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Cognitive Performance of Yogic and Non-Yogic Young Adults: A Comparative Study

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ABSTRACT

The aim of this study is to observe the cognitive performance of yogic and non-yogic young adults on selected cognitive tasks such as six letter cancellation test (SLCT) and digit-letter substitution test (DLST). To serve the purpose of the investigation, 60 male and female students each from yogic and non-yogic groups, of 18-25 years of age groups with a mean and SD of 21.4+1.85 were selected randomly. Subjects were selected from the students of M.P.Ed and M.A. (Yoga) at LNIPE, Gwalior (MP), India for yogic and non-yogic groups respectively. SLCT and DLST were used as an instrument for measuring cognitive performance of yogic and non-yogic groups. The statistical procedure applied to inspect the hypotheses of the study was descriptive statistics (mean & SD) and comparative statistics (independent *t*-test). The level of significance was set at 0.05. According to the analysis, calculated *t*-values of DLST and SLCT are 2.26 and 2.14 which are more than tabulated value 2.00 at 58 df, hence *F* ratio was found significant at the level of 0.05, so the null hypothesis of no difference among the groups might be rejected. Results indicated that there is significant difference in cognitive performance among yogic and non-yogic groups and it may be because of the nature of activity in which the subjects involved during the practical classes of their respective courses.

Keywords: Digit/Letter Substitution Test (DLST), Six Letter Cancellation Test (SLCT), Yogic and Non-Yogic Groups.

1. INTRODUCTION

Yoga is an old Indian science and way of life that joins the demonstration of specific asanas, controlled breathing, and reflection. It is planned to change and prosperity to the physical, mental, excited, and powerful estimations of the individual. Yoga is frequently depicted symbolically as a tree and incorporates eight perspectives: yama (widespread ethics), niyama (singular ethics), asana (physical postures), pranayama

(breath control), pratyahara (control of the feelings), dharana (center), dyana (thought), and samadhi (euphoria).

Scholarly execution is our ability to utilize the data acquired by mental systems in our brains. A well-working cerebrum controls an extent of hardheaded and programmed exercises. Instances of these exercises are the rest wake cycle, thought, acknowledgment, slant, feeling, hunger satiety and memory. The cerebrum is the single organ that controls our body works out. It is a structure with around 100 billion interconnected cells. Studies disavow the predominant view that adults lose a titanic number of neurons (mind cells) reliably.

Memory and particular thought are basic capacities for insightful and capable execution. Practices to upgrade these capacities are not educated either in preparing or association instructional classes. Any structure which can proficiently improve these capacities will be of a motivating force in universities, schools, and workplaces. Substitution tests and letter cancelation tests are for the most frequently taken as clinical and research instruments in neuropsychology (Lezak, 1995), the best thought about which is the Digit Letter Substitution Test, one of the subtests from the Wechsler Intelligence Scales (Wechsler, 1955, 1981). Substitution tests are fundamentally speed subordinate assignments which require the part to facilitate specific digits or letters, symbols, pictures to various symbols inside a predefined day and age. Substitution tests are sensitive to mind brokenness (Lezak, 1995; Spreen and Strauss, 1998) nonspecifically in light of the way that their execution draws on an extensive variety of methods: the essential responses made in substitution assessments depend upon the joining of complex neuropsychological systems, comprise visual looking at, mental flexibility, upheld thought, psychomotor speed, and speed of information getting ready (Lezak, 1995; Van Hoof, Jogems-Kosterman, Sabbe, Zitman, and Hulstijn, 1998). This common affectability to mind brokenness, joined with the probability of social occasion association and the less duration test time, makes substitution tests and letter cancelation tests are exceedingly proper as screening instruments. In this examination, the effect of yoga techniques on execution of the Digit– Letter Substitution Task (DLST) and SLCT was inquired about. The DLST depends upon specific thought and memory. It is appreciated and executed for all age groups subjects, including school understudies. It was in this way given to individuals in a 7-day personality change camp held for school understudies in the midst of their mid-year escape. The essential objective of this examination was to examine possible changes in memory and particular thought, which evaluated by the Digit– Letter Substitution Test (DLST) and Six Letter Cancelation Test (SLCT) in view of routine with respect to Asana, pranayama, consideration and kriya yoga.

2. METHOD

Selection of Subjects: To serve the purpose of the investigation, 60 male and female students each from yogic and non-yogic groups, of 18-25 years of age groups were selected randomly. Subjects were selected from the students of M.A. (Yoga) and M.P.Ed at Lakshmbai National Institute of Physical Education, Gwalior for yogic and non-yogic groups respectively.

Administration of Tests: The DLST test sheet is given to subjects. The DLST worksheet comprises of 8 lines × 12 segments exhibit of irregular digits 1–9. The key gives the numbers 1 to 9, each joined with another letter (see also Smith, 1982; Wechsler, 1955, 1981); the test things are printed underneath the key. Subjects were told to settle on their own decision of letter substitution methodology, regardless of whether evenly, vertically, or choosing every specific digit randomized in the exhibit each one in turn. They were

advised to substitute whatever number target digits as could be expected under the circumstances in the predetermined time of 90 seconds. Finally, they were advised to start the test, test was moved toward a standard stopwatch. Scoring the DLST checks both the total number of substitutions attempted, and the amount of wrong substitutions. Net score is procured by deducting the letter from the past. The utilization of this DLST convention to consider impacts has just been approved for the Indian populace.

Similarly, The SLST test sheet is given to subjects. Six letter cancellation test (SLCT) for this six target letters were given on the top of page and below them randomly letters were given. Instructions were given to search the target letters and cancel them by slash. Cancel as many as possible within given time (90 second). Scoring the SLCT tallies both the aggregate number of scratched off letters, and the quantity of wrong wipe out letters. Net score is acquired by deducting the letter from the previous. The subjects were exhorted to give their real performance and the research scholar had assured the respondents that the information given by them would be kept confidential and utilized for the research purpose only.

Statistics: The statistics used to analyze the hypotheses of the study were, descriptive statistics (mean & SD) and comparative statistics (independent *t*-test) at level of significance 0.05. SPSS 20 was also used. The assumptions for applying independent *t*-test were also taken into consideration.

3. RESULTS

In order to compare or to see the differences between yogic and non-yogic young adult's cognitive performance, independent *t*-test was used as statistical technique at level of significance 0.05.

Table 1
Descriptive Statistics for Cognitive Performance of Yogic and Non-Yogic Groups

		<i>Group Statistics</i>			
	<i>Group Types</i>	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Std. Error Mean</i>
DLST	Yogic	30	58.73	13.21	2.41
	Non-Yogic	30	51.73	10.63	1.94
SLCT	Yogic	30	38.30	9.84	1.80
	Non-Yogic	30	33.00	9.33	1.70

Table 1 shows the scores of Mean and S.D. of performance of cognitive domains for yogic and non-yogic groups. The Mean & S.D in DLST of yogic and non-yogic young adults are 58.73 ± 13.21 ; 51.73 ± 10.63 respectively. The mean of yogic group is larger than that of the non-yogic group in DLST.

Similarly, The Mean & S.D in SLCT of yogic and non-yogic young adults are 38.30 ± 9.84 ; 33.00 ± 9.33 respectively. The mean of yogic group is again larger than that of the non-yogic group in SLCT.

However, whether the difference is significant or not has to be tested by using the two sample *t*-test for unrelated groups and details are shown in Table 2.

There is one conditions for utilizing the two-example *t*-proportion for disconnected gatherings is that the differences of the two gatherings must be equivalent. To test the equity of changes, Levene's test was utilized.

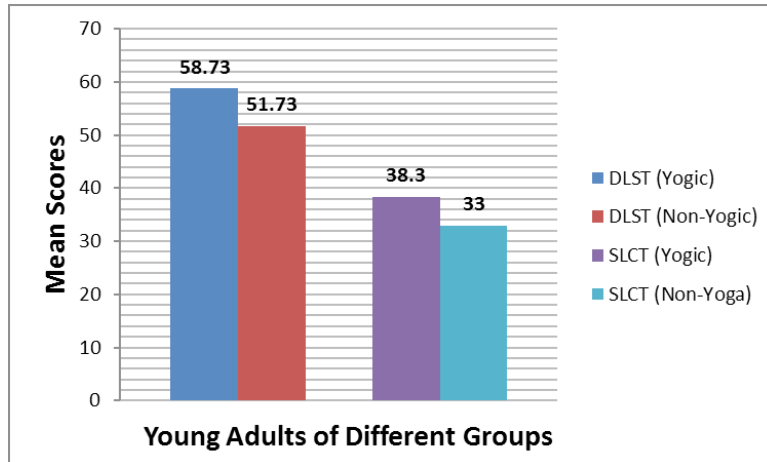


Figure 1: Mean Comparison of Cognitive Performance of Different Young Adults Groups

Table 2

F and *t*-table for testing the equality of variances and equality of means of Yogic and Non-Yogic Groups

		Independent Samples Test					
		Levene's Test for Equality of Variances		<i>t</i> -test for Equality of Means			
		<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2-tailed)	Mean Difference
DLST	Equal variances assumed	0.11	0.74	2.26	58	0.028*	7.00
SLCT	Equal variances assumed	0.23	0.63	2.14	58	0.037*	5.30

*Significant at 0.05 level.

Table 2 shows that the *F*-value is 0.11 which is not significant because the *p*-value is 0.74 that is greater than 0.05. So, in case of DLST the null hypothesis of equality of variances may be accepted and it is reasoned that the differences of the two gatherings are equivalent.

It can be seen from the Table 2 that the value of *t*-statistic is 2.26. This *t*-value is significant as the *p*-value is 0.028 which is under 0.05. Thus, the null hypothesis of equality of population means of two groups is rejected and it may be reasoned that the performance in DLST of yogic and non-yogic groups are different. In this situation only two-tailed test was used and, therefore, only conclusion which can be drawn is that the performance in DLST of both the groups are not equal and no further conclusion can be drawn about the larger group mean.

Further, the value of *t* (=2.26) is compared with tabulated $t_{0.05}(n_1 + n_2 - 2)$ for one tail hypothesis. Here $n_1 = 30$ and $n_2 = 30$ and, therefore, for one tail hypothesis the value of $t_{0.05}(58) = 2.000$. Since calculated value of *t* (=2.26) is greater than tabulated *t* (=2.000), H_0 may be rejected and it may be concluded that performance in DLST of the yogic group is significantly higher than that of non-yogic group.

Similarly, in case of SLCT the *F*-value is 0.23 which is not significant because the *p*-value is 0.63 that is greater than 0.05. So, the hypothesis of no difference for the equality of variances might be acknowledged and it is inferred that the fluctuations of the two variances are equivalent.

It can be seen from the Table 2 that the estimation of *t*-value is 2.14. This *t*-value is significant as the

p -value is 0.037 which is under 0.05. In this way, the null hypothesis equality of population means of two groups is rejected and it might be presumed that the execution in SLCT of yogic and non-yogic groups are different. In this situation only two-tailed test was used and, therefore, only conclusion which can be drawn is that the performance in SLCT of both the groups are not equal and no further conclusion can be drawn about the larger group mean.

Further, the value of $t (=2.14)$ is compared with tabulated $t_{0.05}(n_1 + n_2 - 2)$ for one tail hypothesis. Here $n_1 = 30$ and $n_2 = 30$ and, therefore, for one tail hypothesis the value of $t_{0.05}(58) = 2.000$. Since calculated value of $t (=2.14)$ is greater than tabulated $t (=2.000)$, H_0 may be rejected and it might be summarised that performance in SLCT of the yogic group is significantly higher than that of non-yogic group.

4. DISCUSSION/CONCLUSIONS

On the basis of the results of the study, the hypothesis stated that there would be significant difference in cognitive performance in yogic and non-yogic young adults. The hypothesis established was found to be true in Cognitive Performance, hence it can be concluded that young adults of yogic and non-yogic groups has different level of performance on cognitive domains.

Similar results were found in the study of Dr. V.K. Mishra (2016) that was title with “Effect of yoga package on performance of digit–letter substitution test and six letter cancellation test in early and middle adolescent” that is significant increase in the score of SLCT ($p < 0.001$) and DLST ($p < 0.001$) due to yogic practices.

This difference on cognitive abilities among yogic and non-yogic groups may be because of frequency of regular participation in various yogic practices they have. The aim of this research were to emphasize the multi-dimensional nature of cognitive domains and its long-term impact on symptom profiles and outcomes, as well as produce a useful new measure that would be appropriate for use in both research and practice settings.

As it was found that there is difference in cognitive domains among yogic and non-yogic groups of young adults and it may be because of the yogic practices in which the subjects from yogic group were engaged during the last few months. Few of the important yogic practices in which subjects were engaged; suryanamaskar, various Asanas, pranayama, meditation and yogic cleansing process during the different sessions.

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