

Effect of *Vedic* chanting on memory and sustained attention

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Researches and studies have shown that *Yogasanas*, *Pranayama* and meditation help in enhancing memory and improving attention, but no study is available on the effect of traditional *Vedic* chanting on memory and sustained attention, which is one of the important features of cognitive abilities. The present study compared the effect of chanting group, who had minimum two-years experience on memory and sustained attention with that of non-chanting group who had no exposure to such type of chanting. Data was analyzed using non-parametric Mann Whitney U test. Chanting group showed significant increased scorings in both the memory tests and considerable reduction in total error and total time taken for cancellation tests compared to non-chanting practitioners.

Key Words: *Vedic* chanting, Memory enhancing activity, Sustained attention, *Pranayama*

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The *Vedas* are the impersonal and inspirational hints of ultimate reality unveiled by persons of peerless perseverance for perfection, the *Rishis*. These revelations form the core of all spiritual, philosophical, religious and social pursuits of Bharat through millenia. *Vedic* chanting is a meditative practice from the rich tradition of Indian spiritual practices.

Vedic chanting expects good memory and attention. The whole of *Vedic* lore was passed on from generations in an oral tradition without the aid of writing until recent times. Memory capacities were utilized to maximum extent and the entire lot of *mantras* was kept by rote. As it is known by experience and observation that chanting improves memory and attention this study has been taken to examine the facts by systematic research.

Various studies and observations have proved the utility of chanting in betterment of different aspects of our personality. Some of them are listed here. The frequencies and the sympathetic overtones generated by *mantras*, which have a vibration pattern of their own, influence our sympathetic and parasympathetic nerves, which are spread in a fine network around our internal organs. The sympathetic response generates the neuromotor response, and influences the two

hemispheres of the cerebral cortex¹. Transcendental Meditation (TM) facilitates right hemispheric functions². The practice of Transcendental Meditation was shown to improve academic performance in university students³. The practice of meditation was shown to improve the academic performance and psychological health in high school students⁴. Both prayer and *mantra* caused striking, powerful, synchronous increase in existing cardiovascular rhythms⁵. Mental repetition of *Om* showed a significant decrease in skin resistance level of the experimental group. It also showed reduction in the heart rate and the rate of breathing⁶. A study was conducted on the effect of TM on personality between groups, non-meditators and beginners, short term and long-term meditators where subjects were female employees from two pharmaceutical companies. The long meditator group showed more positive personality traits than any other group⁷. Studies conducted on different yogic practices like *asana*, *pranayama*, and meditation reveals that these techniques can be used as an intervention to enhance memory and concentration.

There are no studies conducted regarding the effect of *Vedic* chanting. Therefore, an attempt is made to study the effect of *Vedic* chanting on memory and sustained attention.

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Methodology

The two groups were so selected that they were matched for age and sex. Both groups stayed in residential setups of similar ambiance. They had similar daily routine from 5 am to 10 am. Their socio-economic backgrounds were also similar. Thirty-five subjects were chosen in both preselected groups and their age ranged from 13-15 yrs (mean age ± 14). Two groups were matched for age and only males were selected. Matching of age, ambiance, daily routine and socio-economic background for both the groups assured that the results could be attributed to chanting. Base line scores of memory and sustained attention were assessed by means of delayed recall tests and cancellation tests, respectively. Data was analyzed using non-parametric Mann Whitney U test.

Subjects Inclusion

criteria

- * Healthy males
- * Age group 13-15
- * Minimum of two-years stay in the campus
- * Experience of two year chanting

Exclusion

criteria

- * Having any kind of disease
- * Age group less than 13, and more than 15
- * Less than two-year stay in the campus
- * Less than two years of chanting

It was a preselected cross sectional study done on chanting and non-chanting groups. There were two groups where the experimental group had *Vedic* chanting as their part of daily schedule and with an experience of two years of chanting. The control group had no exposure to that type of chanting; however all the other factors influencing the subjects were similar to both the groups as mentioned in criteria. Same tests were conducted to assess the base line scores of memory and sustained attention for both the groups. This design was chosen, as it was a preliminary study of traditional *Vedic* chanting on memory and sustained attention.

Assessment

Memory test

Memory was assessed by using Delayed recall test (verbal memory test and spatial memory test). The test material was projected on a screen allowing ten sec for each slide. After ten slides were shown, a mathematical problem (e.g. $8+5-2-3+9-4-7+6$) was

projected on the screen and the students were asked to calculate. Immediately after this, the subjects were asked to recall and write down or in case of spatial memory to draw within 60 sec the test items that had been shown to them⁸.

To test verbal memory, standard nonsense syllables of three letters, e.g. NEM were selected from a prepared list⁹. The test for spatial memory consisted of 10 simple line drawings. The drawings were simple and easy to reproduce but could not be described verbally. For both verbal and spatial memory tests a correct answer was scored as "1", and a wrong answer was scored "0". Both groups were told that the tests were for their self-assessment of memory.

Sustained attention

Sustained attention was assessed using letter and character cancellation tests. These paper and pencil tests require visual selectivity at fast speed on a motor response task. They assess many functions, not least of which is the capacity of sustained attention. Visual scanning and activation, and inhibition of rapid responses are also necessary to the successful performance of cancellation tasks. Lowered scores on these tasks can reflect the general response slowing and inattentiveness of diffuse damage or acute brain condition or the more specific defects of response shifting and motor smoothness or of unilateral inattention. With the addition of a motor component, these tasks call upon a set of functions similar to those relevant to other complex tests of attention. The basic format for these tests follows the vigilance test pattern. It consists of rows of letters or numbers randomly interspersed with a designated target letter or number. The individual is instructed to cross out all target letters or numbers. The performance is scored for errors and for time to completion.

Letter and character tests were conducted by supplying the subjects a sheet, which had 25 printed rows, and there were 29 letters or characters in each row. Each row had a letter or a character at the extreme left end in a box. The subjects were expected to cancel the boxed character or letter in the row.

Variables were made into four categories:

- 1 Total time taken to complete the sheet in both letter and character cancellation test in seconds.
- 2 Letter or character left out.
- 3 Letter or character wrongly cancelled.
- 4 Letter or character total error combines both letter or character left out and wrongly cancelled.

Data extraction and analysis

The subjects were seated properly in a place free from disturbance with sufficient space between them. Proper explanation was given about the tests that were going to be conducted. After clearing the doubts of the subjects regarding tests, ten slides containing meaningless words were shown. Each slide was shown for ten sec followed by an arithmetic sum to divert the attention, but the subjects were unaware of this fact. Pencil and sheets were provided and instruction was given that only answer should be written on the top of the sheet after calculation. One minute was given to recall and reproduce the letters on the sheet. Similar procedure was followed for spatial memory test by showing the slides of non-geometrical diagrams. Each correct diagram or letter carried one mark.

Each subject was called one by one for letter and character cancellation test. Cancellation sheets were provided. Total time taken for each of the student was calculated using a stopwatch. Seventeen subjects were provided with the sheets containing letter cancellation first followed by character cancellation sheets. Next 18 subjects were provided with character cancellation

sheets test first followed by letter cancellation sheets. After completion of all the rows given sheets were collected back.

Data were analyzed using statistical package (SPSS version10.0). The data of both the groups were assessed with tests of normality. As data were not normally distributed, non-parametric Mann Whitney U test was used to compare verbal and spatial memory scores, letters left out, wrongly cancelled, total error, and total time taken between non chanting and chanting practitioners.

Results

The verbal and spatial memory scores, letter and character left over, letter and character wrongly cancelled, total error and total time taken were compared between the groups using Mann Whitney U test. Chanting group showed better verbal (VMS) and spatial (SMS) scoring when compared to non-chanting group (Table 1). The chanting group showed a significant reduction in both letter and character left out (Letter, $p=0.024$; Character, $p=0.012$). Total errors (Letter, $p=0.013$; Character, $p=0.002$). There was a significant reduction in total time taken (TTT,

Table 1—Comparison of verbal and spatial memory scores

		Mean	Std deviation	Std error Mean	Mann Whitney U test	Asymp sg(2) tailed
LO	1	1.43	1.27	0.21	424.000	0.024*
	2	2.37	1.77	0.30		
WC	1	0.80	0.93	0.16	471.000	0.080
	2	1.34	1.28	0.22		
TE	1	2.23	1.33	0.22	404.000	0.013*
	2	3.71	2.43	0.41		
TTT	1	169.83	16.29	2.75	410.000	0.017*
	2	186.69	25.13	4.25		
CLO	1	0.71	0.83	0.14	409.000	0.012*
	2	1.69	1.68	0.28		
CWC	1	0.60	0.65	0.11	503.000	0.164
	2	1.06	1.19	0.20		
CTE	1	1.31	1.08	0.18	357.000	0.002*
	2	2.74	2.13	0.36		
CTTT	1	154.94	18.49	3.13	423.500	0.026*
	2	167.37	23.60	3.99		
VMS	1	8.43	1.37	0.23	347.000	0.001*
	2	7.00	1.93	0.33		
SMS	1	8.34	1.37	0.23	347.500	0.002*
	2	6.91	1.93	0.33		

* $p<0.05$; 1: Experimental group, 2: Control group, LO = Left Over, CWC = Character Wrongly Cancelled, WC = Wrongly Cancelled, CTE = Character Total Error, TE = Total Error, CTTT = Character Total Time Taken TTT = Total Time Taken, VMS = Verbal Memory Scoring, CLO = Character Left Over, SMS = Spatial Memory Scoring

p=0.017). However, there was no significance in wrongly cancellation of letters and characters (WC, p=0.080; CWC, p=0.164).

Discussion

Task of cancellation requires sustained visual attention, scanning without distraction, and better concentration¹⁰. Repeated and Continuous chanting may have influenced the increase in the level of attention by activating the cells in the brain. Better verbal and spatial scorings and decrease in total time taken; reduction in total errors could be related to the fact that reduced anxiety can improve performance on tasks requiring learning and memory¹¹. Anxiety reducing effects of yoga practice¹², and the anxiety reducing effects of meditation are also well known¹³. Reduced anxiety and calmness of mind combined with active cells due to rhythmic *Vedic* chanting could have facilitated in improving memory and sustained attention. The present study suggests that chanting influences both the hemispheres of the brain resulting in good memory and attention. Even though sound is the gross form of chanting its effects can be seen in subtle areas like brain cells. Hence, the practice of *Vedic* chanting in a traditional way can also be used as one of the powerful means as any other yogic practices like *asanas*, *pranayama*, or meditation in calming down the mind, enhancing memory and in effective improvement of attention.

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