

# Effect of 14 Weeks of Mindfulness Meditation on Verbal Memory and Composite Memory of Male College Students

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## Abstract

Meditation known as influential factor on many neurocognitive variables, memory is one of them. Studies have identified that meditation affects working memory. This study aimed to identify the effect of mindfulness meditation on verbal memory and composite memory. Twenty (n=20) male volunteered students are ranged between 21 to 29 years were taken from colleges and university of Kalyani, West Bengal, India. The subjects were selected voluntarily as the subject of the study. The age range between 21 to 29 years. The subjects were randomly divided into two groups and named as control Group and Experimental group. At first, Linearity, Homoscedasticity, and Normality of data were checked by Kolmogorov-Smirnov test, Breusch-Pagan-Godfrey and Kolmogorov-Smirnov test respectively in SPSS 23 software. In present study the mean, standard deviation (SD), independent paired sample 't' test were used for observing the effect of meditation programme. Independent paired sample t test was also used to identify the base line difference between the groups. After fourteen weeks of mindful meditation practice significant improvements were seen in verbal memory and composite memory of the experimental group. The findings suggest that mindfulness meditation practice can improve verbal memory composite memory of an individual.

**Keywords:** Meditation, Memory, Mindfulness, Composite.

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## INTRODUCTION

The world is suffering from various physical, psychological and neurological problems. Many research articles reveal that yoga and yogic posture (Asanas) develop the physical, mental, spiritual, and emotional aspects of an individual [1]. Meditation refers to a large variety of mental practices that involve voluntary change in states and content of consciousness [2]. It is known to all that meditation has a positive impact on stress, anxiety, depression and many other psychological and neurological problems. Meditation's beneficial role not only limited in psychological problems, but also has a great impact on neurocognitive and physical health problems [3]. Yogic procedures help to maintain normal body functions. They affect functions of Central Nervous System (CNS) like planning, execution of tasks, memory and learning. The mindfulness training techniques helps to increase cerebral blood flow [4]. According to Chandra *et al.*, Sudarshan Kriya yoga (meditation) can improve Working memory capacity [5]. It has been found that following two weeks of mindful meditation training can improve working memory capacity [6]. Several

researchers showed much interest on effect of meditation practices on psychological health but effect of meditation practices on cognitive functions and neurodegenerative disease is still poorly explored [7]. In this perspective it seems important to explore the effect of meditation on memory of college students as they frequently need strong memorizing ability.

## METHODOLOGY

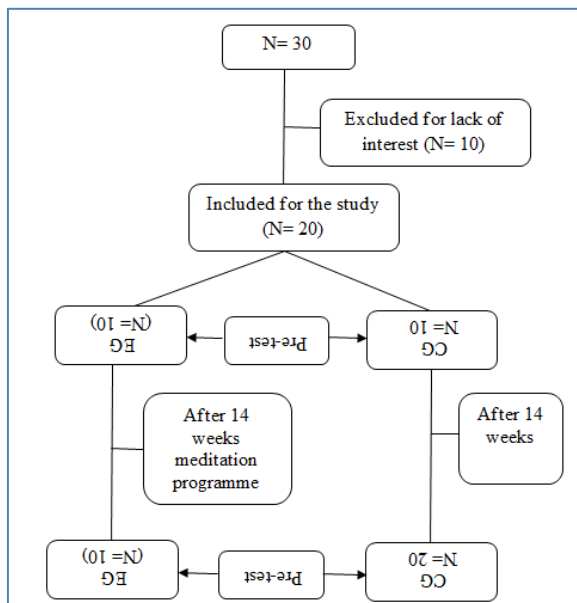
### Participants

Initially 30 subjects were taken and finally 20 subjects confirmed their participation. In this experimental study total twenty (N=20) volunteered students age ranged between 21-29 years were taken. Subjects were randomly divided into the control group (C.G: n=10) and Experimental Group (E.G :n = 10).

### Design

The study was conducted for a period of 14 weeks. This study was approved by the Departmental Research Committee, Department of Physical Education, and University of Kalyani. Written consent form and information about the study detail (nature of

the treatment, duration of the Experimental period, tentative output of the study and the benefits and risk of experimentation) was given to each subject and duly filled & signed consent form was obtained from all subjects. The design of the study is presented in the Figure 1.



**INTERVENTION**

The study was conducted into three phases - i) Pre-test, ii) Meditation practice and iii) Post-test. All the subjects were informed about the purpose of the study. The subjects of the EG were encouraged and motivated, so that they could involve in mindful meditation practice without any hesitation. Total fourteen weeks of meditation practice was given to the EG. Meditation

programme which was scheduled for five days in a week. Ten minutes of mindful meditation was given to the EG in the first phase i.e first seven weeks of the programme and in the second phase i.e in the next seven weeks of the programme, fifteen minutes mindful meditation was given. All the data of the present study was collected through Central Nervous System Vital Signs software.

**DATA ANALYSIS**

The data were collected twice: once before the commencement of the meditation programme and once after the completion of 14 weeks meditation programme. The linearity, normality and homoscedasticity of the data were checked. The data linearity was checked by linearity test, the data normality was checked by the Kolmogorov-Smirnov test in IBM SPSS 23 version software and homoscedasticity checked by the Breusch-Pagan-Godfrey test in Eviews software. After checking the linearity, normality and homoscedasticity, independent t- test was conducted to find out the baseline difference between experimental & control group. Paired sample ‘t’ test was conducted to find out the difference between pre & post test score of each group separately.

**RESULTS & DISCUSSION**

**Verbal Memory**

Verbal memory is storage of phonological information refers to material presented in the verbal form. It is the ability to remember what an individual read or hear [8]. The baseline comparison between the groups was observed and the statistical results are presented below.

**Table-1: Baseline Comparison between Control and Experimental Groups on Verbal memory**

Group	Sample	Mn	±SD	Mn Diff	t-value	Sign
Pre- test	Control	96.20	17.18	16.50	1.38	.201
	Experimental	79.70	30.22			

From Table no. 1 it is observed that pre-test mean of verbal memory of Control and Experimental groups were 96.20 ±17.18 and 79.70 ±30.22 respectively. The mean difference of pre-test group was 16.50 and the calculated “t”-value (t = 1.38) obtained

from the table -1 reveals that initially there was no significant difference on verbal memory between CG and EG. So, it may be assumed that both the groups were more or less same in verbal memory.

**Table-2: Comparison between Pre and Post -test Mean of Verbal memory of Control and Experimental Groups**

Group	Sample	Mn	SD	Mn Diff	t- value	Sign
CG	Pre-test	96.20	17.18	8.50	1.12	.291
	Post test	87.70	21.00			
EG	Pre-test	79.70	30.22	25.70	2.27*	.050
	Post test	105.40	16.57			

\* Significant at 0.05 level; Table value 2.26.

From Table 2, it is observed that the means of verbal memory during Pre-test and Post-test of CG were 96.20 ± 17.18 and 87.70 ±21.00 respectively. On the other hand, the pre and post-test means of EG were

79.70 ±30.22 and 105.40 ±16.57 respectively. The mean differences of CG were 8.50 and EG were 25.70.

The computed "t"-value obtained from the table-2 for both the groups i.e. CG and EG were 1.12 and 2.27 respectively. Table 2 shows that the "t"-value of CG ( $t=1.12$ ) which was not significant at 0.05 level; whereas the "t"- value of EG ( $t=2.27$ ) which was significant at 0.05 level. That means there was a significant improvement of Experimental Group in Verbal memory after fourteen weeks of Mindful Meditation Programme.

## DISCUSSION ON VERBAL MEMORY

Verbal memory is referred to memory for verbally presented information which is a rather broad concept [9]. It measures how can a subject recognize, remember and retrieve words e.g. exploit or attend literal representation or attribute. It includes remembering, recalling an appointment or rehabilitation

information and attending classes etc. Mindful meditation can improve verbal memory capacity [10]. Manjunath & Shirley found that yoga practice, meditation has an influential effect on verbal memory [11]. In the present study the significant improvement was observed in experimental group which was in the same path with the other researchers.

### Composite Memory

Composite memory refers to the combination and composite score of verbal memory and visual memory which can be measured by CNS vital sign software [9]. It can measure how well a subject can identify, recall and finally recognize an object or event. The statistical results of baseline comparison between CG and EG are presented in the following table.

**Table-3: Baseline Comparison between Control and Experimental groups on Composite memory**

Group	Sample	Mn	±SD	Mn Diff	t-ratio	Sign
Pre- test	Control	95.10	11.30	14.60	2.13	.63
	Experimental	80.50	19.34			

From table no. 3 it is observed that pre-test mean of composite memory of Control and experimental groups were  $95.10 \pm 11.30$  and  $80.50 \pm 19.34$  respectively. The mean difference of pre-test group was 14.60. and the calculated "t"-value ( $t=2.13$ )

obtained from the table 3 reveals that initially there was no significant difference on composite memory between CG and EG. So, it may be assumed that both the groups were more or less same in Composite memory level.

**Table-4: Mean, SD of Composite Memory and Comparison (t-test) between Pre-test and Post-test means of Control and Experimental groups**

Group	Sample	Mn	SD	Mn Diff	t-ratio	Sign
CG	Pre-test	95.10	11.30	3.10	0.59	.572
	Post-test	92.00	14.50			
EG	Pre-test	80.50	19.30	22.70	2.98*	.016
	Post-test	103.20	16.36			

Significant at 0.05; Table value 2.26

From Table 4, it is observed that, the Pre and Post - test means of CG were  $95.10 \pm 11.30$  and  $92.00 \pm 14.50$  respectively. On the other hand, the pre and post-test means of EG were  $80.50 \pm 19.30$  and  $103.20 \pm 16.36$  respectively. The mean differences of CG were 3.10 and EG were 22.70.

The computed "t"-value obtained from the table - 4 for both the groups i.e. CG and EG were 0.59 and 2.98 respectively. Table 4 shows that "t"-value of CG was 0.59 which was not significant at 0.05 level; whereas the "t"- value ( $t=2.98$ ) of EG was significant at 0.05 level. The result indicates that there was a significant improvement of Experimental Group in Composite Memory after fourteen weeks of Mindful Meditation Programme.

### Discussion on Composite memory

The composite memory reflects a child's ability to recall, manipulate, and sequence auditory information [13]. It measures how can an individual

recognize, remember and retrieve words and geometric figures. Identified problems with the storage, manipulation, and retrieval of information. Remembering and learning new information, recalling an appointment or information, attending class, inability to navigate in familiar places, recalling images, etc.

Much research study observed that meditation programs can increase working memory [14]. Chiesa, Calati and Serretti found that mindful meditation practice can increase memory capacity [15].

In the present study, significant improvement of composite memory was observed in the experimental group following 14 weeks of a meditation programme. There was almost no change in the control group. Therefore, it may be concluded that meditation is beneficial for the composite memory of young male students.

Research study reveals that Meditation practice helps in increasing the level of GABA, Dopamine and reduces the secretion of Norepinephrine and Cortisol [2]. These physiological phenomena may help in reducing, stress, anxiety and maintaining good mental state which may influence the performance in memory.

## CONCLUSION

It is suggested that the early introduction of a meditation programme to the students may help in improving the working memory and retention capacity. Based on results and within the limitations then findings of the present study provide evidence that mindful meditation can increase verbal memory as well as composite memory function of young college students.

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## REFERENCES

1. Biswas, S., Biswas, A., & Bandyopadhyay. N. (2021). Effect of Four Weeks Intervention of Yogic Practices on Cricket Specific Motor Fitness. *Journal of Advances in Sports and Physical Education*, 4(5), 125-130  
DOI:10.36348/jaspe.2021.v04i05.007 Retrieved from <https://www.researchgate.net>.
2. Bandyopadhyay, N., & Koley, A. (2021). Yoga an effective therapeutic means for managing stress: A review. *International Journal of Fitness, Health, Physical Education and Iron Games*, 8(1), 150-154 Retrieved from <https://www.researchgate.net>.
3. Davis, D. M., & Hayes, J. A. (2012, July). What are the benefits of mindfulness? *Monitor on Psychology*, 43(7).  
<http://www.apa.org/monitor/2012/07-08/ce-corner>
4. Reader A. L. (1993). Body heat. *Nature*, 361(6409), 200.  
<https://doi.org/10.1038/361200b0>
5. Chandra, S., Sharma, G., Mittal, A. P., & Jha, D. (2016). Effect of Sudarshan Kriya (meditation) on gamma, alpha, and theta rhythm during working memory task. *International journal of yoga*, 9(1), 72–76. <https://doi.org/10.4103/0973-6131.171715>
6. Baranski, M. (2017). Mindfulness Meditation May Enhance Working Memory Capacity. (Electronic Thesis or Dissertation). Retrieved from <https://etd.ohiolink.edu/>
7. Marciniak, R., Sheardova, K., Cermáková, P., Hudeček, D., Sumec, R., & Hort, J. (2014). Effect of meditation on cognitive functions in context of aging and neurodegenerative diseases. *Frontiers in behavioral neuroscience*, 8, 17.  
<https://doi.org/10.3389/fnbeh.2014.00017>
8. Schwering, S.C., & Macdonald, M.C. (2020). Verbal Working Memory as Emergent from Language Comprehension and Production. *Frontiers in Human Neuroscience*.  
<https://doi.org/10.3389/fulum.202100068>
9. Gualtieri, C., & Johnson, L. (2006). Reliability and Validity of a computerized neurocognitive test battery. *Archives of clinical Neuropsychology*. 21, 623-643.  
<http://dx.doi.org/10.1016/j.acn.2006.05.007>
10. Tatsumi, I.F., Watanabe, M. (2009) Verbal Memory. In: Binder M.D., Hirokawa N., Windhorst U. (eds) *Encyclopedia of Neuroscience*. Springer, Berlin, Heidelberg.  
[https://doi.org/10.1007/978-3-540-29678-2\\_6266](https://doi.org/10.1007/978-3-540-29678-2_6266)
11. Youngs, M. A., Lee, S. E., Mireku, M. O., Sharma, D., & Kramer, R. (2021). Mindfulness Meditation Improves Visual Short-Term Memory. *Psychological reports*, 124(4), 1673–1686.  
<https://doi.org/10.1177/0033294120926670>
12. Manjunath, N. K., & Telles, S. (2003). Effects of sirsasana (headstand) practice on autonomic and respiratory variables. *Indian journal of physiology and pharmacology*, 47(1), 34–42.
13. Springer School and Center- Understanding WISC IV Composite Scores. Retrieved September 17, 2013, from <https://www.springer-ld.org/2013/09/17/understanding-wisc-iv-composite-scores/>
14. Quach, D., Mano, K.E.J., & Alexander, K. (2015). A randomized controlled trial examining the effect of mindfulness meditation on working memory capacity in adolescents. *Journal of Adolescent Health*, doi:10.1016/j.jadohealth.2015.09.024.
15. Chiesa, A., Calati, R., & Serretti, A. (2011). Does mindfulness training improve cognitive abilities? A systematic review of neuropsychological findings. *Clinical psychology review*, 31(3), 449-464.