



Original Research Article

## Effect of Raj Yoga Meditation on Affective & Cognitive Functions

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### ABSTRACT

**Context:** Raj Yoga is the supreme or the highest yoga that empowers the self to rule the mind, sense-organs and the body. There are several psychological benefits incurred by raj-yoga which have not been highlighted due to scarcity of scientific studies. **Aims:** The present study examined the effect of duration of Raj Yoga Meditation practice on affective & cognitive functions in terms of attention/concentration, memory, visual processing, neuroticism, hope and happiness. **Materials and Methods:** Sixty- four healthy volunteers practicing Raj yoga from 1 month to more than 10 years were segregated into two groups of beginners and practitioners and their psychological and affective functions assessed using standard measures at a Raj Yoga Centre in Delhi, India. **Results and Conclusions:** Results suggest that the group practicing Raj Yoga for longer duration had significantly less neurotic symptoms, scored higher on hope and happiness and higher on cognitive functions in comparison to the group practicing Raj Yoga for shorter duration. These results may be due to personality development, self-actualization and better attention and concentration achieved due to training in Raj Yoga.

**Key-words:** Raj Yoga, Affective & Cognitive Functions

### INTRODUCTION

The word 'Raj' means the king, sovereign or the supreme. Raj Yoga is the supreme or the highest yoga that empowers the self to rule the mind, sense-organs and the body. Raj-Yoga also implies that even a person who is a king and who is very busy can practice it, as this practice does not involve any acts of austerities or penances or

renouncing one's household. Raj-Yoga meditation is different from all other forms of meditation; although contemplation, reflection, imagination, concentration, etc. are employed in its practice.

Raj-Yoga is based on the understanding that every person has two aspects of personality – body (outer sheath) and a conscient entity which is a metaphysical or spiritual being or soul. It is

this which thinks, understands, reflects and has emotions. Brain is one of its mechanisms and its switchboard or control apparatus. However, in the course of time, certain factors have led the conscient entity to identify itself with the brain or the body. This wrong identification has caused suffering in various forms and has led the society to the path of struggle for existence and peacelessness.

The practice of Raj Yoga results in alertness and awareness of the mind and illusions of material consciousness, frees one from fear of the unknown, gives clarity and certainty about what lies beyond the immediate perceivable world. It can also be practiced for maintaining sound health, improving concentration for better performance in any field, overcoming character defects, developing personality, etc.

There are several psychological benefits incurred by yoga which have been highlighted in the studies conducted in the field. It increases somatic and kinesthetic awareness, improves mood, [1] increases subjective well-being of the individuals, [2] increases self-acceptance and self-actualization, increases social adjustment, decreases anxiety, depressive symptoms and hostility. [3, 4] There are reports of benefits of yoga seen in the treatment of anxiety disorders, obsessive-compulsive disorder, and schizophrenia. Kundalini meditation and relaxation have been used for anxiety disorders and obsessive-compulsive disorder. [5] The best studies of mood changes associated with Yoga were carried out on Hatha-Yoga, a form of Yoga that involves a strong exercise dimension. [6] It involves stretching, balancing, and breathing routines. After practicing Hath Yoga, subjects reported being less anxious, tense, angry, fatigued, and confused. Yoga has a very significant role in the treatment of

psychosomatic disorder which is precipitated due to stress. [7-10]

Yoga has also been described as training in awareness which produces definite changes in perception, attention and cognition. [11] It has been shown that processing of sensory information at the thalamic level is facilitated during the practice of pranayama (breathing exercises) [12] and meditation. [13] Integrated approach of yoga that combines physical postures, pranayama and meditation together with the notional correction based on philosophy of yoga was found to improve both cognitive (visual perception) and motor functions (hand steadiness in college students following 10 days of yoga practice). [14] This improvement was believed to be due to improved eye hand coordination, attention, concentration and relaxation. [13]

Among the various types of Yoga, very few studies have been documented regarding the practice of Raj Yoga and its effects. Changes in various autonomic and respiratory variables during the practice of Brahmakumaris Raja yoga meditation in 18 males with 5-25 years of experience in meditation were reported in a study [13] which revealed that heart rate during the meditation period was increased. There was no significant change during meditation, for the group as a whole, in palmar GSR, finger plethysmogram amplitude, and respiratory rate. The individual level analysis revealed that changes in autonomic variables suggestive of both activation and relaxation occurred simultaneously in different subdivisions of the autonomic nervous system in a subject. Apart from this, there were differences in patterns of change among the subjects who practiced the same meditation.

With this background, the present study was conducted to know: (i) The impact of duration of Raja Yoga Meditation practice on affective and cognitive functions

and (ii) To compare the beginners and experts of Raja Yoga Meditation on affective and cognitive functions in terms of attention/concentration, memory, visual processing, neuroticism, hope, and happiness.

## SUBJECTS AND METHODS

This study was conducted at BramhaKumari Raj Yoga Centre, Delhi. 100 Participants were interviewed and screened initially. The Inclusion and Exclusion criteria for the participants were age group of twenty five to fifty years, at least educated up to High School, residing in North Delhi and nearby areas, not having any significant physical or psychiatric illness and given informed consent to participate in the study. After screening according to the exclusion and inclusion criteria, sixty four individuals were selected for the study. Informed consent was taken from each participant. The nature and purpose of the study was explained to them. Thereafter, the drawn sample was randomly divided into two groups. The first group consisted of thirty eight individuals who

were practicing raj yoga for the last two years and the second group consisted of twenty six individuals who were practicing raj yoga for ten or more years. Mean age of the participants in group I and group II was  $38.42 \pm 9.78$  and  $40.38 \pm 8.34$  years respectively. In both groups majority of the participants were married, employed and from urban background. Most of the participants' income was above 3 Lac rupees per year. No significant difference was found between the groups on any of the socio demographic characteristics i.e., education, marital status, occupation and socio-economic status and income.

Socio- demographic and Clinical Data Sheet were filled for initial information. Assessment of all the participants was done using the NEO-PI R (Neuroticism Scale for assessing neuroticism), Happiness Scale, The Adult Hope Scale and Quality of Life Scale which were used to assess psychological and affective functioning. Rey Verbal Learning Test, Rey Osterrieth Complex Figure Test and Letter Cancellation Tests of NIMHANS Neuropsychological Battery were administered to assess cognitive functions.

### *Tools used:*

- Neuroticism scale of NEO-PI R: [15] The scale is characterized by a general tendency to experience negative affects such as fear, sadness, embarrassment, anger, guilt and disgust. Individuals high in this factor are also prone to have irrational ideas, are less able to control their impulses and cope more poorly than others with stress. Six facets of neuroticism that are assessed include: anger, anxiety, hostility, depression, self-consciousness, impulsiveness and vulnerability. Each facet contains six items. The domain scales show

internal reliabilities ranging from 0.87 to 0.92. The facet scales show internal reliability ranging from 0.58 to 0.82.

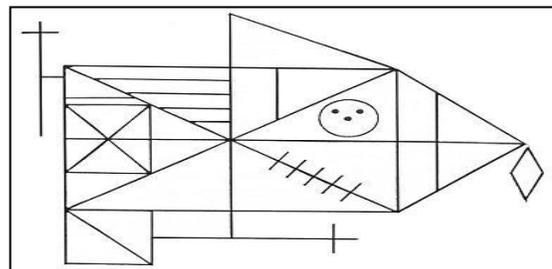
- The Adult Hope Scale: [16] The adult hope scale measures Snyder's cognitive model of hope which defines hope as "a positive motivational state that is based on an interactively derived sense of successful (a) agency (goal-directed energy) and (b) pathways (planning to meet goals)". The adult hope scale contains 12 items. Four items measure pathways thinking, four agency thinking and four items are fillers. Participants respond to each

item using an eight point scale, ranging from definitely false to definitely true and the scale takes only a few minutes to complete.

- Happiness Scale: [17] is a four item scale of global subjective happiness. Two items ask respondents to characterize themselves using both absolute ratings and ratings relative to peers, whereas the other two items offer brief description of happy and unhappy individuals and ask respondents the extent to which each characterization describes them.
- Quality of Life Scale: [18] It assesses an individual's quality of life through self-report of the importance they attach to each of six life domains, on a seven-point rating scale. The six domains are: material and physical well-being, relationships with other people, social, community and civic activities, personal development and fulfillment, recreation and independence or the ability to do for yourself. The QOLS has low to moderate correlations with physical
- Rey Osterith Complex Figure Test [20] from NIMHANS Neuropsychological Battery ROCFT is a "pen and paper" neuropsychological test used to evaluate neurological dysfunction in visual perception and long term memory. The test requires the subject to copy a complex figure and later produce from memory.

health status and disease measures. The QOLS is a valid instrument for measuring quality of life across patient groups and cultures and is conceptually distinct from health status or other causal indicators of quality of life.

- Rey's auditory verbal learning test (RAVLT) [19] from NIMHANS Neuropsychological Battery is a measure of verbal learning and memory. It is a measure of immediate memory, acquisition or new learning, retention, primacy, and recency effect, susceptibility to proactive and retroactive interference.
- Letter Cancellation Test (From NIMHANS Neuropsychological Battery): [19] This test assesses visual scanning, response speed and sustained attention. The subject is presented with letters of English alphabet, and is instructed to cancel out specific letters. In addition, the numbers of different errors (omissions and commissions) done by the subject are counted.



### ***Statistical analysis***

The results were analyzed using the statistical package of social sciences-version 16.0 for windows. Socio-demographic variables were analyzed using the  $\chi^2$  and independent sample t-test. Performance of both the groups on study variables were compared using the independent sample t-test.

**Table 1: Socio-demographic characteristics of the sample: Group I (N=38) and Group II (26)**

		Group 1(38)	Group2(26)	X <sup>2</sup>
Gender	Male	19	15	.36 <sup>NS</sup>
	Female	19	11	
Education	High School	2	3	3.59 <sup>NS</sup>
	Intermediate	5	1	
	Graduate	20	13	
	Postgraduate	6	7	
	Professional	5	2	
Marital Status	Unmarried	9	12	3.53 <sup>NS</sup>
	Married	29	14	
Occupation	Student	5	1	2.67 <sup>NS</sup>
	Service	16	15	
	Business	10	7	
	Housewife	7	3	
Average no of hours	1 to 5	22	7	9.16 <sup>NS</sup>
	6 to 10	9	9	
	11 to 15	5	7	
	16 to 20	1	1	
	21 to 25	1	0	
	26 to 30	0	2	
*=.05, **=.01, NS= Not Significant				

Table-1 shows the significance of difference between the beginners and practitioners on socio-demographic characteristics. The table reveals that beginners and practitioners did not differ significantly on any of the socio-

demographic variables, i.e. gender, education, occupation, marital status and average number of hours of Raj Yoga practice.

**Table 2. Comparison of Raj Yoga Practitioners on NEO-PIR, hope, happiness and QOL: Group I (N=38), Group II (N=26)**

	Group 1 (38)	Group 2(26)	
	M±SD	M±SD	t
N1	14.71±5.01	9.42±4.51	4.31**
N2	13.05±5.14	8.73±3.81	3.65**
N3	14.00±6.09	9.69±4.26	3.11**
N4	13.44±4.39	9.50±4.12	3.61**
N5	13.65±4.26	10.07±3.03	3.68**
N6	11.84±5.42	6.57±3.61	4.33**
Total	80.71±24.00	54.00±17.48	4.85**
Hope	53.10±7.42	56.92±6.32	2.14*
Happiness	5.03±1.27	5.99±1.02	3.17**
QOL	85.76±13.77	84.80±15.18	0.26 <sup>NS</sup>
*=.05, **=.01, NS= Not Significant			

Table 2 presents the comparison of both groups' scores on the subscales of NEO-PI R i.e. anxiety, anger, hostility, self-

consciousness, impulsivity and vulnerability. Findings suggest that the differences between both groups were found

to be statistically significant at .01 level on all the subscale of NEO-PI R. The mean total scores for the group I and group II were  $80.71 \pm 24.00$  and  $54.00 \pm 17.48$  respectively. The difference between these was also found to be statistically significant at .01 level. These findings suggest that the group practicing raj yoga for longer duration had significantly less neurotic symptoms in comparison to the group practicing raj yoga for shorter duration. The differences

between both the groups' scores were also found to be significantly different for hope and happiness scales. These findings suggest that the group practicing raj yoga for longer duration had significantly more amount of hope and happiness in comparison to the group practicing raj yoga for shorter duration. However, no significant differences were found between both groups' scores on Quality of Life Scale.

**Table 3. Comparison of Raj Yoga Practitioners on Cognitive functions: Group I (N=38), Group II (N=26)**

	Group 1 (38)	Group 2(26)	
	M $\pm$ SD	M $\pm$ SD	t
Verbal learning	7.39 $\pm$ 2.18	7.00 $\pm$ 2.13	.71 <sup>NS</sup>
Visual perception	8.44 $\pm$ 4.67	8.92 $\pm$ 4.21	.41 <sup>NS</sup>
Attention	6.02 $\pm$ 7.38	6.23 $\pm$ 5.90	.11 <sup>NS</sup>
	1.25 $\pm$ 6.50	.04 $\pm$ .020	.92 <sup>NS</sup>
* $\leq$ .05, ** $\leq$ .01, NS= Not Significant			

Table -3 shows that in visual and verbal memory, no significant difference was found between the groups and neither was there any difference in attention i.e., errors of omission or commission.

## DISCUSSION

The findings of the present study suggest that the group practicing raj yoga for longer duration had significantly less neurotic symptoms in comparison to the group practicing raj yoga for shorter duration. These findings are consistent with the findings of other studies revealing that normal healthy volunteers practicing yoga show reduced neuroticism, anxiety and hostility. [21,22] There is an increase in expressiveness or catharsis, indicating decreased emotional complexes. [22,23] Others have reported that yoga exercises

help to release muscle tension [24] and improve muscular efficiency as seen in enhanced strength, tone, flexibility and work output. [25-28] Due to improved functions of the entire muscular system, build up of chronic muscle tension is avoided, thus helping to promote a state of mental relaxation.

Comparative studies have shown meditation and yogic therapeutic techniques to be better and more efficacious than psychoanalysis or behaviour therapy. Yoga practices serve as effective therapy to cure hypertension, anxiety and psychoneurotic symptoms. [21,29]

The differences between both the groups' scores were also found to be significantly different for hope and happiness scales. These findings suggest that the group practicing raj yoga for longer

duration had significantly more amount of hope and happiness in comparison to the group practicing raj yoga for shorter duration. These findings are consistent with the findings of other studies revealing that practicing yoga improves mood, [1] increases subjective well-being of the individuals, [2] increase self-acceptance and self-actualization, increases social adjustment. [3,4]

However, no significant differences were found between both groups' scores on quality of life scale. Some studies have specifically demonstrated potential benefits of yoga on quality of life in various clinical populations, including patients with depression, stress, and anxiety. However, the results of these studies need to be interpreted carefully since many of the published studies regarding yoga are small and lack meticulous design. It may also be difficult to compare studies that evaluate different patient populations. Only a few systematic and comprehensive reviews of scientific research on yoga for patients have been published. Also, none of the previously published reviews addresses the quantitative magnitude of the identified effects.

This result might also have been obtained because of the complexity of the concept of quality of life for normal individuals. The concept of quality of life has many more domains than only hope and happiness and is determined by many other moderator variables like age and other socio-demographic variables in normal population. Studies controlling the moderator effects of other socio-demographic and psychological variable will be needed in future to exactly find out the status of quality of life in different groups of normal yoga practitioners.

In visual and verbal memory, no significant difference was found between groups and neither was there any difference on errors of omission or commission. These findings are

consistent with the findings of Oken, et al. (2006) [30] who found no effects from either of the active interventions on any of the cognitive and alertness outcome measures.

Whereas the difference between the two groups for the error of omission is negligible, the difference between the two groups for the error of commission is comparatively large showing that the people practicing raj yoga for 10 or more years have falsely hit only few targets in comparison to the people who have been practicing raj yoga for 0-2 years. This is also a very significant finding indicating that there has been a large although not statistically significant difference in one aspect of attention in favor of people practicing raj yoga for a longer time. This finding is also supported by findings of the previous studies indicating improvement in some aspect of attention with raj yoga. [31] The reason for the differences not becoming statistically significant may be the nature of task used in the study.

A suggestion for future studies on this topic may be using finer measures of cognitive functions as the subjects participating in these studies are normal individuals who can perform equally on these very basic cognitive tasks. Hopefully, finer measures of the cognitive functions will be able to differentiate between the experts and beginners of Raj Yoga.

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## REFERENCES

1. Shapiro D Cline K. Mood changes associated with Iyengar Yoga

- practices: A Pilot Study. *International Journal of Yoga Therapy* 2004; 14: 35-44.
2. Nathawat SS, Kumar P. Influence of meditational techniques and Jacobson's progressive muscular relaxation on measures of mental health. *Indian Journal of Clinical Psychology* 1999; 26: 192- 199.
  3. Janakiramaiah N, Gangadhar BN, Murthy PJ. Antidepressant efficacy of SudarshanKriya Yoga (SKY) in melancholia: A randomized comparison with electroconvulsive therapy (ECT) and imipramine. *Journal of Affective Disorder* 2000; 57:255-259.
  4. Kumar, S.S., Kaur, P. and Kaur, M.S. Effectiveness of Shavasana on depression among university students. *Indian Journal of Clinical Psychology* 1993; 20: 82-87.
  5. Shannahoff - Khalsa, DS, Ray LE, Levine S. Randomized controlled trial of yogic meditation techniques for patients with obsessive-compulsive disorder *CNS Spectrums* 1999; 4: 34-47.
  6. Berger BG, Owen DR. Mood alteration with yoga and swimming: Aerobic exercise may not be necessary. *Perceptual and Motor Skills* 1992; 75: 1331-1343.
  7. Balakrishna V, Sanghvi LD, Runs K, Doongaji DR, Vahia NS. The comparison of psycho physiological therapy with drug therapy. *Indian journal of psychiatry* 1979; 19:2,87-91.
  8. Grover P, Verma VK, Pershad D. Verma SK. Role of yoga in the treatment of psychoneurosis. *PGI Bulletin* 1986; 22:68-77
  9. Sahasi S, Mohan D, Kacker C. Effectiveness of yogic techniques in the Management of anxiety. *Journal of Personality and Clinical Studies* 1999; 5: 1,51-56.
  10. Verma SK, Rao S. Recent trends in clinical psychological intervention (methods based on other than behaviour therapy). *NIMHANS Journal* 1996; 14:307-314.
  11. Brown D P. A model for the levels of concentrative meditation. *International Journal of Clinical and Experimental Hypnosis.* 1977; 25: 236–73.
  12. Telles S, Joseph C, Venkatesh S, Desiraju T. Alteration of auditory middle latency evoked potentials during yogic consciously regulated breathing and attentive state of mind. *Int J Psychophysiol* 1992; 14:189–98.
  13. Telles S, Desiraju T. Autonomic changes in Brahmakumaris raja yoga meditation. *Int J Psychophysiol* 1993; 15:147–52.
  14. Telles S, Nagarathna R, Nagendra HR. Autonomic changes during 'OM' meditation. *Indian J PhysiolPharmacol* 1995; 39:418–20.
  15. Costa PT, McCrae RR. *NEO PI-R professional manual.* Odessa, FL: Psychological Assessment Resources, Inc; 1992.
  16. Snyder CR, Harris C, Anderson J R, Holleran SA, Irving LM, Sigmon, ST, Yoshinobu L, Langelles C, Harney P. The will and the ways: Development and validation of an individual differences measure of hope. *Journal of Personality and Social Psychology*, 1991; 60: 570-585.
  17. Lyubomirsky S, Lepper H S. A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research* 1999; 46: 137-155.

18. Burckhardt CS, Anderson, KL. The Quality of Life Scale (QOLS): Reliability, Validity, and Utilization. *Health and Quality of Life Outcomes* 2003, 1:60
19. Mukundan CR. NIMHANS neuropsychological battery: test descriptions, instructions, clinical data and interpretation: NIMHANS publications, Oct 1996. Proceedings of the National Workshop in Clinical Neuropsychology
20. A. Rey and P. Osterrieth. Translations of excerpts from Rey's 'Psychological Examination of Traumatic Encephalopathy' and Osterrieth's 'The Complex Figure Test'. *The Clinical Neuropsychologist*, 7:2-21, 1993.
21. Kocher, H.C. (1972) Mirror tracing test as a measure of steadiness among values. *Yoga Mimansa*, 19,4,1-15.
22. Kocher, H.C. & Pratap, V. (1971) Neurotic trend and yogic practices. *Yoga Mimansa*, 14, 1 & 2, 34-40.
23. Sahu, R.J. & Bhole, M.V. (1983) Effect of three week yogic training program on psychomotor performance. *Yoga Mimansa*, 22, 18, 2, 59-62.
24. Karambelkar PV, Bhole MV, Gharote ML, Muscle activity in some asanas: a pilot study *Yoga Mimansa* 1969; 12,1, 1-13.
25. Gharote ML, Effect of yogic training on physical fitness. *Yoga Mimansa*, 1973; 15: 4,31-34.
26. Gharote ML, Ganguly SK, Moorthy AM. Effect of yogic training on minimum muscular fitness, *Yoga Mimansa* 1976-77; 17: 3 & 4,12-20.
27. Moorthy AM, Detraining effect of yogic and non yogic exercises on minimum, muscular fitness. *Yoga Mimansa* 1982-83; 21:3 & 4,49-54.
28. Salgar DC, Bisen VS, Jinturkar MS. Effect of Padamasana - A Yogic exercise on muscular efficiency. *Indian Journal of Medical Research* 1975; 63: 768-772.
29. Naug RN, Yogic therapy of neurotic diseases. *Indian Journal of Clinical Psychology* 1975; 2:1,87-91.
30. Oken BS, Zajdel D, Kishiyama MA, Flegal K, Dehen C, Haas M, Kraemer DF, Lawrence J, Leyva J. Randomized, controlled, six-month trial of yoga in healthy seniors: effects on cognition and quality of life. 2006;12(1):40-47.
31. Manjunath, NK, Telles S. Saptial and verbal memory test scores following yoga and fine arts camps for school children. *Indian Journal of Physiological Pharmacology* 2004; 48:353-356.

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