.84; 0.88 (for different age group and total respectively). Kuder-Richardson reliability was 0.71 – 0.82; 0.86 (for different age group and total).

Validity:

Content validity,construct validity,discriminant validity and concurrent validity has been reported

Data collection Procedure:

The study was conducted in various parts of Chennai, where the subjects have been selected from the normal schools. Before the study was administered the purpose of this study was explained to the parents and the head of the institutions and informed consent was obtained.

The general information about the individual's academic performance and participation in games has been collected from the respective class incharges. For each individual the test was administered in a separate

room with the distraction-free environment, good lighting and ventilation. Initially, the basic descriptions about the test items were explained. The subject was given directions to respond by pointing out the correct answer.

The administration of the test was also done individually. The test consists of 36 items, preceded with an example (trial) and the subject started initially with it. After the subject had matched with the presenting choice of 4 alternatives, the examiner says 'YES' for the right alternative or 'NO' for the wrong alternative and finally the correct alternative is pointed to the subject. This similar type of confirmation or explanation was not given for test items.

The data collected from the 331 subjects were complied for statistical analysis.

Data Analysis:

The data were analyzed with the statistical Package for the Social Sciences (SPSS) 23 version.

Results:

A total of 331 subjects participated in the normative study within the age group of 4-8 years. The subjects were taken from different schools in and around Chennai.

Table 1. Demographic distribution

Sl. No.	**Age**	**Boys (N =164)**	**Girls (N = 167)**
1	4.0 –4.11	40	37
2	5.0 – 5.11	38	44
3	6.0 – 6.11	42	45
4	7.0 – 7.11	44	41

The above table shows the demographic distribution of the variables.

Table 2 The performance of Chennai samples on MVPT

Age	**N**	**Mean**	**SD**	**F**	**LOS**
4.0 – 4.11	77	11.45	3.23	82.45	0.001
5.0 – 5.5	54	14.89	4.25		
5.5 – 5.11	28	17.75	4.27		
6.0 - 6.5	52	20.10	4.25		
6.5 – 6.11	35	23.54	4.16		
7.0 – 7.5	60	22.70	3.34		
7.5 – 7.11	25	24.28	4.02		
Total	331	18.19	6.09		

p = 0.05

F = ANOVA value

The above table shows the performance of Chennai samples on MVPT. One way ANOVA was used to find out the statistically significant difference between age groups. Results shows ($F = 82.45$, $p<0.001$) that there is a statistically significant difference between groups at 0.001 level.

Table 3. Comparison of overall performance between gender on MVPT

Gender	Subject (N)	Mean	Standard Deviation	F	Level of Significance
Boys	164	18.25	6.05	0.16	0.698
Girls	167	18.13	6.14		

F = ANOVA value

p = 0.05 level

The above table shows the comparison of overall performance on MVPT between boys and girls. One way ANOVA was used to identify significant difference between boys and girls on the performance in MVPT. A result shows that there is no statistically significant difference between boys and girls.

Table 4. The performance of Chennai samples on 5 subskills of visual perception in MVPT

Age	Spatial relationship (SR) %	Figure ground perception (FG) %	Visual memory (VM) %	Visual closure (VC) %	Visual discrimination (VD) %
4.0 – 4.11	39.87	38.73	30.22	23.82	32.90
5.0 – 5.11	60.44	44.81	31.01	31.00	37.66
6.0 – 6.11	87.95	58.09	67.26	42.64	57.44
7.0 – 7.11	78.37	58.41	72.82	49.06	64.68

The above table shows that there is more percentage score for spatial relationship and least percentage score for visual closure in each age group.

Table 5. The overall performance of Chennai samples on 5 subskills of visual perception in MVPT

Age	Spatial relationship (SR) %	Figure ground perception (FG) %	Visual memory (VM) %	Visual closure (VC)	Visual discrimination (VD) %
4.0 – 7.11	66.65	49.90	50.32	36.70	48.17

The above table shows that overall performance of Chennai samples in spatial relationship is more percentage and visual closure is least percentage.

III. DISCUSSION

The purpose of this study was to determine the normative data for MVPT in Chennai Children. Since the influence of culture has been reported on visual perception [11]. the primary objective of this study was to compare the performance on MVPT between Chennai and Western population. The secondary objectives were to determine the difference in performance between genders and to find out the correlation between age and raw score. Inorder to maintain the geographical distribution the subjects were selected from the various normal schools situated in North, South and Central Chennai. The selected population for this study was 331 participants comprising of 164 boys and 167 girls.

Results shows the Chennai population performance on MVPT from the age groups 4 - 7.11 years. Results on comparison of visual perception between boys and girls in table 3 and figure 2 shows that there is no statistically significant difference between genders. This statement has been supported by Chan. et al., (2005) [12] in their normative study on visual perception among Hong Kong children.

The results on the performance of Chennai population on 5 subskills of visual perception in MVPT in each age groups and in overall age group showed that there is increase percentage score for spatial relations and least percentage score for visual closure in each groups and in overall age groups. This increase percentage score in spatial relation may due to the early ability to use the spatial concepts. By about 36 months of age the infants usually begin to understand the concepts [13]. And the visual closure is performed by only least number of samples.

IV. CONCLUSION

This study concluded that there is statistically significant difference in performance between Chennai and Western Children. The study emphasis to ensure the norms for the MVPT. The norms produced in this study form the base line for future research, where the MVPT can be used for screening, diagnostic and treatment purposes.

Implications for Occupational Therapy:

Visual perception skill is important for children's academic performance like reading, writing, play and Activities of Daily living skills. Since Occupational Therapist plays major role in visual perception, this norm can be used to screen the children with visual perception problem from school and for diagnostic as well as to evaluate effectiveness of therapy programs.

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Dr.U.Ganapathy Sankar "Normative Data of Motor Free Visual Perception Test among Indian Children. ." IOSR Journal of Pharmacy (IOSRPHR), vol. 8, no. 4, 2018, pp. 67-71