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CONCENTRATION AND CO-ORDINATION TESTING APPARATUS (CCTA)

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Abstract: The aim of the study was to find the difference in pre-test and post test level of Concentration and Co-ordination among adult (19-55) and children (5-18) by using Concentration and Co-ordination Testing Apparatus. A quantitative method was adopted for the study. The tool used was Concentration and Co-ordination Testing Apparatus by Coexin Technologies. The apparatus were administered to a group of 60 children who were ranging from 5-18 and 60 adult ranging from 19-55. There were four different type of strings were used for the study. E14 & E8 for adult and D14 & D8 for children. Karl Pearson's Product Moment Correlation and paired samples *t*- test was used to analyze the collected data. The research reveals that there is no significant difference between pre-test and post test of time and error in design strings. The researcher concluded that the Concentration and Co-ordination Testing Apparatus is highly reliable.

Key words: concentration, Co-ordination, Concentration and Co-ordination Testing Apparatus.

INTRODUCTION

Concentration refers to the mental effort, a person direct towards whatever they are working on or learning at the moment. Concen tration sometimes confused with attention span, although attention span refers to the length of time a person can concentrate on so mething. Several research studies point to exercise being advantageous to increase concentration. Concentration can be improved by using concentration exercise tools. Exercising regularly is one of the easiest and most effective ways to reduce the symptoms o f ADHD, learning disabilities, mental retardation and other disabilities. Exercising also improve concentration, memory, motivatio n, and mood. Physical activity immediately boosts the brain's dopamine, nor epinephrine, and serotonin levels all of which affect f ocus and attention.

RESEARCH METHODOLOGY

3.1 Aim

To test the Level of Concentration and Co-ordination among adults (19-55 age) and children (5-18 age)

3.2 Objectives

- To measure the level of concentration among adults (19-55 age) and children (5-18 age)
- To find the difference in the pre-test and post test of time and error in E14 string
- To find the difference in the pre-test and post test of time and error in E8 string
- To find the difference in the pre-test and post test of time and error in D14 string
- To find the difference in the pre-test and post test of time and error in D8 string
- To find the relationship between pre-test and post test of time and error in E14 string
- To find the relationship between pre-test and post test of time and error in E8 string
- To find the relationship between pre-test and post test of time and error in D14 string
- To find the relationship between pre-test and post test of time and error in D8 string

3.3 Hypothesis

H1: There is a significant difference in pre-test and post test of time and error in E14 string. H2: There is a significant relationship between pre test and post test of time and error in E14 string H3: There is a significant difference in pre-test and post test of time and error in E8 string. H4: There is a significant relationship between pre test and post test of time and error in E8 string H5: There is a significant difference in pre-test and post test of time and error in D14 string. H6: There is a significant relationship between pre test and post test of time and error in D14 string H7: There is a significant difference in pre-test and post test of time and error in D8string.

H8: There is a significant relationship between pre test and post test of time and error in D8 string

3.4 Sample

The experiment was done in 2 conditions, first the population consist of 60 members of 5-18 age group. Second group is 60 members of 19-55 age group. The data were collected by using Concentration and Co-ordination Testing Apparatus.

3.41 Inclusion criteria

- The participant age ranging from 5 to 55 are selected for the experiment.
- Males and females along working individuals are included in this experiment.

3.42 Exclusion criteria

- The individuals who are taking medications are excluded in this experiment.
- The individuals having tremor and tic disorder are excluded from this experiment.
- The age below 5 years and above 55 years old people are excluded in this experiment.
- The individuals from other states are excluded in this experiment.

3.5 Tool 1) **Electrical Concentration and Co-ordination Testing Apparatus**

The instrument manufactured by COEXIN TECHNOLOGIES as well-designed and fabricated. The electronic CCTA consists of wooden/plastic box with two lights on the top for power (green) and error (red) respectively. Also, there is a single pattern of main string and a driving string which are zinc coated materials for corrosion resistance are mounted on the top of the box. Along with the red light, a buzzer also provided in the box for error findings. The task is to hold the driving string on left/right hand and move in the path of main string without touching each other. If the drive string, contact with main string an error is committed. The drive string is advised not to touch/drag on the main string. All the errors in each trial are marked and counted manually by the experimenter by putting a tally mark for each flash of the indicator and sound of the system on Response Sheet. And the time taken in each trial is recorded by means of a stopwatch. The time taken and errors committed in each trial are recorded in the data collection table.

2) **Electrical Concentration and Co-ordination Testing Apparatus with digital error counter and digital timer with different modes**

The Digital Electronic Concentration and Co-ordination Testing Apparatus designed and manufactured by COEXIN TECHNOLOGIES, Calicut are of very quality as far as material and craftsmanship is concerned. They employ the most advanced and up-to-date digital technology in their design. The instruments are good looking and easy in use. These instruments consist of three switches for START, STOP & MODE.

This electronic instrument also works on AC mains (220-230V, 50Hz) and can be directly connected to any 2/3/5 pin AC wall socket.

As the Drive string placed at the starting point and presses the START button for starting the timer and the error counter. Before that, the experimenter must select the mode (Light, Sound, Vibrator or Light + Sound) for the error awareness. Once the start button activates, the Digital Timer immediately starts recording time in seconds and its decimal parts. And whenever there is an error the digital error counter automatically records one error in digital form. Thus, here in this instrument Time and Error both are recorded

automatically. Both the Digital Timer and Digital Error counter has reset only when the stop press and then start again. Display is shining blue. As here no external time measuring device is employed for recording of time and the time measurement is free of any human error. This is one of greatest advantages. Secondly the time measurement is in seconds and their decimal parts and not in minutes as in the case with Stop Watches which in turn must converted into seconds

3.6 Procedure

The participants are provided with CCTA (Concentration and Co-ordination Testing Apparatus) which is developed by COEXIN technology to measure the level of concentration, co-ordination and self-confidence.

Adjust the apparatus with suitable string which is according to the age. For age 5-18, D14 & D8 strings and for 19-55 age group, E14 & E8 strings are provided. Next plugged the instrument adaptor (230V -12V) to AC Main wall socket ensuring that the main switches (AC wall socket & instrument) are OFF. Now switch on the mains and instrument switches. This will energise the instrument which in turn be indicated by the glow of digital display. Now seat the subject comfortably and good rapport should be established. Ensure proper level of light and temperature inside the room. Maintain a distraction free area to conduct the experiment.

Part 1: Ask the subject to move the driving string in clockwise direction by using right hand. Provide enough time to complete the experiment and note the time taken and number of errors made by the subject. Five trials can be taken for the same experiment.

Part 2: Ask the subject to move the driving string in anti-clockwise direction by using right hand. Provide enough time to complete the experiment and note the time taken and number of errors made by the subject. Five trials can be taken for the same experiment.

Part 3: Ask the subject to move the driving string in clockwise direction by using left hand. Enough time provided to complete the experiment and note the time taken and number of errors made by the subject.

Part 4: Ask the subject to move the driving string in anti-clockwise direction by using left hand. Enough time should be provided to complete the experiment and note the time taken and number of errors made by the subject.

Turn off apparatus and adjust the apparatus with next string. And start the same test as above with the new string. 5 trials should be taken for each experiment and result should be noted in the Response Sheet.

3.5.2 Scoring

Check out the response sheet and calculate the average score of time and error of the subject separately. Eg:

$$\text{- time} = \frac{t1+ t2+ t3+ t4+ t5}{5}$$

$$\text{Error} = \frac{e1+ e2+ e3+ e4+ e5}{5}$$

Interpret the score by using interpretation table given below.

AGE	STRING	VARIABLE	SCORES				
			LOW	BELOW AVERAGE	AVERAGE	ABOVE AVERAGE	HIGH
5-18	D14	ERROR	>6.83	6.83 > 4.77	4.77	4.77>2.71	<2.71
		TIME	>30.51	30.51 > 25.53	25.53	25.53>20.54	<20.54
	D8	ERROR	>8.60	8.60 > 5.6	5.6	5.6> 2.59	<2.59
		TIME	>33.27	33.27 > 27.08	27.08	27.08>20.89	<20.89
19-55	E14	ERROR	>10.12	10.12 - 6.99	6.99	6.99< 3.85	<3.85
		TIME	>57.35	57.35 -43.47	43.47	43.47<29.59	<29.59
	E8	ERROR	>19.51	19.51 - 15.93	15.93	15.93<10.56	<10.56
		TIME	>52.65	52.65 – 44.13	44.13	44.13<35.61	<35.61

3.7 Research Design

The experimenter used Survey Research Design.

3.8 Statistical Analysis

An appropriate statistical test is selected based on the nature of data and number of variables included in the research. Of the two types of statistical tests parametric and non parametric tests, the present study used parametric techniques such as Correlation, Paired sample t-test and Reliability.

RESULT AND DISCUSSION

H1: There is a significant difference in pre-test and post test of time and error E14 string. **Table4.1:**

Mean difference in pre test and post test of time and error in E14 string

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pre-test Time E14 – Post test Time E14	.98917	3.47569	.44871	.09130	1.88703	2.204	59	.031
Pair 2	Pre-test Error E14 – Post test Error E14	.51983	1.47899	.19094	.13777	.90190	2.723	59	.009

t-test was carried out to determine a significance difference between pre-test and post-test of Concentration Co-ordination Testing Apparatus. The results obtained shows that the t value obtained for Pre-test Time E14 and Post test Time E14 is 2.204. The mean and the standard deviation is 0.99 and 3.47 respectively. And the results obtained for Pre-test Error E14 and Post test Error E14 is 2.723. The mean and the standard deviation is 0.51 and 1.47 respectively, which is not significant. So the result indicates that there is no significant difference between pre-test and post-test of time and error. That is H0 is rejected.

H2: There is a significant relationship between pre test and post test of time and error in E14 string

Table4.2 : Relationship between pre test and post test of time and error in E14 string

Correlations

		Pre-test Time E14	Post test Time E14	Pre-test Error E14	Post test Error E14
Pre-test Time E14	Pearson Correlation	1	.971**	-.087	-.057
	Sig. (2-tailed)		.000	.506	.666
	N	60	60	60	60
Post test TIimeE14	Pearson Correlation	.971**	1	-.115	-.065
	Sig. (2-tailed)	.000		.384	.624
	N	60	60	60	60
Pre-test Error E14	Pearson Correlation	-.087	-.115	1	.904**
	Sig. (2-tailed)	.506	.384		.000
	N	60	60	60	60
Post test Error E14	Pearson Correlation	-.057	-.065	.904**	1
	Sig. (2-tailed)	.666	.624	.000	
	N	60	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

The result indicates that the r value of pre-test error & post error and pre-test time & post test time lies in between -1 and 1. So there is a relationship between pre-test and post test of error and time. Hence H2 is accepted. **Table 4.3:** Reliability of time in E14 string

Reliability Statistics

Cronbach's Alpha	N of Items
.985	2

Here the Reliability score is 0.98 which is highly reliable.

Table 4.4: Reliability of error in E14 string

Reliability Statistics

Cronbach's Alpha	N of Items
.947	2

Here the Reliability score is 0.94 which is highly reliable.

H3: There is a significant difference in pre-test and post test of time and error in E8 string.

Table4.5: Mean difference in pre test and post test of time and error in E8 string

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pre test of Error E8 – Post test of Error E8	-.11333	1.78697	.23070	-.57496	.34829	-.491	59	.025
Pre-test of Time E8 – Post test of TimeE8	.65548	1.66219	.21459	.22609	1.08487	3.055	59	.003

Paired Samples Test

t-test was carried out to determine a significance difference between pre-test and post-test of Concentration and Co-ordination Testing Apparatus. The results obtained shows that the t value obtained for Pre-test Time E8 and Post test Time E8 is 3.05. The mean and the standard deviation is 0.65 and 1.66 respectively. And the results obtained for Pre-test Error E8 and Post-test Error E8 is -0.49. The mean and the standard deviation is -0.11 and 1.78 respectively, which is not significant. So the result indicates that there is no significant difference between pre-test and post-test of time and error. That is H3 is rejected.

H4: There is a significant relationship between pre test and post test of time and error in E8 string

Table4.6: Relationship between pre test and post test of time and error in E8 string

Correlations

		Pre-test Error E8	Post test Error E8	Pre-test Time E8	Post test Time E8
Pre-test Error E8	Pearson Correlation	1	.920**	.350**	.357**
	Sig. (2-tailed)		.000	.006	.005
	N	60	60	60	60
Post test ErrorE8	Pearson Correlation	.920**	1	.330**	.355**
	Sig. (2-tailed)	.000		.010	.005
	N	60	60	60	60
Pre-test TimeE8	Pearson Correlation	.350**	.330**	1	.982**
	Sig. (2-tailed)	.006	.010		.000
	N	60	60	60	60
Post test TimeE8	Pearson Correlation	.357**	.355**	.982**	1
	Sig. (2-tailed)	.005	.005	.000	
	N	60	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

The result indicates that the r value of pre-test error & post error and pre-test time & post test time lies in between -1 and 1. So there is a relationship between pre-test and post test of error and time. Hence H4 is accepted. **Table 4.7:** Reliability of time in E8 string

Reliability Statistics

Cronbach's Alpha	N of Items
.991	2

Here the Reliability score is 0.99 which is highly reliable.

Table 4.8: Reliability of error in E8 string

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pre test of Error D14– Post test of Error D14	.6833	1.4555	.1879	.3073	1.0593	3.637	59	.001

Reliability Statistics

Cronbach's Alpha	N of Items
.959	2

Here the Reliability score is 0.95 which is highly reliable.

H5: There is a significant difference in pre-test and post test of time and error in D14 string.

Pair 2	Pre-test of Time D14 _ Post test of TimeD14	1.2000	4.3445	.5609	.0777	2.3223	2.140	59	.037

Table4.9: Mean difference in pre test and post test of time and error in D14 string

Paired Samples Test

t-test was carried out to determine a significance difference between pre-test and post-test of Concentration and Co-ordination Testing Apparatus. The results obtained shows that the t value obtained for Pre-test Time D14 and Post test Time D14 is 2.14. The mean and the standard deviation is 1.20 and 4.34 respectively. And the results obtained for Pre-test Error D14 and Post-test Error D14 is 3.63. The mean and the standard deviation is 0.68 and 1.45 respectively, which is not significant. So the result indicates that there is no significant difference between pre-test and post-test of time and error. That is H5 is rejected.

H6: There is a significant relationship between pre test and post test of time and error in D14 string

Table4.1.1: Relationship between pre test and post test of time and error in D14 string

Correlations

		Pre-test Error D14	Post test Error D14	Pre-test Time D14	Post test Time D14
Pre- test Error D14	Pearson Correlation	1	.756**	-.092	.100
	Sig. (2-tailed)		.000	.485	.449
	N	60	60	60	60
Post test Error D14	Pearson Correlation	.756**	1	-.066	.065
	Sig. (2-tailed)	.000		.618	.621
	N	60	60	60	60
Pre-test Time D14	Pearson Correlation	-.092	-.066	1	.669**
	Sig. (2-tailed)	.485	.618		.000
	N	60	60	60	60
Post test Time D14	Pearson Correlation	.100	.065	.669**	1
	Sig. (2-tailed)	.449	.621	.000	
	N	60	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

The result indicates that the r value of pre-test error & post error and pre-test time & post test time lies in between -1 and 1. So there is a relationship between pre-test and post test of error and time. Hence H6 is accepted.

Table 4.1.2: Reliability of time in D14 string

Reliability Statistics

Cronbach's Alpha	N of Items
.798	2

Here the Reliability score is 0.79 which is highly reliable.

Table 4.1.3: Reliability of error in D14 string

Reliability Statistics

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pre test of Error D8– Post test of Error D8	.5167	1.9441	.2510	.0145	1.0189	2.059	59	.044
Pre-test of Time D8– Post test of TimeD8	1.1667	3.8846	.5015	.1632	2.1702	2.326	59	.023

Cronbach's Alpha	N of Items
.861	2

Here the Reliability score is 0.86 which is highly reliable.

H7: There is a significant difference in pre-test and post test of time and error in D8 string.

Table4.1.4: Mean difference in pre test and post test of time and error in D8 string

Paired Samples Test

t-test was carried out to determine a significance difference between pre-test and post-test of Concentration and Co-ordination Testing Apparatus. The results obtained shows that the t value obtained for Pre-test Time D8 and Post test Time D8 is 2.32. The mean and the standard deviation is 1.16 and 3.88 respectively. And the results obtained for Pre-test Error D8 and Post test Error D8 is 2.05. The mean and the standard deviation is 0.5 and 1.94 respectively, which is not significant. So the result indicates that there is no significant difference between pre-test and post-test of time and error. That is H7 is rejected.

H8: There is a significant relationship between pre test and post test of time and error in D8 string

Table4.1.5: Relationship between pre test and post test of time and error in D8 string

Correlations

		Pre-test Error D8	Post test Error D8	Pre-test Time D8	Post test Time D8
Pre-test Error D8	Pearson Correlation	1	.773**	.132	-.067
	Sig. (2-tailed)		.000	.315	.613
	N	60	60	60	60
Post test Error D8	Pearson Correlation	.773**	1	.001	-.146
	Sig. (2-tailed)	.000		.994	.265
	N	60	60	60	60
Pre test TimeD8	Pearson Correlation	.132	.001	1	.799**
	Sig. (2-tailed)	.315	.994		.000
	N	60	60	60	60
Post test Time D8	Pearson Correlation	-.067	-.146	.799**	1
	Sig. (2-tailed)	.613	.265	.000	
	N	60	60	60	60

**. Correlation is significant at the 0.01 level (2-tailed).

The result indicates that the r value of pre-test error & post error and pre-test time & post test time lies in between -1 and 1. So there is a relationship between pre-test and post test of error and time. Hence H8 is accepted.

Table 4.1.6: Reliability of Time in D8 string

Reliability Statistics

Cronbach's Alpha	N of Items
.868	2

Here the Reliability score is 0.86 which is highly reliable.

Table 4.1.7: Reliability of error in D8 string

Reliability Statistics

Cronbach's Alpha	N of Items
.888	2

Here the Reliability score is 0.88 which is highly reliable.

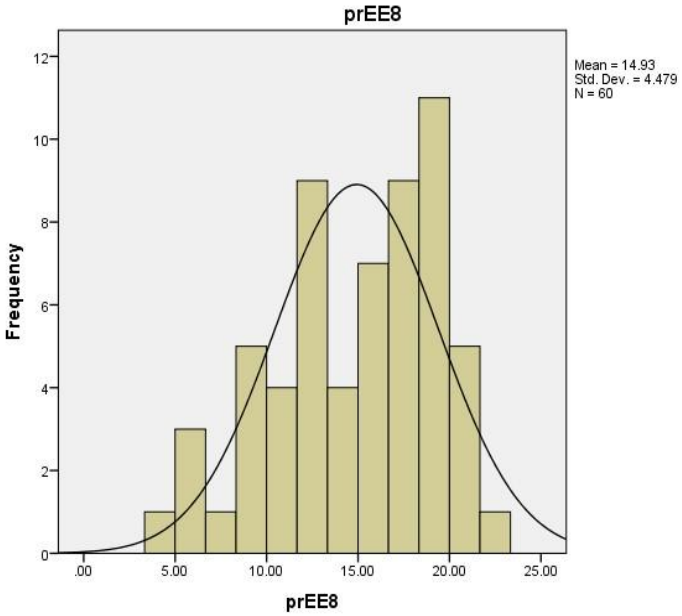


Figure 4.1: Pre-test Error of E14

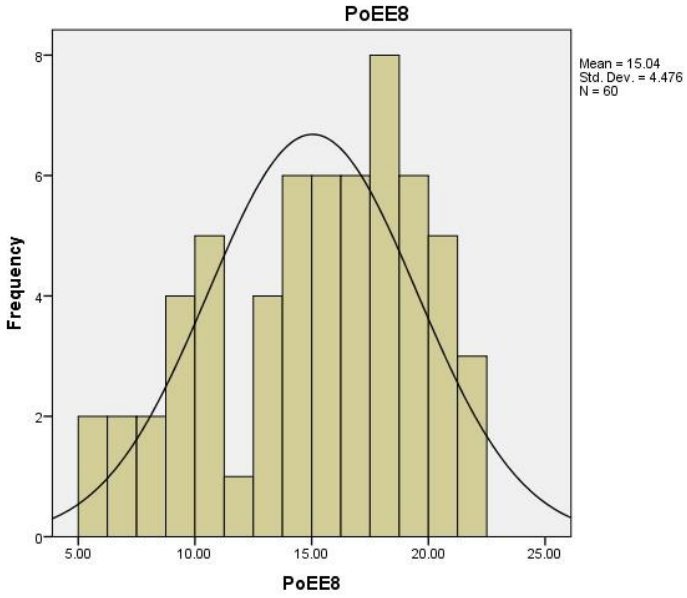


Figure 4.2: Post-test Error of E14

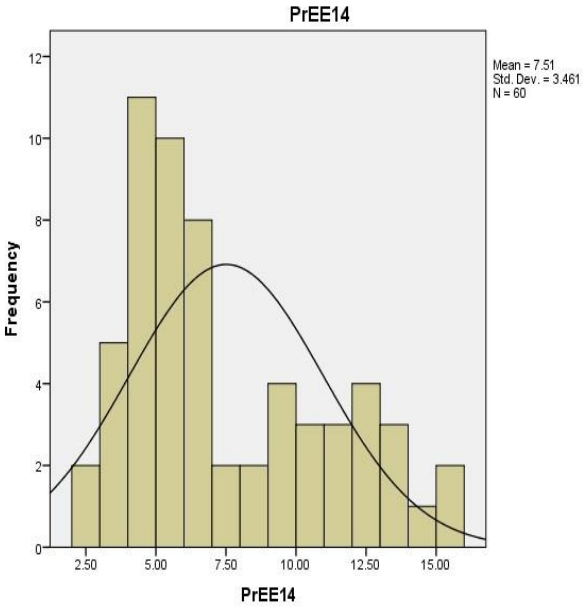


Figure 4.3: Pre-test Time of E14

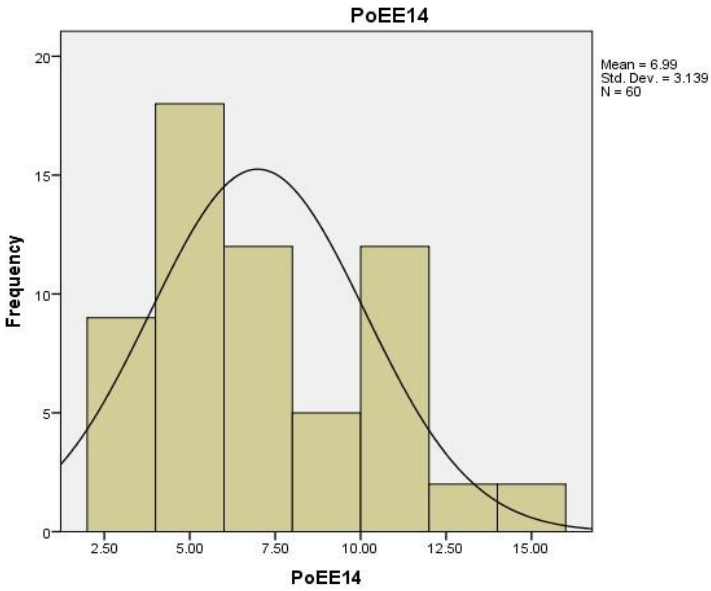
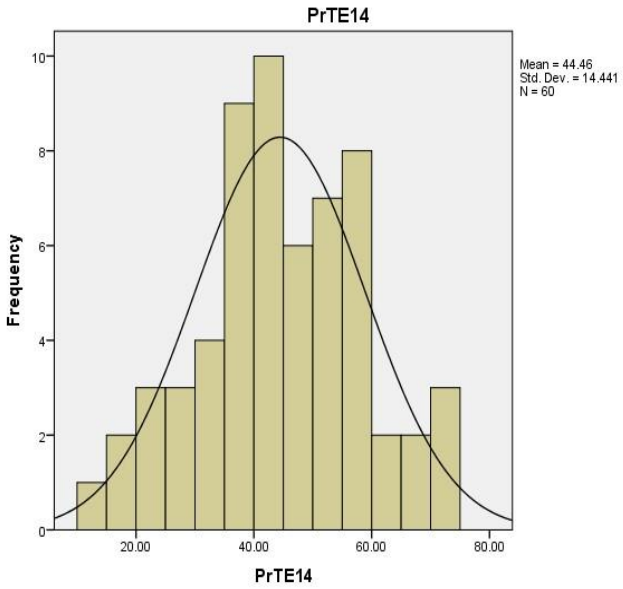


Figure 4.4: Post-test Time of E14



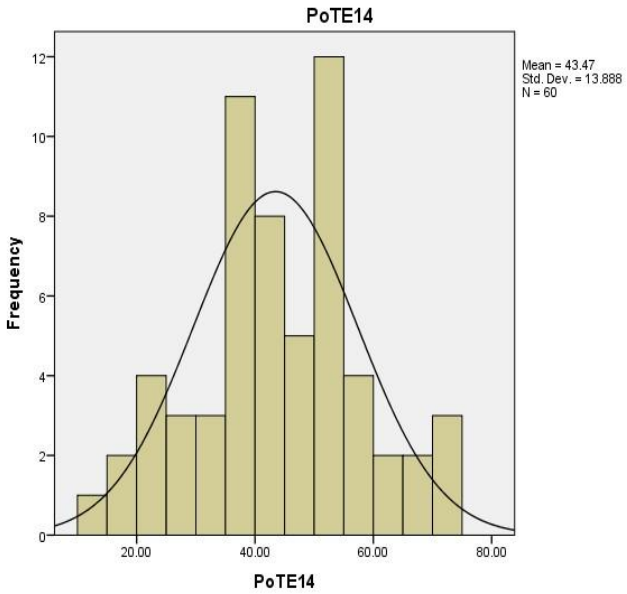
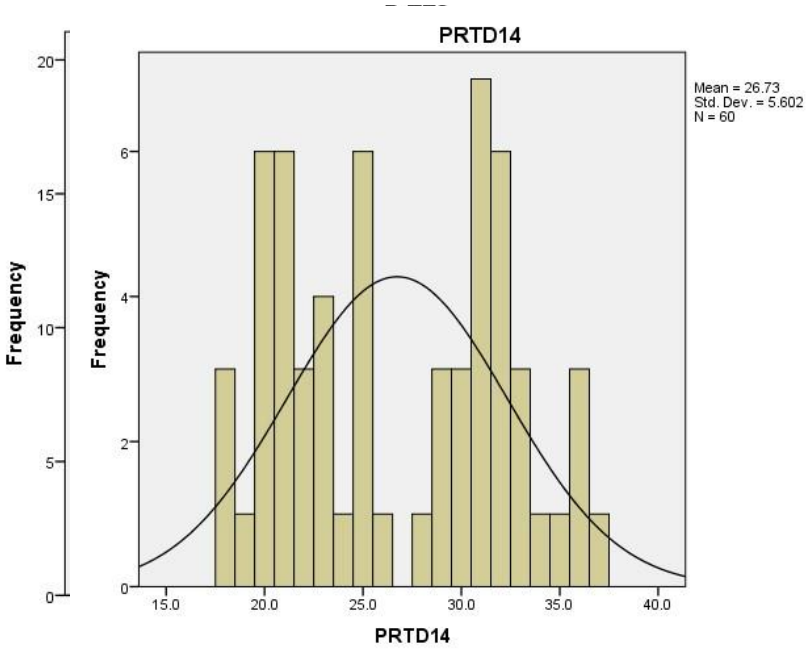


Figure4.5: Pre-test Error of E8 **Figure 4.6:** Post-test Error of E8 **Figure 4.7**: Pre-test Time of E8 **Figure 4.8**: Post test Time of E8

Figure 4.9: Pre-test Error of D14 **Figure 4.1.1:** Post test Error of D14 **Figure 4.1.2**: Pre-test Time of D14 **Figure 4.1.3**: Post test Time of D14



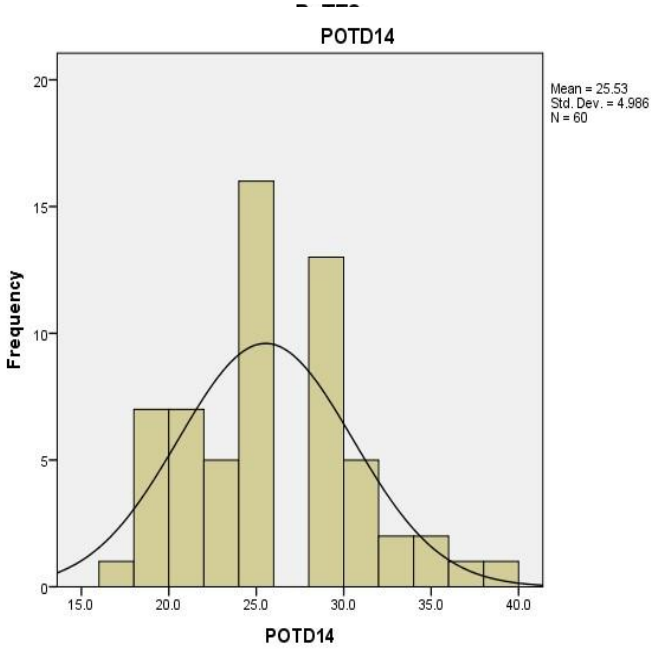
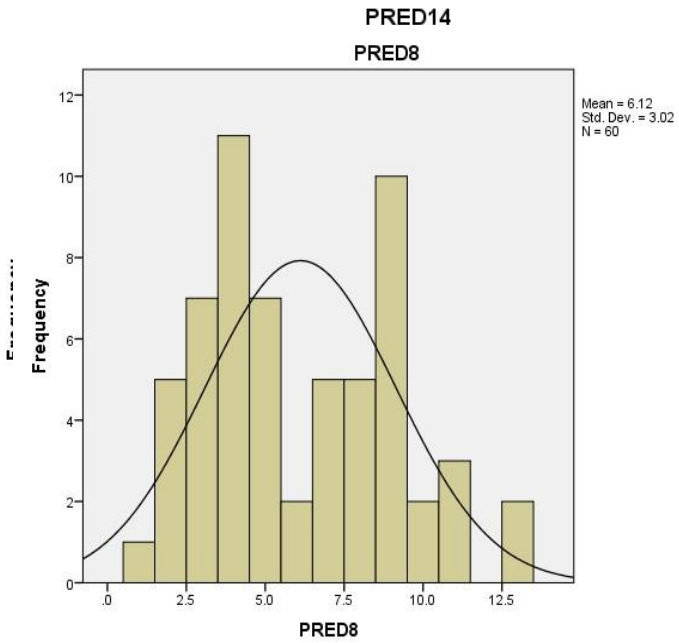
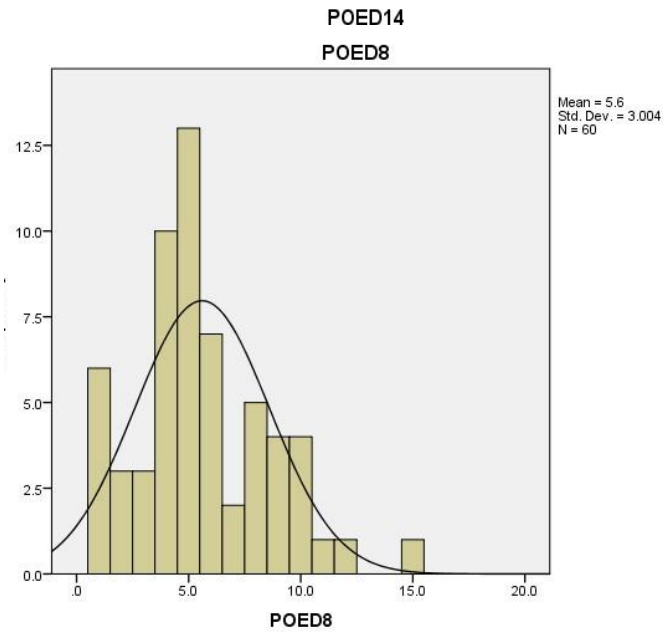


Figure 4.1.4: Pre-test Error of D8 **Figure 4.1.5:** Post test Error of D8 **Figure 4.1.6**: Pre-test Time of D8 **Figure 4.1.7**: Post test Time of D8

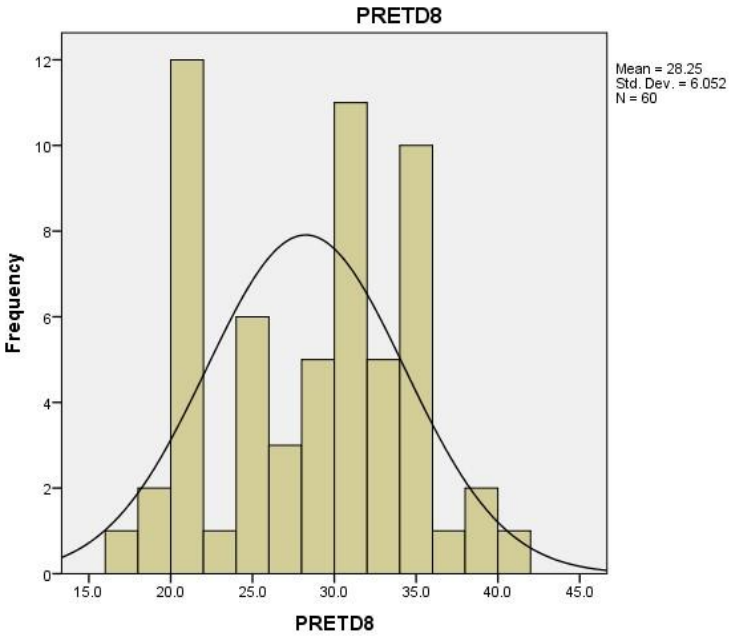


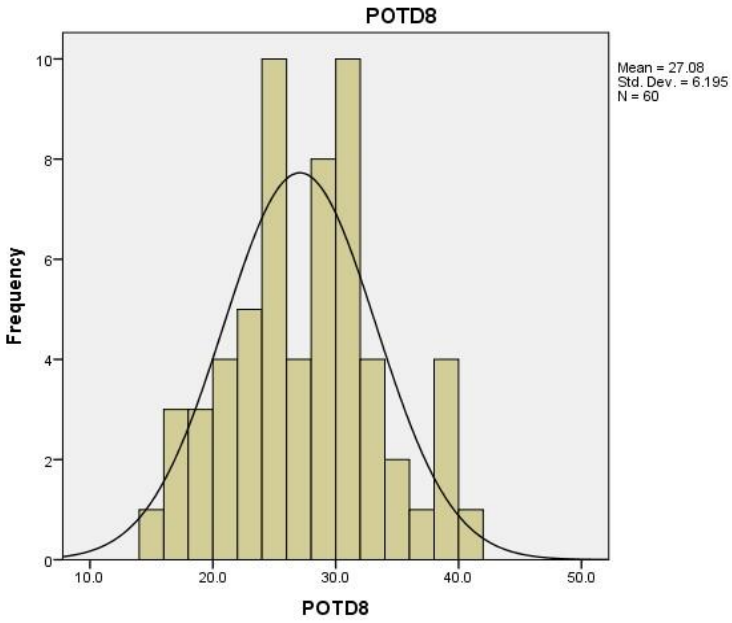


SUMMARY AND CONCLUSION

5.1 Objectives

- To measure the level of concentration among adults (19-55 age) and children (5-18 age)
- To find the difference in the pre-test and post test of time and error in E14 string
- To find the difference in the pre-test and post test of time and error in E8 string





- To find the difference in the pre-test and post test of time and error in D14 string
- To find the difference in the pre-test and post test of time and error in D8 string
- To find the relationship between pre-test and post test of time and error in E14 string
- To find the relationship between pre-test and post test of time and error in E8 string
- To find the relationship between pre-test and post test of time and error in D14 string
- To find the relationship between pre-test and post test of time and error in D8 string

5.2 Hypothesis

H1: There is a significant difference in pre-test and post test of time and error in E14 string. H2:

There is a significant relationship between pre test and post test of time and error in E14 string

H3: There is a significant difference in pre-test and post test of time and error in E8 string. H4:

There is a significant relationship between pre test and post test of time and error in E8 string H5:

There is a significant difference in pre-test and post test of time and error in D14 string.

H6: There is a significant relationship between pre test and post test of time and error in D14 string H7:

There is a significant difference in pre-test and post test of time and error in D8string.

H8: There is a significant relationship between pre test and post test of time and error in D8 string **5.3**

Conclusion

- Concentration and Co-ordination Testing Apparatus is highly reliable Concentration and Co-ordination Testing Apparatus is valid.
- There is no significant difference between pre-test and post test of time and error in E14 string.
- There is no significant difference between pre-test and post test of time and error in E8 string.
- There is no significant difference between pre-test and post test values of time and error in D14 string.
- There is no significant difference between pre-test and post test values of time and error in D8string.

- There is a significant relationship between pre test and post test of time and error in E14 string
- There is a significant relationship between pre test and post test of time and error in E8 string
- There is a significant relationship between pre test and post test of time and error in D14 string.
- There is a significant relationship between pre test and post test of time and error in D8 string.

5.4 Limitations

- 5- 55 age groups were only selected for the study.
- The research only took samples from Kerala.

5.5 Delimitations

The research does not specify any area in Kerala to choose the population.

5.6 Implications of the study

- Concentration and Co-ordination Testing Apparatus is providing to increase concentration and brain-eye-hand coordination.
- Feedbacks of the tool is, this tool will help to improve concentration, self-confidence, brain-eye-hand coordination, memory enhancement, motor coordination, sustained attention and hand writing

5.7 Suggestions

- The study helps to understand about concentration & co-ordination and its importance in our daily life.
- Exercising this tool can be very helpful to improve concentration, self-confidence, brain-eye-hand co-ordination, memory enhancement, motor coordination, sustained attention and hand writing.
- This study can be extended by using other population like mentally challenged group, people who are having medications.

REFERENCE

1) Mangal, SK. (2008).An introduction to psychology. Sterling publishers private limited; New Delhi
2) Ebraham, A. (2011). General psychology. Tata McGraw hill education private limited; New Delhi
3) American Psychiatric Association's (2013) Diagnostic and Statistical Manual of Mental Disorders (5th ed.; DSM-5)
4) World Health Organization (2020). International Statistical Classification of Diseases and Related Health Problems (10th ed.; ICD-11)
5) Caspi, A., & Silva, P. (1995). Temperamental qualities at age 3 predict personality traits in young adulthood: Longitudinal evidence from a birth cohort. Child Development, 66, 486–498.
6) Council on Sports Medicine and Fitness & Council on School Health. (2006). Active healthy living: Prevention of childhood obesity through increased physical activity.
7) Courage, M. L., & Howe, M. L. (2002). From infant to child: The dynamics of cognitive change in the second year of life.