

Yoga for Cognitive Functions: A Review

Kanchan Yadav¹ & Dr. Arti Yadav²

1. PhD Scholar, Department of Yoga Science, University of Patanjali, Haridwar – 249405, India
2. Assistant Professor, Department of Yoga Science, University of Patanjali, Haridwar – 249405, India

Received: 15.07.2022 Revised: 01.09.2022

Abstract:

Background: In modern era, information technology has become the boon for the overall development of a person. Excessive television watching, spending lot of time on social networking sites on mobile and computer increase the eye complaints, decreased attention and capacity of response. To have good attention, response and vision, one has to be relaxed first; this can be achieved through yoga. Yoga is an ancient science that involves the practice of shatkarma, asana, pranayama, and mudra to develop one's mind and body. It shows that yoga practice could improve one's focus on their mental resources, information processing more quickly and more accurately and update information effectively. Yoga has shown a positive impact on mental health and well-being, attention, memory, and vision.

Objective: The purpose of this article was to review the efficacy of yoga on reaction time, attention, visual perception and visual acuity.

Methods and Materials: 17 studies had been included in this review. “Yoga and Reaction time”, “Yoga and Attention”, “Yoga and Visual perception”, and “Yoga and Visual acuity” as a key word were used to identify the studies from search engine, Google Scholar.

Results: Out of 17 studies included in the study; yoga shown significantly improvement in reaction time in 5 studies, 7 studies showed improved attention after yoga, 2 studies showed improvement in visual perception after practising yoga and 3 studies showed improvement in visual acuity after yoga practice.

Conclusion: The review concluded that yoga plays an important role in increasing reaction time and attention, and helpful in good vision.

Key words: Yoga, Reaction time, Attention, Visual perception, Visual acuity.

Introduction:

Yoga practices and its teachings in India entered the Western world in the 19th

century with the translation of yogic texts. Swami Vivekananda presented yoga to the

United States in 1893 at the World Parliament of Religions in Chicago (US). Swami Vivekanand delivered many yoga lectures, created the Vedanta Society, and wrote numerous publications (Killingley, 2013). In the 20th century, multiple different kinds of yoga were developed and performed. People in the United States currently claim to practice yoga primarily for its health benefits, rather than for religious reasons. In the United States, 9 out of 10 individuals have heard of yoga, one out of every three people has tried it at least once, and more than 15% of people have done it. More than a third of Americans say they plan to try yoga in the near future (Wei, 2016). The beauty of yoga is that it is accessible to everyone; yoga sessions may be adapted to any level of fitness or health. For many people, yoga has evolved into a way of life. Physical exercises consisting of various postures (Asanas) and breathing methods (Pranayamas) are the emphasis of the preliminary courses (Harrington, 2001). “Hatha Yoga” is a discipline that focuses on conditioning one's body and mind through the use of shatkarma, yoga poses, yogic breathing, mudra, and Samadhi (Digambaraji & Kokaje, 1998). The ancient yoga literature describes shatkarma as the first and most important step in mind - body training, preceded by asana practice (Taimini, 1999). Asanas are postures that are executed with steadiness and comfort, according to the Patanjali Yoga Sutra (2/48). The ability to maintain a Sadhaka's (practitioner) physical stance with relaxation, that is, without tensing the body muscles, is known as steadiness (Taimini, 1999). Yoga postures have been shown to enhance a number of physiological, psychological, and cognitive functions when performed (Saraswati, 2002).

Reaction time (RT) is an important factor in sporting events, academia, and many everyday activities (Metin et al., 2016; Sant'Ana et al., 2016). Multiple researchers have investigated the working

of this complex physiological phenomenon (Kuang, 2017). RT is depending on detection of the response, information transfer through afferent neurons, speed of the sensory cycle comprised of the final response, as well as the development of a response from the central nervous system (Adleman et al., 2016; Greenhouse et al., 2017). Attention is the ability to participate in a task for a required period of time. It is a necessary element of cognition and has been classified in two ways, as a capacity or as a source implementation skill (Sethi, 2013). Attention is characterised as possession of mind, in clear and vivid form from many thoughts arises in the brain as impulses. It implies withdrawal from some things in order to deal effectively with others (James, 1890). Visual perception is the ability to interpret the surrounding environment by collecting information that is contained in visible light. It is creative in nature; that is a coherent whole that arises from the obscure fragments. Sensory inputs need to be detected, identified, differentiated and organized to form this coherent whole from fragmented sensory inputs (Karmakar & Pant, 2017). Visual acuity is the measurement of able to distinguish between two stimuli dispersed in space with a contrasting colour to the surroundings. The resolution limit is the minimal range of precision that allows the human optic system to differentiate two things as different stimuli; visual acuity is the reciprocal of the resolution limit. Clinically, this is determined by the distinguishing letters on the chart, but this task also necessitates identification of the letters' shape and structure, which are activities that also include the larger regions of visual perception (Kniestedt & Stamper, 2003).

Methods and Materials:

The key words “Yoga and Reaction time”, “Yoga and Attention”, “Yoga and Visual perception” and “Yoga and Visual acuity” were used to find the studies on Google Scholar. This review has included 17

studies for discussion. Studies required to be written in English, published in peer-reviewed journals, and accessible through the university library as inclusion criteria. The review covered studies that contained at least one asana and/or one pranayama. Reviews, single-case studies, and editorials were excluded from the study. This review did not include studies published before 2010.

Result:

17 Studies shown significant improvement in reaction time (auditory and visual), attention, and visual acuity and visual perception after practicing yoga (yogic eye exercises, asana, pranayama, shatkarma).

Telles et al., (2018) concluded that 18 minutes of daily yoga practice (YOGA bellows style breathing or Bhastrika pranayama, Breath awareness, and sitting quietly as a control session) for 3 days reduced Reaction Time in 25 healthy female volunteers ranging in age from 19 to 32 years. **Sharma et al., (2018)** found that practising an hour of yoga 3 times a week for 12 weeks improves sensory motor function (decreased auditory and visual reaction time) and decreased stress in 50 sedentary men aged 25 to 45. **Chobe et al., (2016)** **Chobe et al., (2016)** concluded that a 3-week Yoga program, five days a week for an hour daily, and five days a week for three hours daily physiotherapy had shown significant improvement in psychological health and visual reaction time in patients with chronic multiple sclerosis for 19 years and seven months. **Hanji & Venkatesh (2014)** found that yoga training for 60 minutes per day for 2 months enhanced the reaction time (auditory and visual) in 50 male age ranging 18 to 25 years. **Ramanathan & Bhavanani, (2020)** showed that a 60-minute Silver Yoga program (Asanas, Pranayamas, and Relaxation) twice a week for 12 weeks improved elderly individuals' reaction time, enhancing their agility and alertness, which is dulled with age. **Nilsoge et al., (2016)** opines that, 12 months yoga intervention showed better

performance in visual attention, attention span in Pre-Adolescents. **Joice P P et al., (2018)** suggested that, daily yoga practice for 30minutes helps to improve attention of medical students. **Jarraya et al., (2019)** found that, 12weeks yoga practice improved attention in 5years old Kindergarten children. **Schmalzl et al., (2018)** concluded that 8-weeks of Yoga-based practices (YBP) can lead to measurable changes in sustained attention in novice practitioners. **Vhavle et al., (2019)** suggested that yoga improves attention, as effectively as physical exercise intervention in adolescent schoolchildren. **Nagaraj et al., (2019)** opined that yoga intervention shown significant difference on attention & concentration in Volleyball players with age ranging 14 to 16 years. **Saxena et al., (2020)** suggested that, Hatha yoga may improve attention and hyperactivity in high school students. **Rayat, (2015)** found that practice of yogic exercises (yogic asanas) for 6 weeks is effective to develop the balance and perception of National level male players with age ranging 14 to 40 years. **Karmakar & Pant, (2017)** revealed that there was minimal improvement found, but regular practice or a long-term duration of Trataka Kriya sessions might have had a major impact in the level of Visual Perception of Elderly aged 60 and up. **Gosewade et al., (2016)** opinedthat30 minutes of pranayama twice a day, combined with eye exercises, can be utilized as a non-pharmacological strategy for enhancing visual acuity in Medical Students aged 18 to 30 years. **Kumar and Deol (2018)** found that 4 weeks of yogic eye exercises (palming, blinking, sideways viewing, front and sideways watching, rotational viewing, up and down viewing, near and far viewing) had no effect on right eye females. However, there was a significant difference in Left Eye Female. **Bianchi and Bellen (2020)** discovered that a 6-minute yoga eye workout (ocular motility, focusing, concentration/purification or Trataka, and

relaxation or palming) improved visual acuity by 2.28 %.

Conclusion:

The particular review showed a high effectiveness of yoga, yogic eye exercises, pranayama and other yogic techniques on reaction time (auditory and visual), attention, visual perception and visual

acuity. The study also revealed the co-existence of reaction time with the physiological health and cardiovascular parameters, and co-existence of attention with the memory development. Few studies had also revealed that yoga helps in reducing the anxiety, stress and depressive behaviour.

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