IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

The Effects Of Yogic Practices On Cognitive Functions And Mental Health: An Experimental Study

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Abstract:

This is an experimental study which investigates the effects of Yogic Practices(YP) on Cognitive Functions(CF) and Mental Health(MH) among adolescence(12 to 14 age). In this study total 20 participants have taken their active participation. Over 12 week period, and group were engaged practices of Asanas, Meditations, Mudra, and Pranayama. Cognitive functions were assessed using standardized tests before, during, and after the intervention with the help of Cognitive Assessment Battery (CAB)™ PRO test (CogniFit Inc., San Francisco, CA, USA). It is an online suite of neuropsychological battery tests. The outcomes of the study furnish a comprehensive report, detailing individual scores across 06 cognitive skills and mental health. The validity index of the measurements encompasses Z-scores, percentiles, and adjusted percentile scores. In the evaluation of test-retest reliability for the Cognitive Assessment Battery (CAB), RMANOVA and intergroup correlation were judiciously employed. The results from RMANOVA underscored significant distinctions in cognitive functions and Mental Health among the yogic practices.

Introduction

Cognitive functions play A crucial role in learning, memory, And overall mental wellbeing. Yogic practices, which include asanas, pranayama and meditation have been suggested to enhance cognitive abilities by improving focus, reducing stress, and promoting neuroplasticity. However, empirical studies on their impact, particularly among adolescents, remain limited. The positive correlation between Yogic Practices and cognitive health is increasingly recognized, particularly as populations age. This study aims to provide empirical evidence regarding the effects of structured yogic practices on cognitive functions.

The hypothesis guiding this research posits that individuals engaging in regular physical activity will exhibit significant improvements in cognitive functions compared to those who do not participate in such activities. Understanding this relationship is crucial, as it can inform interventions aimed at improving mental health and cognitive resilience.

Objective: This study aims to investigate the effects of yogic practices on CF and MH through an experiment design.

Methods: Total 20 adolescence girls (12 to 14age) were recruited for the study. Participated were randomly assigned to the yogic practices group. Inclusion criteria included no history of neurological disorders and a willingness to participate in the physical activity program.

Training Program: The Yogic Practices group underwent a structured training program that lasted 12 weeks. The program included asanas, pranayama, mudra, and meditation conducted six times a week for one hour per session.

Result:

The significant variables for Yogic practices:

1. The variable **Auditory perception** is significant with p-value **0.00013**
2. The variable **Contextual memory** is significant with p-value **0.0**
3. The variable **Divided attention** is significant with p-value **0.00082**
4. The variable **Planning** is significant with p-value **0.00268**
5. The variable **Response time** is significant with p-value **2e-05**
6. The variable **Short-term memory** is significant with p-value **0.02321**

Table 1. RM ANOVA Analysis for all the variables tabulated of Yogic Practices Group

SN.	Source	ddof1	ddof2	F	p-unc	ng2	eps
1	Auditory_perception	2	40	11.25244	**0.000133**	0.131024	0.966116
2	Contextual_memory	2	40	17.7119	**3.10E-06**	0.2055	0.953958
3	Divided_attention	2	40	8.534856	**0.000819**	0.177418	0.993368
4	Planning	2	40	6.894129	**0.002676**	0.134474	0.856927
5	Response_time	2	40	14.54339	**1.79E-05**	0.190912	0.801801
6	Short_term_memory	2	40	4.140611	**0.023208**	0.089491	0.84531

Table 2. Mean and Standard Deviation table of Yogic Practices Group

Feature	Pre_test		During_test		Post_test	
	Mean	SD	Mean	SD	Mean	SD
Auditory_perception	-2.601	1.0434	-2.4308	0.9494	-1.6463	1.2735
Contextual_memory	-1.9037	0.9302	-1.3729	0.9872	-0.6993	1.0574
Divided_attention	-3.1395	1.1801	-2.3939	1.6166	-1.5311	1.5173
Planning	-1.1829	1.3012	-0.3415	1.502	0.098	1.3334
Response_time	-1.1679	1.2936	-0.4982	1.0256	0.0368	0.719
Short_term_memory	-1.1731	1.2558	-0.5493	1.4563	-0.1676	1.3442

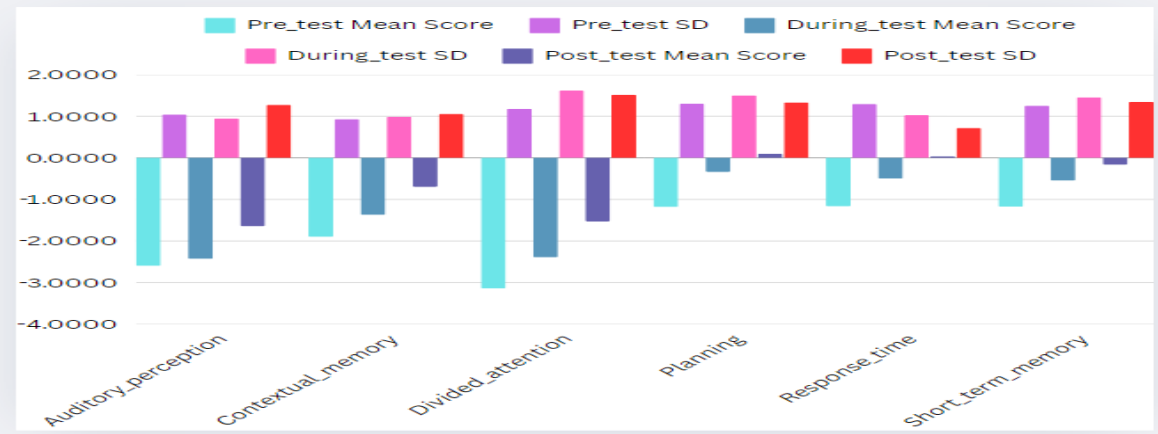

Figure No. 1: The Graph presents the mean and standard deviation (SD) scores for various cognitive features measured at three stages: pre-test, during-test, and post-test. Improvements are observed across all features, with scores moving towards positive values over time. Notably, auditory perception, contextual memory, and divided attention show significant gains, indicating enhanced cognitive performance.

POST-HOC Tables for significant variables

Table 1. Tukey-Kramer Post Hoc Test for **Auditory perception**:

Multiple Comparison of Means – Tukey HSD, FWER=0.05

Group 1	**Group 2**	**Mean Diff.**	**p-adj**	**Lower**	**Upper**	**Reject**
Pre test	During test	-0.1702	0.8704	-0.9839	0.6436	False
During test	Post test	0.7846	0.0611	-0.0292	1.5983	False
Pre test	Post test	-0.9547	**0.0176***	-1.7685	-0.141	**True**

Table 2. Tukey-Kramer Post Hoc Test for **Contextual memory**:

Multiple Comparison of Means – Tukey HSD, FWER=0.05

Group 1	**Group 2**	**Mean Diff.**	**p-adj**	**Lower**	**Upper**	**Reject**
Pre test	During test	-0.5308	0.2017	-1.2672	0.2056	False
During test	Post test	0.6735	0.0797	-0.0629	1.41	False
Pre test	Post test	-1.2044	**0.0006***	-1.9408	-0.4679	**True**

Table 3. Tukey-Kramer Post Hoc Test for **Divided attention**:

Multiple Comparison of Means – Tukey HSD, FWER=0.05

Group 1	**Group 2**	**Mean Diff.**	**p-adj**	**Lower**	**Upper**	**Reject**
Pre test	During test	-0.7457	0.2266	-1.8211	0.3298	False
During test	Post test	0.8628	0.1397	-0.2127	1.9383	False
Pre test	Post test	-1.6085	**0.0019***	-2.6839	-0.533	**True**

Table 4. Tukey-Kramer Post Hoc Test for **Planning**:

Multiple Comparison of Means – Tukey HSD, FWER=0.05

Group 1	Group 2	Mean Diff.	p-adj	Lower	Upper	Reject
Pre test	During test	-0.8415	0.1276	-1.8662	0.1832	False
During test	Post test	0.4395	0.5605	-0.5852	1.4642	False
Pre test	Post test	-1.281	**0.0107***	-2.3057	-0.2563	**True**

Table 5. Tukey-Kramer Post Hoc Test for **Response time**:

Multiple Comparison of Means – Tukey HSD, FWER=0.05

Group 1	Group 2	Mean Diff.	p-adj	Lower	Upper	Reject
Pre test	During test	-0.6696	0.1011	-1.4406	0.1014	False
During test	Post test	0.535	0.226	-0.236	1.306	False
Pre test	Post test	-1.2046	**0.0011***	-1.9756	-0.4336	**True**

Table 6. Tukey-Kramer Post Hoc Test for **Short-term memory**:

Multiple Comparison of Means – Tukey HSD, FWER=0.05

Group 1	Group 2	Mean Diff.	p-adj	Lower	Upper	Reject
Pre test	During test	-0.6238	0.3019	-1.6284	0.3808	False
During test	Post test	0.3817	0.6342	-0.6229	1.3863	False
Pre test	Post test	-1.0055	**0.0498***	-2.0101	-0.0009	**True**

Post-hoc table will help the significance of the variable over the time. Summary of the post-hoc result for Yogic practices are given below:

1. The **Auditory perception** variable is significant different during **Pre-test** to **Post-test**.
2. The **Contextual memory** variable is significant **Pre-test** to **Post-test**.
3. The **Divided attention** variable is significant during **Pre-test** to **Post-test**.
4. The **Planning** variable is significant during **Pre-test** to **Post-test**.
5. The **Response time** variable is significant during **Pre-test** to **Post-test**.
6. The **Short-term memory** variable is significant during **Pre-test** to **Post-test**.

Summary:

The study investigates the impact of Yogic practices on Cognitive Functions (CF) and Mental Health (MH). Hypotheses were formulated with the null hypothesis (H_0) positing no difference in activity over time for CF and MH variables, and the alternative hypothesis (H_1) suggesting a difference. Utilizing Repeated Measures Analysis of Variance (RM ANOVA), the study identified significant variables with p-values less than 0.05. Noteworthy variables included Auditory perception, Contextual memory, Divided attention, Planning, Response time, Short-term memory.

Detailed examination through Tukey-Kramer Post Hoc Tests revealed the temporal significance of

total 06 variables. Notable findings include improved Auditory perception, Contextual memory, Divided attention, Planning, Response time, Short-term memory in the Yogic Practices group. The study's post-hoc analysis facilitates a nuanced understanding of the temporal dynamics and significance of various cognitive functions, contributing valuable insights into the efficacy of Yogic Practices on cognitive and mental well-being.

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