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ORIGINAL ARTICLE

A COMPARATIVE STUDY OF SHORT TERM AND LONG TERM MEMORY BETWEEN ATHLETE AND NON ATHLETE

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Abstract:

The aim of this study was to compare the Short Term Memory and Long Term Memory of Athlete and non Athlete. One hundred college boys (50 Athlete participated in inter-college tournament and 50 non Athlete) from different colleges of north 24 district in West Bengal were considered for this study whose age range between 22 to 25 years. Only, Short Term and Long Term memory were measured for this study. Standard questionnaires were used for this study. The statistical 't' test was applied to investigate the existence of significant difference in Short Term Memory and Long Term Memory between Athlete and non Athlete. In conclusion Athlete performed better in the both tests i.e. Short Term Memory and Long Term Memory in comparison to non Athlete and the difference was statistically significant. Exercise not only gives healthy life style but also improve memory function. so regular exercise is strongly recommended.

KEY WORDS:

Short term memory, Long term memory, College students

INTRODUCTION

Memory is one of the most important cognitive domains with respect to everyday function and is the process of storing, encoding, and retrieving information. Different forms of memory are recognized, including sensory, short-term, long-term, and working memory (Baddeley, 1996). Short-term memory refers to the function that temporarily retains stimuli that have just been perceived. Its capacity is limited in terms of the number of items that can be stored and lasts for 20 seconds. Through repetition, information may be transferred from short-term memory to long-term memory. Long-term memory refers to information that is represented on a more permanent basis. Unlike short-term memory, long-term memory has no known limits to capacity and is relatively durable. Working memory is a short-term memory system that allows concurrent retention and manipulation of information (Baddeley, 1986). It is used for thinking about what is already known and for deriving conclusions on the basis of that knowledge; therefore, working memory is fundamental to successful completion of many activities.

More recently, Rolls (2000) described four types of brain systems that are involved in different types of memory. These systems are based on the use of functional magnetic resonance imaging to study neuronal operations in various parts of the brain. One system involves the primate orbit frontal cortex and amygdale, which represents the learning stimulus-reinforce associations and is involved in motivation and emotion. The second system is in the temporal cortical visual areas. This is involved in learning representations of objects that don't change with respect to size or view. A third system in the hippocampus

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is implicated in remembering specific events (i.e., episodic memory). In the fourth area, brain systems in the frontal and temporal cortices are involved in short term memory.

Memory is the explicit or implicit recall of information encoded in the recent or distant past. Current conceptualizations of memory, however, do not view the construct as a unitary system but rather divide it into hierarchical taxonomic modules based on duration of retention and the type of information that is being retrieved. Among the more fully elucidated conceptualizations of memory systems is one characterized by Larry Squire and colleagues, in which long-term memory is divided into declarative and non declarative sub components. Declarative, or explicit, memory refers to the ability to consciously recall facts (semantic memory), events (episodic memory), or perceptual information (perceptual memory). Non declarative memory requires the implicit recall of information and is usually divided into procedural, priming, or simple conditioning paradigms. Information that is retained on the order of seconds or minutes is usually referred to as short-term memory and is thought to represent a memory system distinct from long-term memory. Working memory, which comprises short-term memory, refers to the short-term store required to perform certain mental operations during retention.

Findings have suggested that adult brain continues to generate new neurons in response to exercise in the hippocampus (Praag et al., 1999 and Churchill et al., 2002). Hippocampus receives information from each of the sensory modalities and projects widely throughout the brain (Swanson et al., 1983) .This area is best known for its role in learning and memory (Wittenberg et al., 2002) . Exercise has also been shown to enhance hippocampus cholinergic functioning (Fordyce et.al., 1991). Several studies have suggested that exercise influences the levels of the amines and endorphins in the body and these changes can have a positive influence on cognitive functions. Thus, higher levels of norephinephrine, catecholamine, serotonin and other neurotransmitters might have contributed to the beneficial effects of exercise on cognitive performance abilities (Etnier et al., 1995 and Cotman et.al 2002). Samorajski and et al have found that exercise increased latency in middle and old aged significantly and has the lowest effect on adult mice (Samorajski et al., 1985). Study of Radak et al. have showed that middle aged exercised rats had a significantly better short-term and long-term memory than age matched control rats (Radak et.al., 2001). Conversely, Radak et al. conducted another case-control study, in which exercise did not significantly alter the memory retrieval and latency compared with control group (Radak Z et al., 2001).

Therefore, the main objective of this study was to compare the Short Term Memory and Long Term Memory of Athlete and non Athlete college students.

DEFINATION OF THE TERMS

SHORT TERM MEMORY

Short-term memory, also known as primary or active memory, is the information we are currently aware of or thinking about. In Freudian psychology, this memory would be referred to as the conscious mind. The information found in short term memory comes from paying attention to sensory memories.

Most of the information kept in short-term memory will be stored for approximately 20 to 30 seconds, but it can be just seconds if rehearsal or active maintenance of the information is prevented. While many of our short-term memories are quickly forgotten, attending to this information allows it to continue on the next stage - long-term memory (http://psychology.about.com/od/memory/f/short-term-memory.htm).

Short-term memory resides in the inside (medial) of the temporal lobe called the hippocampus and entorhinal cortex, and lasts a few minutes to a few weeks before being erased. When you try to recall a conversation or a phone number learned a few minutes to a few weeks ago, these brain areas are activated.

LONG TERM MEMORY

Long-term memory refers to the continuing storage of information. In Freudian psychology, long-term memory would be call the preconscious and unconscious. This information is largely outside of our awareness, but can be called into working memory to be used when needed. Some of this information is fairly easy to recall, while other memories are much more difficult to access.

Through the process of association and rehearsal, the content of short-term memory can become long-term memory. While long-term memory is also susceptible to the forgetting process, long-term memories can last for a matter of days to as long as many decades.
(http://psychology.about.com/od/memory/f/long-term-memory.htm).

Long-term memory can last a lifetime though scientists are not yet certain which brain areas are involved in this function. Well-learned facts such as the name of a school one attended as a child are stored

as long-term memories.

METHOD AND MATERIALS

Standard questionnaire were used for the collection of data. Two questionnaires were used for this study one was Short Term Memory and other one was Long Term Memory. Short Term Memory and Long Term Memory Test scale used for this study was prepared by B.B.Asthana (1982).

SUBJECT:

In this study One hundred college boys (50 Athlete participated in inter-college tournament and 50 non Athlete) from different colleges of north 24 district in West Bengal were randomly selected, whose age range from 22 to 25 years.

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.

STATISTICAL PROCEDURE

The statistical 't' test was applied to investigate the existence of significant difference between Athlete and non Athlete on their memory performance.

FINDINGS

TABLE -1

SIGNIFICANCE OF DIFFERENCE OF MEANS AND STANDARD DEVIATIONS IN SHORT TERM MEMORY BETWEEN ATHLETE AND NON ATHLETE

VARIABLES	GROUP	NUMBER	MEAN	S.D.	't' RATIO
SHORT TERM MEMORY	ATHLETE	50	65.26	8.78	11.41*
SHORT TERM MEMORY	NON ATHLETE	50	46.1	7.97	

*Significant at 0.05 level

't' value required to be significant at 0.05 level of confidence with 98 degree of freedom was 1.98.

TABLE -2

SIGNIFICANCE OF DIFFERENCE OF MEANS AND STANDARD DEVIATIONS IN LONG TERM MEMORY BETWEEN ATHLETE AND NON ATHLETE

VARIABLES	GROUP	NUMBER	MEAN	S.D.	't' RATIO
LONG TERM MEMORY	ATHLETE	50	55.18	9.18	5.60*
LONG TERM MEMORY	NON ATHLETE	50	46.54	5.89	

*Significant at 0.05 level

't' value required to be significant at 0.05 level of confidence with 98 degree of freedom was 1.98.

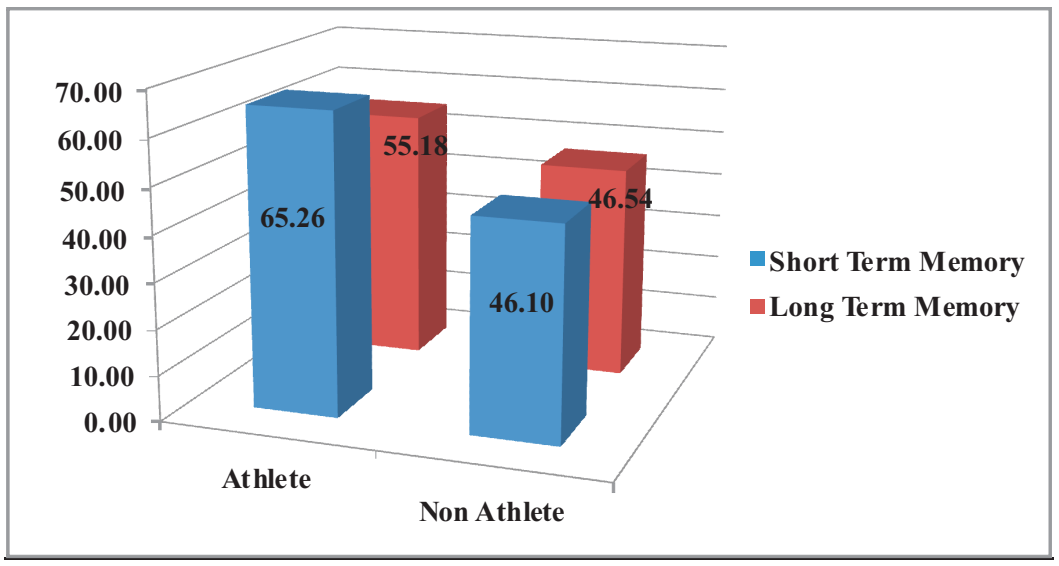

Fig- 01: COMPARISON OF MEANS IN SHORT TERM MEMORY AND LONG TERM MEMORY BETWEEN ATHLETE AND NON ATHLETE

DISCUSSION OF FINDINGS

This study aimed to compare the Short Term Memory and Long Term Memory of Athlete and non Athlete. It was found from the above statistical calculation that Athlete performed better in the both tests i.e. Short Term Memory and Long Term Memory than that of non Athlete and the difference was statistically significant.

Some researchers supported the present study. P. Perrig-Chiello et al., 1998 found positive relationships between physical exercise and function, Hakimeh Saadati et.al showed that short term and long term exercise training enhanced learning and memory performance significantly, Saadati et.al 2010, suggested that that physical activity promoted learning and memory consolidation, Radak et al. have showed that middle aged exercised rats had a significantly better short-term and long-term memory than age matched control rats. Other studies have shown that long term potentiation (LTP) and memory function are elevated after exercise (Samorajski et.al 1985, Van Praag et al., 1999 and Lee MH et al., 2005).

Findings have suggested that adult brain continues to generate new neurons in response to exercise in the hippocampus (Praag et al., 1999 and Churchill et.al 2002). Hippocampus receives information from each of the sensory modalities and projects widely throughout the brain(Swanson et.al 1983).This area is best known for its role in learning and memory(Wittenberg et al., 2002). Exercise has also been shown to enhance hippocampus cholinergic functioning (Fordyce et al., 1991). Several studies have suggested that exercise influences the levels of the amines and endorphins in the body and these changes can have a positive influence on cognitive functions.

Maintaining brain health and plasticity throughout life is an important public health goal. It is increasingly clear that behavioural stimulation and exercise can help us to achieve it. Over the past decade,

a number of studies on humans have shown the benefits of exercise on brain health and function, particularly in aging populations (Ivy et al., 2001). It has been previously reported that running enhances neurogenesis, levels of brain–derived neurotrophic factor (BDNF) and other growth factors and neurotransmitters especially in the hippocampus (Honma, 1986). In addition, hippocampal-dependent learning may enhance survival of cells prior to spatial training (Nibuya et al., 1995). Moreover, exercise and training programme improves memory function so regular exercise programme is strongly recommended.

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