IMPROVEMENT IN VISUAL PERCEPTION FOLLOWING YOGA TRAINING

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Visual discrimination was tested in two groups of 18 College students each, with ages ranging from 17 to 22 years. One group (the 'yoga' group) had 10 days training in yoga. Including asanas (physical postures), pranayama (voluntary regulation of breathing), tratakas (visual focusing exercises), meditation, and lectures on the theory of yoga. The control group carried on with their routine activities. The ability to detect intermittent light of fixed luminance, at varying frequencies was tested in both groups at the beginning and end of 10 days. While Initial values were similar for both groups. at the end of 10 days the frequency at which the yoga group was able to detect the flickering of the stimulus, was significantly more than the initial values (Wilcoxon's paired signed ranks test), whereas the control group showed no significant change. The final value of the yoga group was also significantly more than that of the control group (t test for unpaired data).

Meditation has been described as a training in awareness, which when kept over long periods produces definite changes in perception, attention, and cognition (Brown, 1977). Significant changes were reported in the visual perception of advanced meditators, who were able to distinguish subtle differences in color and shade, and were on the whole more perceptually sensitive (Brown & Engler, 1980). Another study described an increase in visual sensitivity following the practice of the mindfulness Buddhistic meditation (Brown, Forte & Dysart, 1984.) Subjects were able to detect shorter light flashes, and they required a shorter interval to differentiate between successive flashes correctly. In contrast the control group did not change.

It has also been shown that processing of sensory information at the thalamic level is facilitated during the practice of pranayama (Telles et al. 1992), and meditation (Telles & Desiraju, 1993, Telles et al. in press) These two practices, along with physical postures (asanas), cleansing practices (kriyas), devotional sessions, and lectures on the theory and philosophy of yoga were found to bring about an improvement in hand steadiness in college students following 10 days of practice (Telles et al. 1993). This improvement was believed to be due to improved eye-hand co-ordination, attention, concentration, and relaxation, as well. Hence the present study was carried out to assess whether practising the same yogic techniques for 10 days would significantly alter visual perception.

METHOD

Sample

There were 2 groups of subjects (with ages ranging from 17 to 22 years). Each group had 18 subjects, of whom 3 were females. One group participated in a 10 day residential camp in yoga. The control group, like the yoga group were university students.

Testing Procedure

Critical flicker frequency was measured using the apparatus fabricated by Anand Agencies (Pune, India), which has a red light stimulus (6mm in diameter) with intensity of approximately 06 mw/cm2 at a flash frequency from 12-95 cycles per second. Each subject was tested individually with binocular vision. The apparatus and subjects eyes were kept on the same line of vision and were 50cm apart. During the experiment all overhead lights were switched off except one 60w bulb to maintain a constant background illumination.

Assessments were made for both groups ('yoga' and control) at the beginning and end of 10 days. During the 10 day period the 'yoga' group received training in yoga, whereas the control group did not receive such training and carried on with their routine activities. The initial and final values were compared for significant differences using Wilcoxon's paired signed ranks test.

The yoga group received 10 days training in asanas (physical postures), pranayarna (voluntary regulation of breathing), kriyas (cleansing techniques including visual focusing exercises used to improve visual acuity and mental concentration), meditation, devotional sessions, and lectures on the theory and philosophy of yoga. This programme took approximately 8 hours a day.

RESULTS

Both groups ('yoga' and 'control') had approximately similar values of critical flicker frequency (CFF) on initial testing (group mean + SEM, 37.6 ± 0.7, and 37.9 ± 0.6, respectively). At the end of 10 days, the CFF of the yoga group had significantly increased to 42.6 ± 1.6 ($p<0.01$, Wilcoxons paired signed ranks test), whereas the control group showed no significant change (38.4 ± 0.7, $p>0.5$, Wilcoxon's paired signed ranks test). The final value of the yoga group was also significantly more than that of the control group ($p<0.001$, t test for unpaired data).

DISCUSSION

The CFF depends on a variety of factors, such as stimulus characteristics, concurrent stimulation of other sensory modalities, temperature, body position, and diurnal rhythms (Graham, 1965). In the present experiment stimulus parameters were kept constant. Also other sensations were cut-off by carrying out both initial and final tests under constant illumination and in a sound-attenuated room, with temperature maintained constant, and the subject seated in a comfortable position. The time of testing was also kept the same. Other factors which influence CFF are the levels of concentration, attention, and relaxation. These factors could have influenced the CFF favorably in the present study. Apart from this, temporal resolution of visual stimuli is often limited by the brain rather than the eye (Riggs, 1992). The improvement could be related to enhanced neural processing at the thalamic level which occurs during pranayama and meditation (Telles et al. 1992, Telles et al., in press).

Hence the significantly higher CFF levels seen after 10 days of yoga training could be due to diverse factors, ranging from more efficient processing of sensory information in the brain to increased attention, concentration, and simultaneous relaxation with yoga.

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