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ORIGINAL ARTICLE

EFFECT OF TRAINING PROGRAMME ON NEUROPSYCHOLOGICAL VARIABLES

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Abstract:

The aim of this study was to investigate the effect of training programme on neuropsychological variables. Fifty college students (boys) whose age range between 22 to 27 years were randomly assigned to training from Bped College. Short term memory, long term memory, tactile sense and visual perception were measured for this study. Short term and long term memory scale, Aesthesiometer and Muller lyer illusion tests were used for this study. The training sessions performed five days a week and training classes were divided into two sessions, one was in the morning and the other in the evening with the duration of one thirty five minutes each session. Paired t' test was applied to investigate the existence of significant difference between pre and post test phases of the effect of twelve weeks exercise programme. In conclusion improvement was found after twelve weeks training programme in case of short term memory, long term memory and tactile sense but in case of visual perception no significant improvement was observed. Exercise not only gives health life style but also improve your neuropsychological variables so exercise is strongly recommended.

KEY WORDS:

Neuropsychology, Short Term Memory, Long Term Memory, Tactile Sense, Visual Perception.

INTRODUCTION

Neuropsychology is a specialty area of psychology that focuses on thinking, learning, and behaviour and its relationship to the brain. Neuropsychologists often work closely with neurologists and other health care providers to identify how a neurological illness or injury may be affecting functioning in day-to-day life. Neuropsychologists use standardized tests to examine different aspects of thinking (such as memory, attention, and problem solving) and behaviour to better understand a person's individual profile of abilities and challenges (strengths and weaknesses). With this information, a neuropsychologist can indentify brain structures or systems that may not be working efficiently and make suggestions for treatments or supports that can help a person function to maximum capacity. (Epilepsy and Neuropsychology, 2009).

Neuropsychology, which has recently been recognized by APA (American Psychological Association), is one of the most exciting and fascinating areas of psychology today. There is a high emphasis on brain damage and diseased regions of the brain and its effects on behavior and cognitive functioning, making it a scientific discipline that bridges the fields of neurology and psychology. Neuropsychology is an assessment of the brain/ behavior relationship. The job of a Neuropsychologist involves working with people both young and old. Many psychologists also earn a living providing expert testimony in legal cases. (www.psychology.sdsu.edu/advising/advising.htm)

Neuropsychology is the branch of psychology that explores the relationship between brain functioning and behaviour (Cohen & Swerdlik, 2002). It is the neuropsychologist's role to assess individuals in order to draw inferences about the structural and functional characteristics of their brain.

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Since the 1990s, neuropsychology has gained institutional acceptance as a neuroscience and professional discipline. It has become a major responsibility of the neuropsychologist to conduct assessment (Perez-Arce, 1999). Neuropsychological assessment has grown from being used only for diagnostic purposes in a clinical setting to being an integral part of treatment evaluation as well as a major source of contribution to research in the of neuroscience (Anderson, 2001). Although a neuropsychological assessment does not consist of tests only, neuropsychological tests form an integral part of the assessment process as they are uniquely sensitive to different patterns of impairment that are associated with different disorders and damage to different areas of the brain (Anderson, 2001). It is important that neuropsychologists understand the complex interplay of biological, socio-cultural, cognitive, and other variables that may affect individuals' performance on neuropsychological tests if they are to work effectively with individuals from diverse backgrounds. Quality of education is proposed as one such variable.

A neuropsychological assessment typically evaluates multiple areas of functioning. It is not restricted to measures of intelligence (e.g., IQ) and achievement but examines other areas of functioning that also have an impact on performance in the classroom, with peers, at home, or on the job. The following represents a set of cognitive functions that is likely to be assessed:

1)Sensory perceptual and motor functions 2)Attention 3)Memory 4)Auditory and visual processing 5)Language 6)Concept formation and problem solving 7)Planning and organization 8)Speed of Processing 9)Intelligence 10)Academic skills 11)Behavior, 12)emotions, and 13) personality

DEFINATION OF TERMS

NEUROPSYCHOLOGY

As defined by the National Academy, Neuropsychology is: “The study of brain behaviour relationships based upon a combination of knowledge from basic neuroscience, functional neuroanatomy, neuropathology, clinical neurology Psychopathology and psychological interventions.”

SHORT TERM MEMORY

A short-term memory is the retention of information for a brief time without creation of the neural changes for later recall.

LONG TERM MEMORY

Long-term memory is information that one remembers for a comparatively extended period of time. Along with short-term and working memory, long-term memory helps explain why and how people remember.

VISUAL ILLUSION

A visual illusion is a distortion of movement, form, size or colour in the visual field. Visual illusions can be the result of a stroke in the occipital lobe.

TACTILE SENSE

The tactile sense is one of the five traditional senses of the body. It is recognized by the organs of touch which are found mainly in the skin. The sensitivity varies from one part of the skin to another, e.g. the highly sensitive areas are the tactile sense on the forehead, temples, and the back of the forearm.

METHOD AND MATERIALS

SUBJECT:

The study was experimental type. Fifty male B.P.Ed students were selected randomly for this study, whose age range from 22 to 25 years. These subjects were selected from different places in West Bengal from different physical Education Institution.

TEST/TOOLS

LONG TERM MEMORY TEST (L.T.M.)

Long Term Memory scale was designed by B. B. Asthana (1982). L.T.M. Scale find out the effect of rehearsal of paired –associates on the long term memory of the subject when tested after two minutes of interpolated task. Higher percentage of recall indicates better performance and lower percentage indicates poor performance.

SHORT TERM MEMORY TEST (S.T.M.)

Short Term Memory scale was designed by B. B. Asthana (1982). S.T.M. scale study the effect of different time intervals and association values on short term recall. Higher percentage of recall indicates better performance and lower percentage indicates poor performance.

TACTILE SENSE

Tactile sense was measured by Aesthesiometer. It is a calliper formed of two pieces sliding across one another. One having a graduate scale and the other sliding part with one window also having scales on its sides. Two pointed projections can be increased and decreased through the sliding of sliding part of rider. A 2 inch line was drawn on the front part of subject's forearm, and he was blind folded so that he may not be able to see the touch by Aesthesiometer. Now the experiment was started. The metronome was set on 60 beats per minute with alternative bell. First of all the rough threshold was found out. The 10 ascending and 10 descending trials were taken. On every tick of the metronome the points of Aesthesiometer was touch and on bell it was removed. The response of the subject was noted down. Lower scores indicate better performance.

MULLER LAYER VISUAL ILLUSION TEST

Muller Lyer Illusion: Muller Lyer is made of wooden/fiber/plastic sheet. It length about 45 cm. it is fixed on two Iron/ Aluminium Road on the stand. Muller Lyer Illusion is detachable from the Iron Roads. There are two side of Muller Lyer Illusion. In front side fixable and adjustable position of Muller Lyer Illusion. Standard Stimulus is 15 cm. In Back Side measurement of illusion and two screw for fixing the road.

Instruction by the researcher- the subjects are asked to move and adjust the longer line. So that both the lines should appear equal in length when you realise that both the lines are equal. The subjects are asked to use both hands one by one following the instruction of the researcher. The subjects are to move the sliding part and make the equal distance until his/her own satisfaction. Lower mean scores indicate better result.

PHYSICAL EDUCATION TRAINING PROGRAMME

The Physical Education Programme was divided into three sessions. Two Sessions is of Practical classes, one in the morning and the other in the evening and the remaining session is of theoretical classes. Morning and evening session practical classes are of three periods of forty five minutes each.

FINDINGS

TABLE -1
MEAN SD AND T' RATION OF SHORT TERM MEMORY TEST OF COLLEGE STUDENTS

VARIABLES	GENDER	MEAN	S.D.	't' Value
Short Term Memory (Pre Test)	BOYS(50)	46.67	10.14	10.34*
Short Term Memory(Post Test)	BOYS(50)	63.33	12.63	

*Significant at 0.05 level
't' value required to be significant at 0.05 level of confidence with 49 degree of freedom was 2.02

TABLE -2
MEAN SD AND T' RATION OF LONG TERM MEMORY TEST OF COLLEGE STUDENTS

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[■┼Çś'▒ a ś▒ñF (Pre Test)	. h ò {			
Long Term Memory(Post Test)	BOYS(50)	51.50	8.71	

*Significant at 0.05 level
't' value required to be significant at 0.05 level of confidence with 49 degree of freedom was 2.02

TABLE -3
MEAN SD AND T' RATION OF TACTILE SENSE OF COLLEGE STUDENTS

ë ! wL . [9{	D9b59w	a 9! b	{ 5	Ċ ë Ă ś
ÇĂ'Ç {ś■ś (Pre Test)	. h ò {			3.61*
Tactile Sense (Post Test)	BOYS(50)	4.77	1.03	

*Significant at 0.05 level
't' value required to be significant at 0.05 level of confidence with 49 degree of freedom Was 2.02

TABLE -4
MEAN SD AND T' RATION OF VISUAL PERCEPTION OF COLLEGE STUDENTS

VARIABLES	GENDER	MEAN	S.D.	't' Value
Visual Perception (Pre Test)	BOYS(50)	5.00	0.52	0.98
Visual Perception (Post Test)	BOYS(50)	4.86	0.83	

't' value required to be significant at 0.05 level of confidence with 49 degree of freedom Was 2.02

DISCUSSION OF FINDINGS AND CONCLUSION

In this study, aimed to investigate the effect of training programme on neuropsychological variables. It was found from the above statistical calculation that after three months training programme neuropsychological test performance were improved (except visual perception) and the improvement was statistically significant. These findings are consistent with results of some recent studies conducted Dustman et al. (1984).

Dustman et al. (1984) suggest that the improved transport and utilization of oxygen was realized in brain as well as in other body tissues. An increase in cerebral oxygen might result in improved neuropsychological function because of increased turnover of neurotransmitters which are dependent upon oxygen for their metabolism. Hypoxia has been shown to cause a decline in acetylcholine metabolism (Gibson et al.1982) and oxygen is utilized directly for the synthesis and degradation of dopamine, nor epinephrine (NE), and serotonin (5-HT) (Gibson et al.1982, Gibson et al 1981). Each of these neurotransmitters has been implicated in human behaviour and the functioning of each decline with approaching senescence [Beck et.al.1978]. Spirduso (1983), reporting that the ability of rats to initiate fast movements was clearly related to nigrostriatal dopaminergic efficiency, suggested that chronic exercise can influence neurotransmitter systems. Direct evidence of this was provided by Brown and his colleagues [Brown et al. 1979, Brown et al. 1973].

There is substantial evidence that movement, sensory stimulation, and even ideation results in an immediate increase of cerebral blood flow in activated cortical areas (Engel et al.1982, Gross et al.1980, Larsen et al.1979, Mazziotta et al 1982, Phelps et al.1981). With a concomitant flow increase in frontal association areas (Ingvar et al 1980). The physical activities associated with our exercise programs, in addition to improving aerobic efficiency, may have provided sufficient cortical stimulation to promote structural and functional change.

The fact that aerobic conditioning resulted in improvement for a variety of neuropsychological tests may indicate that this type of exercise affects processes underlying attention and concentration which in turn determine level of performance. Attention wanes during periods of hypoxia (Petajan et al.1973) perhaps due to a release of cortical inhibitory influence on the ascending reticular activating system (Dell et al.1961and Petajan et al.1973).

According to Rev Bras et.al (2008) tactile sensitivity was improved after training. Rev Bras (2011) expressed that the effect of exercise on skin sensitivity may have been influenced by continuous pressure on the hands (due to contact with exercise machines and free weights) during the training session. Shirley et al. (2007) expressed that exercise (yoga practice) has potential applications especially in those occupations requiring good visual perceptual sensitivity and minimal visual strain. The eyes are an extension of the brain. The connection between brain activity and vision is really quite vast. Light affects the brain through the eyes. Our eyes charge and energize our brain and nervous system. The light coming in through the eyes can augment the function of the nervous and vision system.

Findings have suggested that adult brain continues to generate new neurons in response to exercise in the hippocampus (Van Praag et.al 1999 and Churchill JD et.al 2002). Hippocampus receives information from each of the sensory modalities and projects widely throughout the brain (Swanson LW et.al 1983) .This area is best known for its role in learning and memory (Wittenberg GM et.al 2002) . Exercise has also been shown to enhance hippocampus cholinergic functioning (Fordyce DE et.al 1991).

P. Perrig-Chiello et al, 1998 found positive relationships between physical exercise and memory function. Hakimeh Saadati et.al showed that short term and long term exercise training enhanced learning and memory performance significantly so regular exercise programme is strongly recommended.

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