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# Significant Improvement of Memory by Regular Practice of Yoga: A Systematic Review of the Literature

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## Abstract

*The coalition of positive impacts on physical, mental and spiritual well-being, achieved by consistent practice of yoga, is quite evident from various researchers, among which 12 peer reviewed journals and published studies are chosen and minutely studied. The objective of this study is to evaluate the impact of regular practice of yoga on the cognitive skills -to be more precisely, that is, on the improvement of memory. A thorough study was conducted by the researcher on the 12 such mentioned journals in which yoga intervention comprising of asana (physical postures), pranayama (breathing techniques) and dhyana (meditation) was applied to different school and college students. The different study designs, duration of intervention, types of tools used etc. are noted down to derive the best possible accurate conclusions. The significant improvement in cognitive skills of the experimental group are observed through the result of the applied memory tests. Yoga also shows to improve other physical and cognitive performances too. Hence, yoga can be correctly refers as an invigorating medium in the all-around performances of the individuals.*

**Keywords:** Yoga, Memory, Asana, Pranayama, Dhyana, Cognitive Skills

## Introduction

Consistent devotion to yoga displayed positive effects on physical, mental, and spiritual well-being, as evidenced by research from 12 peer-reviewed publications and published papers. The objective of this study aims to assess how regular yoga practice benefits cognitive functions, namely memory.

The researcher analyzed 12 publications where yoga interventions, including asana, pranayama, and dhyana, were applied on school and college students.

Various study designs and tool are noted to get optimal results. Considering the fact "students must be healthy in order to be educated and they must be educated in order to remain healthy", incorporation yoga in the daily lives of the students brings personal changes like, controlled body weight, decrease in anxiety levels, and community changes, like forming a healthier environment for living.

India has presented the world with a distinctive method to build a healthy body and mind both externally and internally, through the special method called yoga.

In the modern era, we are always competing with one another in every aspect. This competitive mindset results in a variety of

physical, mental, emotional, and social challenges. Yoga helps to alleviate a variety of diseases. Yoga has been depicted to be an effective supportive treatment for promoting good health and reducing many of the risk factors associated with psychological and physiological problems.

In this present scenario, daily practice of yoga will keep us healthy in every aspect. Consequently, practicing yoga at school is essential for the upcoming generation’s health, as school is a miniature of society. Yoga improves physical and mental wellness, and hence plays a crucial part in cognitive function. It plays an important role in the development of skills such as attention, focus, and memory.

Many studies discovered that children’s memory and attention are significantly enhanced by consistent practice of yoga. Studies show adolescents practicing yoga have better short-term memory and higher levels of concentration.

Memory is the chief component of executive function. Nobody can remember or work without memory, it being a primary and fundamental component.

The great German philosopher, Immanuel Kant regarded memory to be “the most wonderful of the faculties.”

The purpose of this study is to review the complementary relationship between memory and yoga that is being seen in various studies.

### **Yoga for Students**

The physical and psychological health progress by consistent practice of yoga is prominently evident by evaluating the results of various research works. Yoga also shows to foster positive self-apprehension and concentration in the people who practice regularly. These factors of well-being act as the building blocks of a good personal health and flourishing career. Traditional schools and colleges generally focus only on academic progress, but skills like stress management and well maintenance of physical and mental health when inculcated within the student help them to succeed in their long run.” Education and health are linked; academic performance is related to health status.” Hence, prioritizing physical and emotional health, by building habits, like practicing yoga consistently, can act as a catalyst in the students’ academic success.

### **Methods**

A thorough analysis of the research on the efficacy of yoga programs offered in schools and colleges were carried out. Full-text papers were found using a variety of databases, including Google Scholar, PubMed, the Psychology and Behavioral Sciences Collection, and Educational Research. Keywords were used to find various linked articles.

To find diverse publications, a variety of search phrase combinations were employed, including yoga, pranayama, meditation, children, adolescence, school and college.

### **Inclusion Criteria**

Only peer-reviewed and published articles were considered. Pre-post-test experimental design, cross-sectional research, field experimental technique, survey method, correlational pre-post control, and experimental design, Solomon Four designs were implemented in an educational context. Only yoga interventions involving asana, pranayama, and dhyana were investigated. The studies conducted on school and college students, were only accepted.

## Results:

Criteria	Sheel et al.	Srinisha et al.	Swaroop & Mathur	Banerjee, S.	Deepak et al.	Arpitaben et al.	Sandy et al.	Srikanth & Lancy	Babu & Nagendra	Kantu & Sharma	Banerjee, S.	Ravikumar, N.G
To evaluate whether the sample size was appropriate and relevant to conduct a research on or not	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
To confirm whether/certain protocol was used during the time of yoga intervention	Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
The researches having their outcome measures properly detailed or not	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stating whether the outcome measures worth significant reliability or not depending upon a certain scale where (0-10)	Yes	No	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
To evaluate whether the time period of yoga intervention to be suitable for observing significant impacts(if any) on the experimental group	Yes	No	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes

## Discussion

12 peer-reviewed published studies were selected where yoga has been used as a tool to check whether it improves the memory of the school and college students or not. The selected studies are then analyzed and discussed as follows:

The study conducted by Srinisha et al. displays the importance of yoga on Memory of the regular yoga practitioners. The study was conducted using survey method, comprising 107 college students in total. The test was taken individually, by providing one hour to each student, by a questionnaire made by the researcher, which consisted of fourteen questions. This information collected through this test, was statistically analyzed. The result shows significant improvement of verbal memory of the experimental group. Hence, yoga proves to reduce stress, enhance the functioning of the brain and lungs, increase the level of memory and concentration and enhance mind-body coordination.

Shilkhya Banerjee in her study examines how yoga affects students' memory. This study assesses the impacts of yogic practices on memory and factors affecting the memory functions like attention, recognition and visual retention. Randomized samples of forty students of 7th grade were taken and equally divided into experimental and control groups, having 20 students in each group. Regular training was applied for 60 days for 1 hour daily to the experimental group. A revised PGI memory scale was used during the pre-test and post-test to collect and analyze the scores using mean, t-values and standard deviation of both the groups. The outcomes prominently reflect that the experimental group had better memory and other cognitive functions as compared to the control group.

Sheela Joice and others conducted their study on 100 medical Students as the sample size, which was further divided equally into control and experimental group. The experimental group practiced yoga for three months. PGI memory scale was used to assess the memory of both the groups before and after the yoga intervention. The scores of pre-tests and post-test of both groups were statistically analyzed and it shows significant improvement in memory in the yoga group.

Deepak et al. in his study dealt with 150 healthy students in the age range of 8–14 years in the same school selected by random sampling technique, who were divided into two groups having forty students in the control group. For data analysis t-test was used which reported significant improvement of the students of the experimental group.

Shanti, S. and Madhu, M. aimed to study the effect of regular practice of yoga on the memory of the student of U.P. Board and C.B.S.E. Board. Where the initial sample size was 100 students of 11th grade. Field experimental method was used to analyze the outcomes. The primary tools were

Academic achievement test and short-term memory test (STM) which revealed significant impacts on memory of the students.

Patel, et al. focused to observe any improvement of the short-term memory of higher secondary school students by practice of yoga. 80 students were randomly selected of 11th grade of 15-16 years and students of the experimental group were made to practice yoga for 1 hour each day for 15 days. Analyzing the scores of pre-tests and post-test, it was found that incorporating yoga practices can enhance short-term memory among students, with a more pronounced effect observed in students with higher intelligence levels.

Sandy K., et al. used Solomon Four (Torchis -2005) Design to evaluate the effect of practicing yoga on 300 university students comprising 156 boys and 144 girls, who were divided into 4 groups. 3 inverted yoga postures were applied and 2x2 ANOVA was used to analyze the effects. This study revealed that no significant improvement on short-term memory of students of the experimental group by regular practice of yoga.

The Effectiveness of Super brain Srikanth and Lanny comprised 1945 students comprising 948 boys and 997 girls of age range 6-18 years in Mysore, India. The students practiced Super brain Yoga for a daily period of three months which is a simple exercise that involves specific body movements believed to activate the brain's energy centers. The results revealed 75.9% improvement of memory of the students of the experimental group. The research demonstrated that Super brain Yoga is an excellent strategy for boosting students' cognitive ability and self-confidence.

Natesh Babu and H.R. Nagendra to evaluate the impact of yoga on 138 adolescent school students of age range 12-16 years. The experimental group was made to practice for 10 days and 8 hours each day. Verbal and non-verbal tests were taken which indicated that yoga practice led to significant improvements in working memory among adolescents.

Kauts and Neelam had initially 800 students of ninth grade of 14-15 years out of them, 159 high stressed and 142 low stressed students were present. Pre-post tests of experimental design, while carrying the yoga intervention for seven weeks revealed improvement of memory by yoga training and also decreased stress levels.

Banerjee, S. aimed to assess the consequences of practice yoga on memory, mental exhaustion and academic success among 20 seventh grade for 2 months. The study used a pre- post-test design, being applied on both experimental and control groups. Memory scale of PGI was used, which concluded that incorporating yoga into the daily routine of middle school students can effectively enhance memory, and improve academic performance for both boys and girls.

The study of Ravikumar N.G. shows the effects of yoga on attention and memory among B.Ed. student teachers. 100 B.Ed. Student teachers aged 21–25 years were taken and the experimental group had yoga sessions 30 minutes daily, five days a week, over 12 weeks. PGMI Memory Scale was used to obtain the pre and post test scores. The experimental group shown notable improvement in attention and memory as compared to the control group.

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## Appendix

A brief mention on the studies, intervention and result of the selected works

Author	Location/ setting	Method	Participants	Yoga Intervention (number of sessions, exercise frequency, sessions duration,)	Tool used	Findings
Joice et al.	India/ medical students	Not mentioned	100 Students of 1st year MBBS. Age: 18-22 yrs.	12 weeks 5 days/ week 30 min daily	PGMI memory scale	The study showed significant improvement in memory
Srinisha et al.	India/ college students	Survey method	107 college students	Not mentioned	Questionnaire	The result showed that yoga improves memory of the students
Swaroop & Mahor	India/ school students	Field experimental method	100 students of 11th grade	Not mentioned	Short term memory test	Significant impact on memory

Banerjee, S.	India/ school students	Pre and post- test of experimental and control group design	40 students of 7th grade	60 days 1hr daily	PGI memory scale	In within group comparison, memory scores ( $t=9.90$ , $p<0.05$ ) and between boys and girls also were significantly influenced
Deepak et al.	India/ school students	Cross sectional single- centre study	150 school students Age: 8- 14 yrs.	Not mentioned	Not mentioned	The result was with confident interval of 95% and the score $p< 0.05$ was statistically significant
Patel & Acharya	India / school students	Pre-post test experimental design	80 students of 11 grade Age:15-16 yrs.	15 days 1 hr daily	Dr.K.S. Likhiys's short term memory test	The result should that yoga trend group developed better memory than non-yoga group
Sandy, et al.	USA/ University students	Solomon Four (Trochim 2005) design	300 University students (Boys $n=$ 156 Girls $n=$ 144)	Not mentioned	Short term memory test	The study showed that there was no such significant effect to develop short term memory of the students who practicing inverted yoga positions

Joice & D'souza	India/ school students	Cross- sectional study design	1945 school students (Boys n=948 Girls n= 997)	3 months excluding Sundays and holidays	Superbrain Yoga Questionnaire	The study should significantly effect in case of memory
Babu & Nagendra	India/ school students	Correlational pre post control and experimental design	138 school students Age: 12- 16 yrs	10 days 8 hrs. daily	verbal and non- verbal memory test	Significant effect short in working memory
Kauts & Sharma	India/ school students	Pretest hostess experimental	301 students of 9th grade (Boys n=185 Girls n=116) Age: 14- 15 yrs	7 weeks 1 hr daily	Short term memory test	Research has demonstrated that yoga has an effect on memory significantly
Ravikumar	India/ B.Ed. students	Pre-test post- test experimental design	100 B.Ed. college students Age : 21-25	12 weeks 30 min / day.	PGMI memory scale	PGMI memory scale
Srinisha et al.	India/ College students	India/ College students	India/ College students	12 weeks 1 hour Twice a week	Questionnaire	Significant improvement in memory