

## Effect of Thoppukaranam on Sensory Processing Speed among Hearing-Impaired Students

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When we increase access to both hemispheres of the brain, it stimulates the intellectual functioning. Sensory integration is an important type of sensory processing which requires both hemispheric coordination. It is a challenge especially in the case of differently-abled children to achieve academic success. It needs to have better transmission of signals between both the hemispheres. Thoppukaranam integrates the intuitive and emotion-based right hemisphere of the brain with the logical left hemisphere. The present research paper has tried to use Thoppukaranam to find the effect of colour word interference on hearing impaired students. The results of these exercises have been ascertained using Stroop test. The subjects who are selected for the study were hearing impaired students (N=30) between the age group of 15-21. They were given the Thoppukaranam exercise for 45 days continuously. The results of the pre and post intervention were assessed using paired sample t-test and significant difference in terms of improvements were found in the hearing impaired students on the sensory processing speed.

**Keywords:** Thoppukaranam, hearing impaired students, Stroop test, colour word interference.

The human brain is so sophisticated than any existing computer; it has given people powerful potential to do things. From birth, the brain is developing and changing to adapt to the environment in which it is exposed to (Jensen, 1998). A complex system of 300 million neurons connects the brain's right and left lobes. Each person's 100 billion neurons have about 20,000 very important connecting branches called dendrites. There are more possible connections in the human brain than the number of atoms in the universe.

"Breaking up content learning with physical movement is more effective than excessive content dumping" (Jensen, 2000).

Auditory, vestibular and visual systems work together to build our ability to learn, pay attention, process information, and move our bodies smoothly. Our ears collect the sounds which provide critically important stimulation for the development of the brain. Our ears and eyes are integrated and work together as a team. In

the case of Hearing Impaired students, we can see that they have impairment in one of the sense and that is the hearing. When children are physically active, they are more readily attending to the learning task ( Pica, 1999).

Thoppukaranam is a simple and effective technique to energize and recharge the brain. It is based on the principles of subtle energy and ear acupuncture. Thoppukaranam is an exercise that involves squatting while holding the ear lobes with controlled breathing. Advocates claim that this exercise improves cognition and academic performance. This multisensory enriched exercise did have a positive impact on child's behaviors related to physical, social, and emotional well-being. (Verma, S. & Kumar, K., 2016)

Any experience of information entering the brain including movement, results in neural activity. Getting the students attention and keeping it has been the brass ring in the world of teaching (Jensen, 1998). This study aims at

increasing the whole-brain functioning of the Hearing-Impaired students by incorporating the Thoppukaranam exercise in their regular academic curriculum. Based on the research study formulated, the Stroop color word test is used to find the effect of the Thoppukaranam exercise discussed above.

It is aimed at evaluating the efficacy of Thoppukaranam on Stroop effect which in turn creates an effect on sensory processing speed. This is a pre experimental study among hearing impaired students. The study can help in improvement of the sensory processing speed of the hearing impaired students. The Thoppukaranam exercise was incorporated in order to promote the whole brain learning of the Hearing-Impaired students.

The variables observed by the investigator for the present study are: Independent variable is Thoppukaranam and Dependent variable is Sensory Processing Speed.

#### **Need for the Study**

The present study is conducted to find the effect of the Thoppukaranam exercise on the Hearing-Impaired individuals. Since the Thoppukaranam exercise has been proved to have a positive effect on the sensory processing speed and color-word interference effect based on the theoretical knowledge and review of literature, the tests such as Stroop Color-Word test is selected for this present study.

Chandrasekeran, Rajesh and Srinivasan (2014) had done an investigation on the effect of Thoppukaranam on selective attention and psychological states in a sample of young adults. A randomized self-as-control within subjects design was employed. Data was analyzed using one-way repeated measures analysis. The overall results indicated a significant improvement in all measures of the d2 test of attention and the state of mindfulness after Thoppukaranam. Further, the state of anxiety reduced significantly after the experimental session. Thus, Thoppukaranam resulted in enhancement of cognitive functioning and psychological states.

This deals with the research design, the tools used for data collection, the locale of the

study and sampling technique used for the investigation as well as analysis of the data.

#### **Purpose of the Study**

It is to see whether Hearing-Impaired students engaging in Thoppukaranam exercise on a regular basis enhanced their sensory processing speed on the Stroop effect. The sensory processing speed was measured using the Stroop Test.

#### **Statement of the Problem**

The problem of the study is to find out whether there is an improvement in the Hearing-Impaired students in terms of the sensory processing speed after the implementation of the Thoppukaranam exercise.

#### **Objectives of the Study**

The main objectives of the study is to study the effect of Thoppukaranam on sensory processing speed and the color word interference of the Stroop test in hearing-impaired students.

#### **Hypotheses**

H1: There would be significant differences in the sensory processing speed among Hearing-Impaired students before and after the Thoppukaranam exercise intervention. Based on this six-sub hypothesis were framed, which are as follows.

H1.1: There would be a significant improvement in the sensory processing speed in word recognition of the hearing-impaired students as measured by the Stroop test.

H1.2: There would be a significant improvement in the sensory processing speed in color recognition of the hearing-impaired students as measured by the Stroop test.

H1.3: There would be a significant improvement in the sensory processing speed in color- word recognition of the hearing-impaired students as measured by the Stroop test.

H1.4: There would be a significant improvement in the sensory processing speed in word error of the hearing-impaired students as measured by the Stroop test.

H1.5: There would be a significant improvement in the sensory processing speed

in color error of the hearing-impaired students as measured by the Stroop test.

H1.6: There would be a significant improvement in the sensory processing speed in color-word error of the hearing-impaired students as measured by the Stroop test.

### Method

#### Research Design

The research design used to carry out the present study is single before and after without control group experimental design.

#### Sample

Purposive sampling method involves deliberate selection of particular units of the universe for constituting a sample, which represents the universal (Kothari, 2000). A total sample of 30 students with Hearing-Impairment were chosen for the study. It included equal number of boys and girls (Males N=15 and Females N=15) within the age range of 15 to 20 years.

In order to achieve the objectives of the study the investigator selected an experimental design. A descriptive study determines and reports the way things are. The study was done on 30 hearing-impaired students who were given practices on Thoppukaranam exercise.

#### Tools

The tool used for the present study includes Stroop colour word test.

#### Procedure

The participants of the study included 30 hearing-impaired students who were selected based on purposive sampling. Before administering the tests, clear instructions were provided to the students. During the pre-training session the students were instructed to give relevant answers to the data of Stroop test. They were given proper instructions of how to go with the Stroop test. During this session the students initially followed the supervisor on how to do the Thoppukaranam exercise. Same instructions were given during the post-training session.

### Discussion

To determine the effectiveness of Thoppukaranam on the sensory processing speed of the Hearing-Impaired students, a pre-test of the Stroop color-word test was administered to all the participants at the beginning of the study. This test also served as the post-test given at the end of the study after the implementation of the Thoppukaranam exercise.

	M	SD	t	df	sig
Pre- post test comparison of Time word effect	5.44	4.82	6.14	29	**
Pre –post-test comparison of time color effect	4.88	2.71	9.82	29	**
Pre- post-test comparison of Time colour- word effect	6.02	5.07	6.47	29	**

There was a significant difference in the scores for sensory processing speed and time word, color and color word effect in pre-test and post-test conditions. P value is < 0.01 level.

	M	SD	T	df	Sig
Pre- post-test comparison of error word effect	.13	.42	1.67	29	.10
Pre- post-test comparison of error colour effect	1.04	1.02	5.75	29	**
Pre- post-test comparison of error colour- word effect	1.46	1.34	6.33	29	**

There was no significant difference in the scores for sensory processing speed and error word effect in pre-test (M=.13, SD=.42) and in post-test conditions; t (29), = 1.67, P value is not significant.

There was a significant difference in the scores for sensory processing speed and error color effect and error color-word effect in pre and post conditions. Here the P value is < 0.01 level.

The overall hypothesis H1 which states that

there would be significant differences in sensory processing speed among hearing impaired students before and after Thoppukaranam exercise intervention was said to be partially accepted as there was no significant improvement in the sub hypothesis H1.4. Since this sub hypothesis is not accepted the overall hypothesis that is stated based on sensory processing speed on Hearing-impaired students is also partially accepted.

### Conclusion

The results of the pre and post intervention were assessed using paired sample t-test and significant improvements were found in the hearing-impaired students in terms of sensory processing speed and Stroop effect.

The hypothesis H1 and its subscales states that there would be significant differences in the sensory processing speed among hearing impaired students before and after Thoppukaranam exercise intervention and this is noted by using the Stroop test. The only sub scale where there is no significant difference is in the H1.4 hypothesis. Due to the non-significance in that sub scale the overall H1 hypothesis is partially accepted.

The hypothesis that did not show much significant improvement can be due to the limited intervention period. Due to limited intervention

time period the Thoppukaranam exercise would have been ineffective. The insignificance maybe also due to the simplicity of the word test, as it lacks colors in it which might act as an interference in turn leading to lesser errors. Based on the results of this study, the researcher intends to use Thoppukaranam exercise in instruction in the future to improve student participation and concentration. Teachers should include the Thoppukaranam exercise as a part of the curriculum, in order to energize the children and stimulate their brains.

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