

Development of Normative Data of Cognitive Skills and Motor Ability Parameters of Primary School children of West Bengal.

^{1*}Dr. Sourav Manna^{1*}, ¹Prof Dr. Prakash Chandra Dhara, ²Dr. Amitava Pal

Dr. Sourav Manna

Prof Dr. Prakash Chandra Dhara

Dr Amitava Pal

Lecturer in the department of Physiology
National Medical College
Birgunj, Nepal

Professor In the Department of Physiology
Vidyasagar University
West Bengal, India

Lecturer in the department of Physiology
Panskura Banamali College
West Bengal India

Abstracts

Norms refers to information regarding the group performance of a particular reference on a particular measure for which a person can be compared with other standard data. The purpose of the study was to develop the normative data of the parameters of neurophysiological study on primary school children of west Bengal. About 905 primary school children ages 5-10 years was recruited as a participant. Out of 905 primary school children 445 were boys and 460 were female. Parameters of the cognitive skills and motor abilities were studied among the study participants. Curve grading method was applied to construct the norms of the parameters of the cognitive skills and motor abilities. The capital letter A, B, C, D and F was used to represent the performances as excellent, very good, good and poor. Such grading of the norms for different cognitive and motor ability parameters might be helpful for identifying the position of the primary school children about their cognitive or motor ability strength. It may also a helpful guide for identifying the Bengali children who have cognitive or motor ability strength with clinical or subclinical range, may be identified and special emphasis may be given on them. Some suitable training may be arranged for betterment of their skills.

Keywords:

Norms, Cognitive skills, Motor abilities, Primary school children.

I. Introduction:

Norms refers to information regarding the group performance of a particular reference on a particular measure for which a person can be compared to. From a sociological perspective, social norms are informal understandings that govern the behaviour of members of a society (Marshal G 2009). Social psychology recognizes smaller group units, such as a team or an office, may also endorse norms separately or in addition to cultural or societal expectations (Jackson J 1985). In other words, norms are regarded as collective representations of acceptable group conduct as well as individual perceptions of particular group

conduct(Lipinski and Rimal, 2005). They can be viewed as cultural products (including values, customs, and traditions) (Sherif M 1936) which represent individuals' basic knowledge of what others do and think that they should do (Cialdini 2003).

Furthermore, in the field of social psychology, the roles of norms are emphasized which can guide behaviour in a certain situation or environment as "mental representations of appropriate behaviour" (Aarts and Dijksterhuis, 2003). According to the psychological definition of social norms' behavioural component, norms have two dimensions: how much a behaviour is exhibited, and how much the group approves of that behaviour(Lipinski and Rimal, 2005) Both of these dimensions can be used in normative messages to alter norms and subsequently alter behaviours. At the same time, norms also can be changed contingent on the observed behaviour of others (how much behaviour is exhibited). In fact, in Sherif (1936), one confederate was able to affect the development of a group norm related to the auto kinetic effect.

Individuals may also import norms from a previous organization to their new group, which can get adopted over time.(Feldman 1984.,Bettenhausen and Murnighan 1985). Without a clear indication of how to act, people typically rely on their past history to determine the best course forward; what was successful before may serve them well again. In a group, individuals may all import different histories or scripts about appropriate behaviours; common experience over time will lead the group to define as a whole its take on the right action, usually with the integration of several members' schemas (Bettenhausen and Murnighan 1985).Under the importation paradigm, norm formation occurs subtly and swiftly(Bettenhausen and Murnighan 1985). whereas with formal or informal development of norms may take longer.

Groups internalize norms by accepting them as reasonable and proper standards for behaviour within the group. Once firmly established, a norm becomes a part of the group's operational structure and hence more difficult to change. While possible for newcomers to a group to change its norms, it is much more likely that the new individual will adopt the group's norms, values, and perspectives, rather than the other way around (Hacman 1992).

In neurophysiological point of view, the Scores on different parameters of cognitive skills and motor abilities are most commonly interpreted by reference to norm that represents the test performance on standardization sample.

Basically there are two purposes of norms:

1) Norms indicate the individual's relative standing in the normative sample and thus permit evaluation of his/her performance in refer to other persons. 2) Norms provide compared measures that permitted a direct comparison of the individual performance on difference test.

In neurophysiological studies normative assessment may be carried out for a variety of reasons, such as: Clinical, to understand the pattern of cognitive strengths as well as any difficulties a person may have, and to aid decision making for use in a medical or rehabilitation environment. 2) Scientific investigation, to examine a hypothesis about the structure and function of cognition to be tested, or to provide information that allows experimental testing to be seen in context of a wider cognitive profile.

There also lack of standard normative data on the said parameters of the Bengali children. This lacuna inspired us to development of the norms for cognitive skill and motor ability parameters of the primary school going children in West Bengal.

II. Materials and Methods:

2.1 Selection of Site and Subjects:

The present investigation was carried out on primary school children only. The participants were selected from different primary schools of West Bengal state, India. About 905 participants were included in this study. Among them, 445 were boys and 460 were girls. The age range of the participants was 5-10 years. Parameters of the cognitive skills and motor ability were studied to all selected participants. Ethical approval and prior permission were obtained from the institutional Ethics Committee before commencement of the study. The experiments was performed in accordance with the ethical standards of the committee and with the Helsinki Declaration.

2.2. Inclusion criteria: The eligibility criteria for recruitment of the participants for the study were - age between 5 to 10 years, apparently healthy, not suffering from any acute illness, not having any physical deformity.

2.3. Exclusion criteria: The children who were suffering from neuro-psychological disorder and other acute illness, using different antipsychotic drugs for a period of time, orthopedically challenged were excluded from the study. Boys and girls having age below 5 years and above 10 years were not taken for this study.

2.4. Methods for determination cognitive skills parameters:

2.4.1. Colour trails Test (CTT)(D'Elia 1986)

This is a measure of focused attention and conceptual tracking. The participant was asked to serially connect the numbers 1-25 printed in two colours irrespective of the colour on colour trails. They were required to

connect the numbers serially from 1 to 25 alternating between pink and yellow circles and disregarding the numbers in circles of the alternate colour on colour trails. Time taken to complete each part is the score.

2.4.2. Color cancellation test (CCT)(Kapur 1974).

This is a measure of visual scanning/selective attention. It consists of 150 circles in red, blue, yellow, black and grey. The participants were required to cancel only the yellow and red circles as fast as they can. Time taken in seconds to complete the test comprised the score.

2.4.3. Picture completion test (PCT)(Malin 1969)

It is a measure of visuoconceptual ability, visual organization and visuo-conceptual reasoning. It consists of 20 cards with pictures of different objects with a missing feature. The participants are required to name or point out to the missing feature. Number of correct responses comprises the score

2.4.4. Rey's auditory verbal learning test (RAVLT) (Leandro et al. 2007)

It is a measure of verbal learning and memory. It is a measure of immediate memory, acquisition or new learning, retention, primacy, and regency effect, susceptibility to proactive and retroactive interference. Nonlinear age effects on RAVLT have been reported in children, with greater improvement in performance during middle childhood than during early adolescence. Age related improvement up till 9 years of age have been reported on RAVLT. It consists of a list of 15 words presented five times with an immediate recall after each of the 5 trials. A delayed recall is taken after a delay of 30 minutes filled with other nonverbal tests

2.4.5. FAS phonemic fluency test(FAS).(Thais et al.2009)

This test evaluates spontaneous production of words beginning with a given letter within a limited time. Participants are asked to produce orally as many words as possible beginning with a given letter F, A, and then S. One minute is given for each letter. Words produced are noted. When the participant corrected their response, this was not considered an error. The final score only included correct answers.

2.5. Methods for determination motor ability parameters:

2.5.1. Reaction Times Test (RT)

Ruler Catching Methods (Kosinski et al 2005).

One way we can test reaction time in lab is by measuring the time it takes to catch a ruler dropped by an accomplice. Subject should hold out the chosen hand and extend the thumb and index finger so they are 8 cm

apart. The ruler is dropped, and the subject grasps it between the thumb and index finger. The number at the subject's fingertips, i.e. distance the ruler fell through the subject's fingers was recorded. Calculate the time it took for the subject to react and catch the falling ruler. The time (t) it took for the ruler to fall can be calculated from the distance it fell. Distance (d) fallen can be converted to time (t) passed with the formula: $d \text{ (in cm)} = (1/2)(980 \text{ cm/sec}^2)t^2$.

$$t^2 = d/(490 \text{ cm/sec}^2) \quad t = \sqrt{d/(490 \text{ cm/sec}^2)}$$

[980 cm/sec² is the acceleration of a falling mass on Earth. Since we know how fast an object falls, we can figure out how long it took to fall a measured distance.]

2.5.2. The Grooved Peg Board Test (Desai et al. 2005)

This test using the dominant hand of the subjects place asymmetrical metal pegs into 25 key shaped holes in the grooved pegboard while being timed. Once completed the test is repeated with the nondominant hand. The score is based on the length of time necessary to insert all the pins and on the number of pins dropped. The test assesses the speed of fine motor control, eye-hand coordination, and manual dexterity.

2.6. Determination of norms of parameters for grading cognitive skills and motor ability of the children

For grading the cognitive skills and motor ability of the children curve grading norms was employed. The grading of the parameters was done for different ages of girls and boys separately. Curve Grading is based on the mean and standard deviation of a group of scores. The curve grade indicated the grade on a curve, that actually demonstrated mean and standard deviation that are needed for presenting the score.

Methods for computation for curve grade norms :(Johnson and Nelson ,1986)

Step 1: Mean and standard deviation of the scores was computed for each of the variable.

Step 2: Five common letter grading system (A, B, C, D and F) was assigned the grades a standard deviation range, as follows:

A=More than 1.5s above the mean

B= Between +0.5s and + 1.5s above the mean

Step 3: Range of C was determined (C range extend above and below the mean, its determination facilitates calculation of the other grade range).

C= between -0.5s and +0.5s from the mean.

Step 3: Range of D was determined. The upper limit of D was exactly the upper limit of C and lower limit of D was 1.5 s below the mean

D= Between -0.5s and -1.5 s below the mean.

Step 4: Range of F was determined by

F= More than 1.5s below the mean.

Step 4: Frequency and percentage of the score was established from the grade range. Theoretical percentage was computed. These percentages are taken from tabled value of the percentages of scores in the normal probability curve that fall ± 0.5 standard deviation and ± 1.5 standard deviation from the mean.

2.7. Analysis of Data:

The collected data will be analyzed by using suitable statistical software. Mean, SD, ANOVA, t-test, correlation coefficient, was done to find level of difference between the mean of two groups of data by statistical software SPSS version 20.

III. Result and discussion

The norms for cognitive skills and motor abilities were determined and those were divided into five grades such as A, B, C, D, and F, (Johnson and Nelson, 1986) which were designated as 'Excellent', 'Very good', 'Good', 'Average' and 'Poor' respectively. For representing the norms, the whole age group (5-10 years) of the children was divided into three groups, instead of six age groups, such as 5-6 year, 7-8 year and 9-10 year. Such grouping was made as there was no significant difference in performances of different cognitive and motor parameters between two adjacent age groups, e.g., 5 and 6 years, 6 and 7, 6 and 9 years and 9 and 10 years was observed. In each age group the cut off values for different parameters of cognitive skills and motor abilities have been presented in different tables in this section.

The distribution of boys and girls in different grades of the parameters of cognitive skills and motor abilities were analysed. It has been seen from the results that the most of the subjects were belonged to grades B, C, D respectively. Thus such distributions of subject in different grade may be helpful grade for selecting condition for particular activities in different fields such as in school performances and different sports activities among the children.

The norms for the performances of cognitive skill and motor ability were found to vary in different newly formed age groups. In the table the norms for the parameters for cognitive skills and motor abilities at different age groups for boys and girls of Bengali population have been outlined. In case of the age group 5-6 year the higher and lower cut off values for colour trail test (CTT) and colour cancellation test (CCT) for boys and girls has been presented (Table 1).

As those parameters represented the score in time (sec) and lower time indicated the better performance, the scores were increased from category A to D. Thus the lower scores were belonging to Category A. It was

noted that the frequencies of boys and girls were the maximum in B and C, i.e., very good' and 'Good' categories for the above two tests. Similarly in other age groups, viz., 7-8 years, and 9-10 years, the same trends of results were observed (Table 2 and Table 3). The highest frequency of the subjects was noted in group C expecting CTT in the age group of 9-10 year for boys.

Table- 1: Norms for Colour trail test (CTT) and Colour cancellation test (CCT) of boys and girls at age group 5- 6 yrs

Grade	CTT				CCT			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	<45	3	<43	2	<40	1	<50	4
B	46-105	51	44-99	53	41-104	53	51-100	47
C	106-164	50	100-155	64	105-167	57	101-150	52
D	165-229	25	156-211	26	168-231	18	151-200	31
F	>230	14	>212	10	>232	14	>201	15

Table- 2: Norms for Colour trail test (CTT) and colour cancellation test (CCT) of boys and girls at age group 7-8 yrs

Grade	CTT				CCT			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	<40	1	<31	1	<36	4	<44	3
B	41-82	53	31-78	48	37-91	43	45-85	48
C	83-124	70	79-125	74	92-145	75	86-127	66
D	125-167	19	126-172	13	146-199	23	128-168	22
F	>168	17	>173	16	>200	17	>169	13

Table- 3: Norms for Colour trail test (CTT) and colour cancellation test (CCT) of boys and girls at age group 9- 10 yrs

Grade	CTT				CCT			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	<24	2	<22	1	<24	3	<19	2
B	23-71	60	22-62	48	25-74	54	20-65	35
C	72-121	47	63-105	77	75-124	55	66-109	92
D	122-170	14	106-145	14	125-174	11	110-153	16
F	>171	17	>146	13	>175	17	>154	12

Table- 4: Norms for Picture completion test (PCT) and phonemic fluency test (FAS) of boys and girls of the age group 5- 6 yrs

Grade	PCT				FAS			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	>4	14	>4	9	>5	16	>5	7
B	3.1-4	48	3.1-4	41	3-5	14	3-5	32
C	2.1-3	48	2.1-3	59	2-3	81	2-3	86
D	1-2	27	1-2	39	1-2	18	1-2	20
F	<1	6	<1	7	<1	14	<1	10

Table- 5: Norms for Picture completion test (PCT) and phonemic fluency test (FAS) of boys and girls of the age group 7-8 yrs

Grade	PCT				FAS			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	>5	34	>5	27	>8	8	>9	7
B	4-4.9	63	4-4.9	63	6-7	42	6-8	52
C	3-3.9	46	3-3.9	44	4-5	67	4-5	68
D	2-2.9	17	2-2.9	18	2-3	36	2-3	19
F	<2	2	<2	2	<1	5	<1	6

Table- 6: Norms for Picture completion test (PCT) and phonemic fluency test (FAS) of boys and girls of the age group 9-10 yrs

Grade	PCT				FAS			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	>5	4	>5	4	>10	5	>10	12
B	4-4.9	52	4-4.9	70	7-9	58	7-9	28
C	3-3.9	47	3-3.9	71	5-6	35	5-6	72
D	2-2.9	33	2-2.9	7	2-4	37	2-4	36
F	<2	4	<2	7	<1	5	<1	3

The norms for picture completion test and phonemic fluency test of Bengali children of 5-6 yrs, 7-8 yrs and 9-10 yrs have been presented in Tables 4, 5 and 6 respectively. For the age group 5-6 yrs the frequency distribution of PCT and FAS of boys and girls was found to be higher in B and C categories, with the higher frequencies in C group, than that of other categories. For the age group 7-8 years, the occurrence of highest frequency was found in B category for PCT and C category for FAS. For the age group 9-10 yrs, the most of the boys and girls were distributed in B and C categories for PCT and in C and D categories for FAS.

Table- 7: Norms for verbal recognition test (REC) and learning of trials (LOT) of boys and girls of the age group 5- 6 yrs

Grade	REC				LOT			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	>11	12	>9	12	>13	5	>12	11
B	8-10	26	7-8	40	9-11	30	9-11	28
C	6-7	53	6-7	44	6-8	66	6-8	55
D	3-5	49	3-5	59	4-5	23	3-5	54
F	<2	2	<2	2	<3	17	<2	7

The cut-off values for different categories for verbal recognition and learning of trials scores of boys and girls of different age group have been presented in Tables 7, 8, and 9. It was noted from the results that for the lowest age group (5-6 yrs) the frequency distribution of the scores of verbal recognition was higher in C and D categories in both boys and girls

Table- 8: Norms for verbal recognition test (REC) and learning of trials (LOT) of boys and girls of the age group 7-8 yrs

Grade	REC				LOT			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	>12	27	>12	4	>16	6	>15	14
B	10-12	36	9-11	73	12-15	22	12-14	27
C	6-9	29	7-8	37	8-11	75	8-11	50
D	3-5	69	5-6	32	5-7	54	4-7	48
F	<2	1	<4	6	<4	5	<3	13

Table- 9: Norms for verbal recognition test (REC) and learning of trials (LOT) of boys and girls of the age group 9-10 yrs

Grade	REC				LOT			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	>16	12	>16	10	>17	8	>17	9
B	13-15	54	13-15	66	12-16	21	13-16	23
C	10-12	38	10-12	40	9-12	54	9-12	59
D	7-9	32	8-9	27	5-8	45	5-8	57
F	<6	4	<7	10	<5	12	<4	5

It was also noted from the Table 7 that in case of the scores of LOT (learning of trials), majority of the boys and girls were distributed in C category. For the age group 7-8 yrs, the highest frequency of the scores of verbal recognition was in D category for boys and B category in girls. The highest frequency of LOT was noted in category C in both boys and girls. The most of the boys and girls were distributed in B and C categories in the highest age group (9-10yrs). In the case of the score of LOT, majority of boys and girls were distributed in C and D categories.

Table- 10: Norms for Reaction time and peg board score for Dominant hand of boys and girls of the age group 5- 6 yrs

Grade	Reaction Time				Peg board score in Dominant hand			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	<0.167	1	<0.150	3	>12	16	>12	8
B	0.168-0.243	58	0.151-0.219	52	10-11	28	10-11	37
C	0.244-0.319	41	0.220-0.287	54	7-9	44	7-9	80
D	0.320-0.395	34	0.288-0.355	35	5-6	54	5-6	25
F	>0.396	9	>0.356	11	<4	1	<4	5

Table- 11: Norms for Reaction time and peg board score of Dominant hand of boys and girls of the age group 7-8 yrs

Grade	Reaction Time				Peg board score in Dominant Hand			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	<0.148	4	<0.142	13	>15	17	>14	13
B	0.149-0.212	54	0.143-200	30	12-14	52	11-13	30
C	0.213-0.276	67	0.201-0.259	46	9-11	51	8-10	46
D	0.277-0.340	14	0.260-0.317	55	7-8	34	7-8	55
F	>341	23	>0.318	8	<6	8	<6	8

Table- 12: Norms for Reaction time (sec) and peg board score of Dominant hand of boys and girls of the age group 9-10 yrs

Grade	Reaction Time				Peg board score in Dominant Hand			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	<0.135	5	<0.117	3	>17	5	>15	10
B	0.136-0.187	42	0.118-0.173	48	14-16	38	13-14	58
C	0.188-0.238	55	0.174-0.229	58	11-13	57	11-12	50
D	0.239-0.290	24	0.230-0.284	33	8-10	33	9-10	29
F	>291	14	>0.285	13	<7	7	<8	6

The results of norms for the reaction time and pegboard score by dominant hand for the age groups 5-6 yrs, 7-8yrs, 9-10yrs have been presented in Tables 10, 11, and 12 respectively. The result revealed that for the age group 5-6 yrs the dominance of frequency distribution for reaction time score was noted in categories B and C. In case of the age group 7-8yrs the most of the boys were distributed in categories B and C and most of the girls were distributed in categories C and D. In higher age group (9-10yrs) the frequency distribution was higher in B and C categories for both boys and girls.

Table- 13: Norms for peg board score for non dominant hand and both hand of boys and girls of the age group 5- 6 yrs

Grade	Peg board score in Non-Dominant hand				Peg board score in both hand			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	>11	9	>10	12	>12	20	>10	12
B	9-10	44	9-10	38	8-11	34	8-9	38
C	7-8	53	7-8	62	5-7	73	5-7	62
D	5-6	34	5-6	40	3-4	-	3-4	40
F	<4	3	<4	3	<2	16	<2	3

Table- 14: Norms for non dominant hand and both hand of peg board test of boys and girls of the age group 7-8 yrs

Grade	Peg board score in Non-Dominant hand				Peg board score in both hand			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	>13	7	>13	5	>13	2	>12	18
B	11-12	51	11-12	40	10-12	34	10-11	-
C	8-10	73	8-10	61	7-9	75	7-9	86
D	6-7	24	6-7	31	4-6	48	4-6	46
F	<5	7	<5	15	<3	3	<3	2

Table- 15: Norms for non dominant hand (NDH) and both hand of peg board test of boys and girls of the age group 9-10 yrs

Grade	Peg board score in non-dominant Hand				Peg board score in Both Hand			
	Boys	Frequency	Girls	Frequency	Boys	Frequency	Girls	Frequency
A	>14	8	>15	5	>15	6	>15	6
B	12-13	39	13-14	42	12-14	48	12-14	44
C	9-11	68	10-12	74	8-11	60	8-11	87
D	7-8	20	8-9	27	5-7	26	5-7	16
F	<6	5	<7	5	<4	-	<4	-

The norms for pegboard scores by dominant hand, non dominant hand and both hand of children having age groups of 5-6 yrs, 7-8 yrs and 9-10 yrs have been presented in different tables. The results (Tables 10 & 13) showed that the peg board scores in the age group of 5-6yrs the dominance of frequency distribution was noted in the categories C and D in cases of dominant hand of boys and non-dominant hand and both hands of girls. On the other hand, the categories of B and C had higher frequency distribution in dominant hand of girls and non-dominant hand both hands in boys. For the age group 7-8yrs (Tables 11 and 14) the higher frequency distribution was observed in the categories of B and C for the dominant hand of boys and non-dominant and both hand of girls and it was observed in C and D categories for the dominant hand of girls and both hand for boys and girls in comparison to other categories. In case of the age group 9-10yrs (Tables 12 and 15) the higher frequency distribution of peg board score was evident in B and C categories for all combination of hand in both boys and girls than that of other categories.

In the present investigation normative data for cognitive skills and motor ability parameters of the Bengali population have been formed. The parameters of the norms for cognitive skill and motor ability that help to determine the measures of the developmental progress of children such as behavior, reflexes, and responses. Further grading of the norms of different parameters has been done. The scores were divided into five grades such as A, B, C, D, and F, which were designated as 'Excellent', 'Very good', 'Good', 'Average' and 'Poor' respectively. The grading was done separately for different age groups as well as for boys and girls.

IV. Conclusion:

Such graded norms will be helpful for categorizing each of children according to their cognitive performance. Selection of children for interschool academic competition will be easier to achieve success. Graded norms, especially of motor skill parameters, will be a guide for selecting the students for different indoor and outdoor sports events.

The grading of norms for different cognitive and motor ability parameters might be helpful for identifying the position of the primary school children about their cognitive or motor ability strength. It may also a helpful guide for identifying the Bengali children who have cognitive or motor ability strength with clinical or subclinical range. may be identified and special emphasis may be given on them. Some suitable training may be arranged for betterment of their skills.

V. Conflict of Interests:

The authors declare that there is no conflict of interests.

VI.Acknowledgments:

The author would like to thank all primary school children participating in this study. The author also thanks to all primary school teachers and parents of the children.

VII.Funding Information:

There is no funding source for this study

VIII .List of abbreviations:

CCT: Colour cancellation Test

CTT: Colour Trail Test

DH: Dominant Hand

LOT: Learning Of Trials

NDH: Non Dominant Hand

PCT: Picture completion Test

RAVLT: Ray's Auditory Verbal Learning Test

REC: Recognition

RT: Reaction Time

SD: Standard Deviation

References

- [1] Aarts, H.; Dijksterhuis, A. (2003). "The silence of the library: Environment, situational norm, and social behavior". *Journal of Personality and Social Psychology*. **84** (1): 18–28. doi:10.1037/0022-3514.84.1.18. PMID 12518968.
- [2] Bettenhausen, K.; Murnighan, J.K. (1985). "The emergence of norms in competitive decision-making groups". *Administrative Science Quarterly*. **30** (3): 350–372. doi:10.2307/2392667. JSTOR 2392667.
- [3] Cialdini, R. D. (2003). "Crafting normative messages to protect the environment" (PDF). *Current Directions in Psychological Science*. **12** (4): 105–109. doi:10.1111/1467-8721.01242.
- [4] D' Elia LF, Satz P, Uchiyama C.L, White T. (1996):Florida, Psychological Assessment Resources. *Color trails test*.
- [5] Desai K., Kene K., Doshi M., More S., Desai S. (2005): Normative Data of Purdue Pegboard on Indian Population. *The Indian Journal of Occupational Therapy*, 37(3): 69-72.
- [6] Feldman, D.C. (1984). "The development and enforcement of group norms". *Academy of Management Review*. **9** (1): 47–55. doi:10.2307/258231. JSTOR 258231.

- [7] Hackman, J.R. (1992). "Group influences on individuals in organizations". In M.D. Dunnette & L.M. Hough (Eds.), *Handbook of industrial and organizational psychology* (Vol. 3). Palo Alto: Consulting Psychologists Press, 234-245.
- [8] Jackson, J. (1965). "Structural characteristics of norms". In I.D. Steiner & M. Fishbein (Eds.), *Current studies in social psychology* (pp. 301-309).
- [9] Johnson B.L and Nelson J.K.(1986): Practical measurement for evaluation in physical education. *Macmillan Publishing Company*, New York PP 174-200.
- [10] Kapur M. (1974): Measurement of organic brain dysfunction. Ph.D thesis submitted to Bangalore University
- [11] Koshinski R.J.(2005) A literature review on reaction time. Clemson University. Accessed March 17, 2005. <<http://biae.clemson.edu/bpc/bp/Lab/110/reaction.htm#Arousal>> .
- [12] Lapinski, M. K.; Rimal, R. N. (2005). "An explication of social norms". *Communication Theory*. **15** (2): 127–147. doi:10.1093/ct/15.2.127.
- [13] Leondro F.M.D., Viviani A.P.L., Lenice de sena R.G., Daniel F. (2007): The Ray auditory-verbal learning test: Aplicability for Brazilian elderly population. *Rev. Bras Psiquiatr*, 29(4): 324-9.
- [14] Malin A.J. (1969): Malin's intelligence scale for Indian children (MISIC). *Indian Journal of Mental Retardation*, **4**:15-25.
- [15] Marshall, G.(2009):Oxford Dictionary of Sociology(3rd rev edition).Oxford University Press p. 324. ISBN: 13:9780199533008.
- [16] Sherif, M. (1936). *Thepsychology of social norms*. NewYork: Harper& Bros. PP 221.
- [17] Thais H.M., Helenice C.F., Etelvina L.S.,Viviane A.C., Patricia P.F., Anne M.K.(2009): Dementia .*Neuropsychologia*, 3(1): 55-60.
- [18] John M. Mecklin. (1936). "The Psychology of Social Norms. Muzafer Sherif ," *American Journal of Sociology* 42(3): 420-421.