BALANCING YOGASANA VS WALL SUPPORT BALANCING YOGASANAIN DLST AND SLCT SCORES

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Abstract

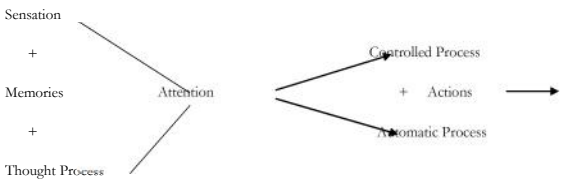
Attention is the behavioral and cognitive process of selectively concentrating on a discrete aspect of information, whether deemed subjective or objective, while ignoring other perceivable information. Yoga is the process through which one can calm down the mind and which can improve attention. Two-group pre-post randomized design with sample size (n=119) of normal students who are in the age range of 13-15 years. Students who have any chronic illness and mental illness, and those who are not willing to participate were excluded. Experimental group (n= 61) with Mean±SD:13.27+1.03 is for whom standing balanced asanas are given and control group (n= 58) with Mean±SD:13.20+1.18 here, standing balancing asanas with wall support is given for 30 days, 50 min/ day. DLST and SLCT were measured before and after the intervention. Standing balancing asana showed significant change in DLST total score, net score (p-value <0.000), but no significant change in DLST wrong score (p-value= 0.083), there is a significant change in SLCT total score and net score(p-value<0.000), there is no significant change in SLCT wrong score (p-value 0.499). Wall support balancing postures shows significant change total score, net score(p-value<0.000), there is no significant change in DLST wrong score (p-value=0.038), there is a significant change in SLCT total score, net score (p-value <0.000), also significant change in SLCT wrong score (p-value <0.001). Performing balancing posture found improvement in score of SLCT and DLST. School children can be benefited with addition of yoga

***Keywords**: Attention, School children, Yoga, Balancing Posture, SLCT, DLST.*

Attention is a chronic condition starting in childhood that least to lack of awareness causing a disterbance in performance and activity. Attention is the behavioral and cognitive process of selectively concentrating on a discrete aspect of information, whether deemed subjective or objective, while ignoring other perceivable information. Attention has also been referred to as the allocation of limited processing resources(Anderson, 2010). A mechanistic understanding of attention is necessary for the elucidation of the neurobiological basis of conscious experience(Knudsen, 2007). Attention consist of education,psychology,cognative neuroscience. Areas of active investigation should be determining the source of the sensory cues and signals that generate attention(Chavajay & Rogoff, 1999). Attention can mainly be classified into (a) Sustained attention ability to focus on one specific task for a continues amount of time without being distracted and (b) Selective attention is the ability to select from many factors or stimuli and to focus on only one that you want, while filtering out other distractions. (c) Alternating attention is the ability to switch your focus back and forth between the task that required different cognitive demands. (d) Divided attention is the ability to do two or more responses or react to multiple demands at same time, it is often reffered as multitasking.

The Nature of Attention and Consciousness

Attention is the way by which we actively take a limited amount of information from the huge amount of information available through our senses, stored memories, and other cognitive processes (De Weerd, 2003; Rao, 2003). It includes both unconscious and conscious processes (Jacoby, Lindsay, & Toth, 1992; Merikle, 2000). By dimming the lights on many stimuli from outside (sensations) and inside (thoughts and memories), we can highlight the stimuli that interest us. This high focus increases the ability respond fastly and accurately to interesting stimuli.



Heightened attention paves the way for memory processes. We are more likely to remember information to which we paid attention than information we ignored. Psychologists believes that attention and conciousness are same. Now, however, they acknowledge that some active attentional processing of sensory and of remembered information proceeds without our conscious awareness (Bahrami, Carmel, 2008)(Shear, 1997). Attention and consciousness form two partially overlapping sets(DiGirolamo, G. J., & Griffin,2003)(Srinivasan, 2008). Conscious attention has three purposes in playing a causal role for cognition. First, it helps in monitoring our interactions with the environment. Through such monitoring, we maintain our awareness of how well we are adapting to the situation in which we find ourselves. Secondly, it assists in connecting past memories and our present sensations to give us a sense of continuity of experience. Such continuity may even help as the base for personal identity. Third, it helps us in controlling and planning for our future actions. We can do it based on the information from monitoring and from the connection between past memories and present sensations.

Yoga: *Yoga* is a 3000- year old tradition which has been practiced in India. It is now considered as a holistic approach to health and it is classified by National Institutes of Health as a form of complementry and alternative medicine(Williams, Steinberg, & Petronis, 2003). Regular practice of *Yoga* helps to bulid a better connectivity between the mind and body through a series of postures, breathing exercises, and meditation. It can be a important tool for stress reduction(Lipton, 2008). The benefits of *Yoga* include reduction in stress and tension, increased strength, balance and flexibility of muscles, lowered blood pressure (Lipton, 2008). *Yoga* is a way of life, consists of four components which are physical postures to develop

strength and flexibility, breathing exercises to decrease respiratory cycles, deep relaxation technique to enhance ability to release anxiety, and meditation practice to increase stress regulation skill (Nagarathna & Nagendra, 2013). *Yoga* is an ancient traditional science of holistic living that includes the practices of specific postures, breathing practices, pranayama and meditation. *Yoga*, in its simple essence, is a technique to achieve control over the modification of mind and balancing the lifestyle (PYS). *Yoga* is an ancient mind-body practice developed in India years ago, According to traditional scriptures, the ultimate goal of *yoga* is achievement of super consciousness state and self-realization, *yoga* can be used to improve overall health and well-being (Muktibhodhananda, 1998). *Yoga* practice involves distinct techniques such as physical postures (asana), controlled breathing (*pranayama*), deep relaxation (*yoganidra*), and meditation (Muktibodhananda, 2013). *Yoga* offers several practices that help in mastery over the modifications of the mind (Satyananda, 2013). through the process of calmness of mind -*mana prashamana upaya* (Bl, 1993).To reach a state of balanced functioning of the mind-body complex (Vireshwarananda, 2000).Yoga is a traditional system of India postulated by Patanjali is his yoga aphorisms. The malady of deteriorated social and ethical values to enhanced/greed, though strong and violent attractions (*räga*) and repulsions (*dveña*) in life, called as *kleças*, this enhanced räga and *dveña* (Muktibodhananda, 2013). They are rooted in uncontrolled speeded up thoughts. Sage *Väsiñöha* in his accomplished book called *Yogaväsiñöha* (LYV 3.6.32) defines yoga as a tool to calm down the mind (*Manaù praçamanopäyaù yoga ityabhidhéyate).*

Yoga and attention: Research on the efficacy of yoga for increasing mental, emotional, physical, and behavioral health characteristics in school programs is a recent but increasing field of inquiry. This systematic review of research on school-based yoga interventions published in peer-reviewed journals offers analysis that identified many publications. The studies that are from these publications were conducted primarily in the United States (n = 30) and India (n = 15) since 2005, where the majority of studies (n = 41) conducted from 2010 onwards. About half of the publications were of studies at elementary schools most (85%) were conducted within the school timetable, and most (62%) also conducted a formal school-based yoga program. There was many changes in yoga intervention characteristics, including overall duration, and the number and duration of sessions. Most of these published research trials are preliminary in nature, with numerous study design limitations, including less sample sizes (median = 74; range = 20-660) and weak research designs (57% RCT's, 19% uncontrolled trials), as it would be guessed in an infant research field. These publications suggest that yoga in the school setting is a viable and potentially efficacious strategy for improving child and adolescent health and therefore worthy of continued research (Khalsa & Butzer, 2016)**.** One pilot study was done with 24 school children and intervention period was twice a week for 6 week. And in this study, they measured motor and executive function, physical self-concept, and anxiety-related behavior. The result showed no significant improvement in movement and executive differences outcome. (Richter, et.al, 2016).The study which was done on attention with single group pre-post and sample size was 60 girls. Intervention period was 5 days of IYM. In this they measured self-esteem(SE) and attention. Result showed that IYM can improve the attention and SE (Sethi JK, Nagendra HR, 2013).the another study with two group pre-post design and 40 girls and boys (9-12 years). Yoga intervention period was 16 session within 2 months. Results showed that there were significant improvement in attention and hyperactivity symptoms (Venkatesan, 2008). there is one more study with two group pre-post design and 200 school children with age range group was 7-9 year. In this study, they measured cognitive functions (attention and concentration) the yoga intervention period was 3 months and later at 3 month follow up. Result showed that yoga was as effective as physical activity in improving cognitive performance (Mayasandra S. Chaya, 2012).

Yogasana: A module of yogic posture that include posture like garudasana, uthita hasta padhasasana, vrikshasana, veerbadrasana (phase 3), natrajasana and tandav asana were include in the intervention which are specially deals with enhancing attention provide attention. Gradually garudasana is termed as eagle pose, tandavasana stands for lord shiva's dance, natrajasana is termed as lord shiva pose, vrikshasana stand for tree poture and veerbhadrasana is termed as warrior posture. These specific balancing posture enhances the attention in each and every individual. This study with randomized controlled design measured physical fitness, cognitive performance, self-esteem, and teacher-rated behavior and performance, in school children where children with age group of 8-13 years were selected. *Yoga* and physical exercise are useful inclusions to the school schedule, with physical exercise enhancing social self-esteem is the conclusion made by study (Telles, Singh, et.al., 2013). Study with Single group pre –post design and the sample size is n=175 and *yoga* intervention period 10 days and the measurement of the study are State and trait anxiety. Result showed that there was significant reduction in *Yoga* intervention reduced both anxiety (Gupta, 2006). One more study was done on *Yoga* education and school students for 11 weeks. Outcomes measures are mood, anxiety, perceived stress, resilience, and other mental health. Result suggest that addition of yoga is good in a secondary school that has role of playing a protective or preventive role in maintaining mental health (Khalsa, S.B.S, 2012).

Studies on SLCT: There are four studies with different interventions which has influenced on SLCT a measure of attention. One among these is matched paired control study on school boys and remaining three were cross over design on adult male group. Students under two educational system i.e., The Gurukula Education System (GES) and Modern Education System (MES) had positive improvement on SLCT but GES found to be far better (Rangan, R., Nagendra, H. R., Bhatt, 2009). Study conducted on Yoga University students assessed on the four different stages of meditation i.e*., Ekagrata, Dharana* and *Dhyana* immediately before and after each session. Following Dharana and *Chanchalata* net SLCT score increased and decreased respectively and other two didn't had influence on scores (Kumar, 2009). Subjects following Cyclic Meditation and Supine Rest resulted in higher to lower degree of changes in net SLCT score respectively and reduction in wrong score in former sessions but not in later sessions (Sarang, S.P., & Telles, 2007). Eight hundred nineteen school students were selected in a study in an age range between nine and 16 years (M = 12.14; SD = 1.78 years) and they were checked once for the cancellation task which showed that both age and sex influenced performance on the SLCT.(Pradhan & Nagendra, 2008)

Studies on DLST: There were two studies available that shows immediate effect of different relaxation techniques on DLST, SLCT, and State anxiety. One study consisted of both male and female who underwent a month of *Yoga* Instructor's Course, participants were from different parts of the world. This study resulted in improvements in DLST, SLCT, and State anxiety scores following 20 minutes of Deep Relaxation Technique (Khemka, Nagarathna,et.al, 2009). Similarly, experienced male *yoga* practitioner was participated in three different sessions i.e. Cyclic Meditation, Supine Rest, and review of scientific literature 25 Control (no intervention) in equal period of time found significant enhancements of score in DLST, Letter Copying, and circle dotting task performance only after Cyclic Meditation whereas there were no changes occur seen following Control intervention (Subramanya, P., & Telles, 2009).

Purpose of the study

Yogic practices help in improving overall cognitive functions. There are specific asanas for specific purpose that are discussed in various ancient texts. Present day researches are increasing in finding the therapeutic effects of yoga where significant results are being found. Most of the studies till now that are done on yoga and attention didn't pay much attention on balancing postures and so present study is focused on finding the effect of standing balancing postures on attention.

Assessment tools: SLCT -Cancellation tests require visual selectivity and a repetitive motor response. A six-letter cancellation test was administered to assess functions such as selective and focused attention, visual scanning, and the activation and inhibition of rapid responses. The six letter cancellation test has been used in similar type of design on Indian population(Natu, M. V., & Agarawal, 1997).The six-letter cancellation task worksheet consists of an array of random alphabets, A-Z, in 14 rows and 22 columns. Students were asked to sit with the worksheet distributed to each one. The instructions are given asking them to cancel as many target digits as possible in the specified time. They are asked to cancel as their wish whether horizontally, vertically, or selecting a particular letter one at a time randomly in the row. Finally, after knowing the test instructions they are asked to start the test, each test was conducted for 90 seconds on a standard stopwatch. DLST- Digit letter substitution test contains flexibility at mind level, visual scanning, attention and psychomotor speed of processing information. It is used with same type of design on Indian population(Natu, M. V., & Agarawal, 1997). DLST worksheet consists a row of random digits,1-9, in 8 rows and 12columns. The coding sheet contains instructions about the test with example of substituting a specific letter for specific digit 1-9, the same code is applicable to entire test. Subjects were instructed to make their choice of letter substitution process, whether horizontally, vertically, or selecting a particular digit randomly in the row one at a time. In given time of 90 seconds' substitute as many target digits as possible.

Data Analysis

All variables were reported in mean ±standard deviation. A paired t test was used to run the statistical test. Statistical significance was set up at P< 0.05. Data was analyzed using r-studio version (1.0.136 – 2009-2016). As data was normally distributed parametric test was set to run the test. To check within group Pre- Post changes paired sample t- test was used.

Result: Yoga-Without wall support- Standing balancing asana showed significant change in DLST total score and net score (p-value <0.000), but no significant change in DLST wrong score (p-value 0.083), there is a significant change in SLCT total score and net score(p-value<0.000), there is no significant change in SLCT wrong score (p-value 0.499). Control-With wall support- Wall support balancing postures also shows significant change total score and net score(p-value<0.000), there is no significant change in DLST wrong score as it changed from (p-value 0.038), there is a significant change in SLCT total score and net score (p-value <0.000), there is also significant change in SLCT wrong score (p-value <0.001).

Table 1 - Within group analysis is done using paired sample t-test

Variable	Without wall support				With wall support			
	Mean±SD		% change	p-value	Mean±SD		% change	p-value
	Pre	Post			Pre	Post		
DLST TOTAL	31.00±10.63	51.52±11.98***	48.48	0.000	29.41±10.03	51.79±12.37***	48.21	0.000
DLST WRONG	0.00±0.00	0.11±0.45	0	0.083	1.64e-02±0.13	0.26±0.89*	99.74	0.038
DLST NET	30.78±11.00	51.34±12.17***	48.66	0.000	29.39±10.05	51.52±12.29***	48.48	0.000
SLCT TOTAL	19.98±7.34	29.86±9.98***	70.43	0.000	18.08±7.71	30.64±10.77***	69.36	0.000
SLCT WRONG	0.17±1.08	0.29±0.88	99.71	0.499	1.64e-02±0.13	0.59±1.23***	99.41	0.001
SLCT NET	19.81±7.54	29.57±9.87***	70.43	0.000	18.07±7.73	30.05±10.72***	69.95	0.000

Discussion- Highlights of Findings: The present study focusses mainly on standing balancing asanas on SLCT/DLST scores in children and the results showed that there is significant improve in SLCT/DLST scores can be significantly improved through focusing practices. Balancing asanas with wall support also have given similar results comparatively. Comparison with earlier findings- Study that is done on children to find the effect of relaxation practices on attention had showed the similar results with present study saying that yogic relaxation (CM) can increase attention levels compared to supine rest Both CM and SR led to improvement in performance, as assessed by SLCT, but the change caused by CM was larger than SR(Pradhan & Nagendra, 2010). Here, in this study both wall support and balancing asanas shows similar result i.e., significant result in increasing SLCT scores. In a study on suryanamaskara followed by supine rest showed improvement in attention measured using DLST (Javadekar P, 2012) and this can be compared with present study which is giving significant improvement in attention levels after practice of balancing asanas. Study done to see the effect of surya namaskar on sustained attention using SLCT resulted that practice of surya namaskar may give significant improvement sustained attention in orphans boys(Devi, Ganpat, 2015).

Mechanism: Yoga means a state of being in which a person can remain steady, calm, and comfortable with our physical body and mind totally aware. In classical yoga text, Gheranda Samhita and Hatha Yoga Pradipika, many asana describe for being healthy and prevent the health problems (Niranjananad, 2012).Yogasanas are classified according to either stages of difficulty of performance or dynamic/static practices. Dynamic

asanas are those that involves dynamic movements of the body, they include sequences such as surya namaskar, pawanamuktasana series, dynamic pascimottanasa and sasanka, bhujangasana. Static practices are done with no or little movement of the body, often remaining in one position for a few minutes or more. They are intended to massage the internal organs, glands and muscles as well as to relax the nerves throughout the body. They are specially concerned with tranquility and calming down of mind thus increasing cognitive functions. Balancing asanas come under the static asanas category and thus help to increase the attention which is one of cognitive function

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