NEUROPSYCHIATRIC ASPECTS OF MEMORY

Thesis submitted for partial fulfilment

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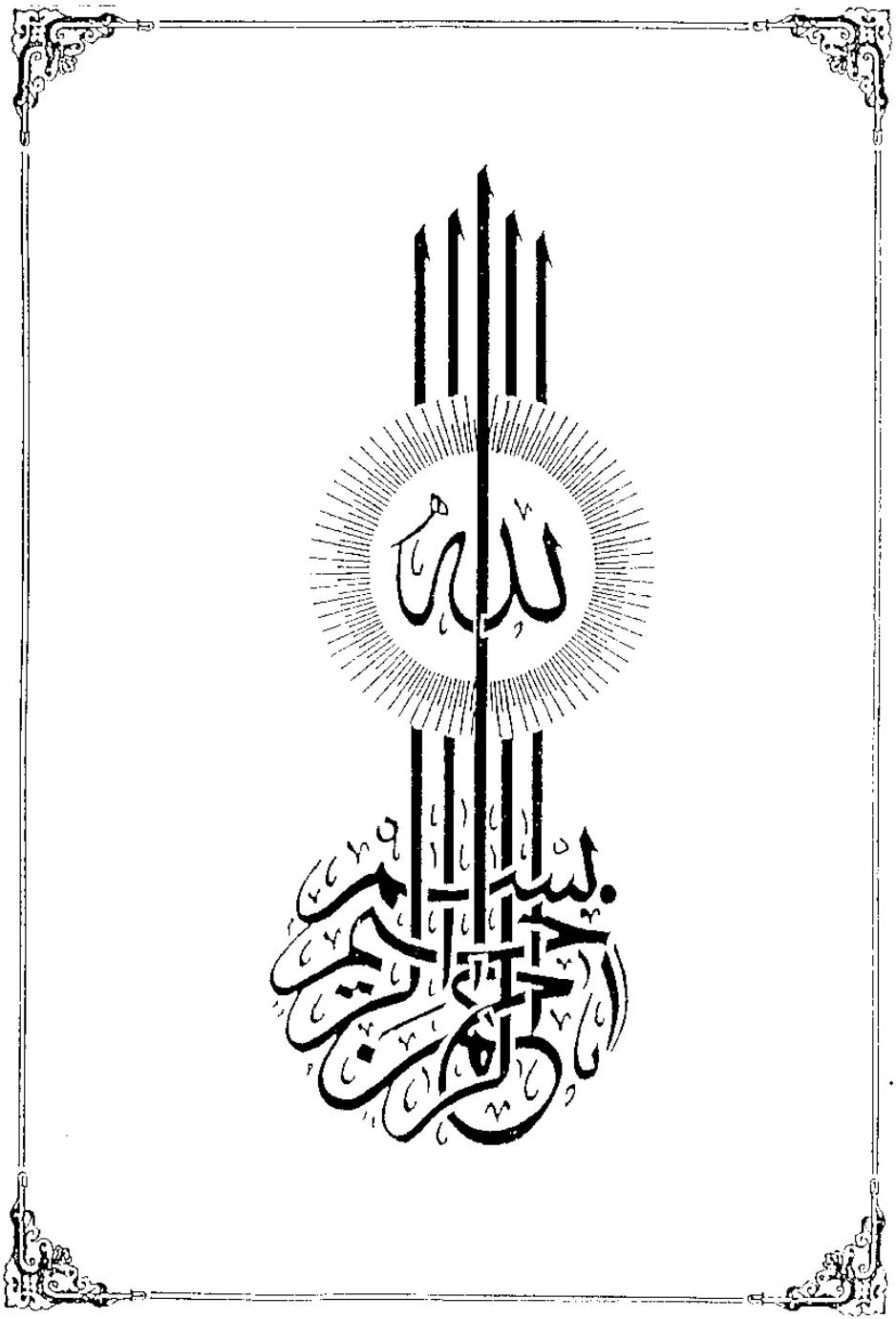

CONTENTS

ABBREVIATIONS

- LTP	LONG TERM POTENTIATION
- NMDA	N-METHYL-D ASPARTATE.
- cAMP	CYCLIC ADENOSINE MONOPHOSPHATE.
- MID	MULIT-INFARCT DEMENTIA.
- Ca^{++}	CALCLIUM
- ACTH	ADRENOCORTICOTROPHIC HORMONE.
- GABA	GAMA AMINO BUTYRIC ACID.
- Na^{+}	SODIUM
- Cl^{-}	CHLORIDE.
- cGMP	CYCLIC GUANOSINE MONOPHOSPHATE.
- RNA	RIBONUCLEIC ACID.
- DNA	DEOXY RIBONUCLEIC ACID.
- PO4	PHOSPHATE.
- Mg^{++}	MAGNESIUM
- KS	KORSAKOFF SYNDROME.
- ECT	ELECTRO-CONVULSIVE THERAPY
- TGA	TRANSIENT GLOBAL AMNESIA
- PD	PARKINSON'S DISEASE.
- AD	ALZHEMIER'S DISEASE.
- MS	MULTIPLE SCLEROSIS.

INTRODUCTION

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The study of memory has long been a field of common interest and outstanding importance. Clinico-pathological correlation has progressed so that lesions in certain parts of the brain are now known to correspond with special patterns of memory disturbances.

Memory disorders are observed in many of the neurological disorders where they might be either transient as in alcoholic black out, epilepsy, transient ischemia of the brain...etc. They may be persistent as in cases of Korsakoff syndrome, cerebro-vascular strokes, dementias...etc.

Also, many psychiatric disorders may present with memory derangement as in cases of depression, dissociation disorder, chronic schizophrenia, and others.

However, there is the clinical problem that many of the neurological diseases may present with memory disturbance accompanied by decreased motivation and attention, together with apathy or disturbed behaviour with no apparent neurological signs or symptoms. A picture which might simulate psychogenic memory disturbances.

On the other hand, psychogenic memory loss might be accompanied by cognitive impairment similar to that of dementia leading, at times, to the false diagnosis of presenile or senile dementia. Accurate diagnosis could be achieved by thorough clinical

history, examination, observation of the patient and some specific investigative methods.

The study has also focused on the physiological and biochemical advances in this field which might be of implication in management of such cases.

New trends of treatment are now under trial all based on recent physiological and biochemical discoveries which should be clearly understood before attempting at such therapies.

AIM OF THE WORK.

1- To review the recent literature concerning the anatomical, physiological, and chemical basis of memory and memory disorders including immediate, recent and remote memory.

2- Discussion of the main organic and psychiatric syndromes presenting with memory disorders.

3- To review the main clinical differentiating points between organic and psychogenic amnesic syndromes and the possible co-morbidity.

4- To achieve the proper management of organic and psychogenic memory disorders.

HISTORICAL REVIEW

Memory and its disorders have received due consideration over the past history. Some mention has been given of memory disturbance in the ancient Egyptian papyrus. In Ebbell's translation (1926) of Eber's papyrus (1900 B.C.), he referred several times to memory disturbance (forgetfulness).

Eb. 227 "to expel "a a a " poison from the heart, expel fleeting forgetfulness and injury of the mind", what we now call dementia.
Eb. 855 z: " As to his mind being drowned, this means that his mind is forgetful like one who is thinking of something else"/
Eb. 855 u: " Perishing of the mind and forgetfulness, it is the action of the priest's breath that does it, it enters into the lungs several times and the mind becomes confused through it." (Okasha,1988)

The study of memory kept progressing over the years, but proper scientific research was most prominent in the last century that it was at times called the golden decade of memory research.

In 1881, Theodule Ribot, a French philosopher and

psychologist, founder of the Revue Philosophique, published "Les maladies de la memoire" this was the first attempt to bring together amnesic study cases systematically and to develop general principles about the organization of memory based on memory impairment.

Herman Ebbinghaus, was a German psychologist, who, in 1885, published his major work " Uber das gedachtnis" on memory. This presented the first set of laboratory demonstrations showing that memory could be studied in a quantitative way. He showed that the strength of memory varied systemically as a function of retrieval interval, repetition and the nature of the material intervening between the study and rest.

In 1887, Sergie Korsakoff, the Russian psychiatrist, first described that syndrome that now bears his name.

The decade came to a close with an American psychologist, William James, who published in 1890 his "principles of psychology". He distinguished between short term and long term memory ~~in~~ which later on found substance in the organization of brain systems.

In the past ten years, we have the first evidence concerning the pattern of neural synaptic interaction that subserves classical conditioning (the work in Aplysia).

Detailed information about presynaptic changes in transmitter economics subserving short term memory were obtained also. the first detailed molecular and morphological correlates of a real long term behavioural change in invertebrates in cases of long term

sensitization were provided.

Many other advances were achieved, as the emergence of consensus that the hippocampus is critical for certain links of memory, the development of animal models of amnesia and the development of long-term potentiation as a major model for studying long term plasticity in vertebrates and finally the story of NMDA receptors (Squire,1989).

Yet, in spite of all the aforementioned advances the physiology of memory has never been fully understood and we are left in great need for further explanation of the memory process.

CLASSIFICATION OF MEMORY

Memory is the capacity to store information in order to produce a delayed modulated response, which is manifested by both unicellular organisms and man in numerous situations or in different ways.

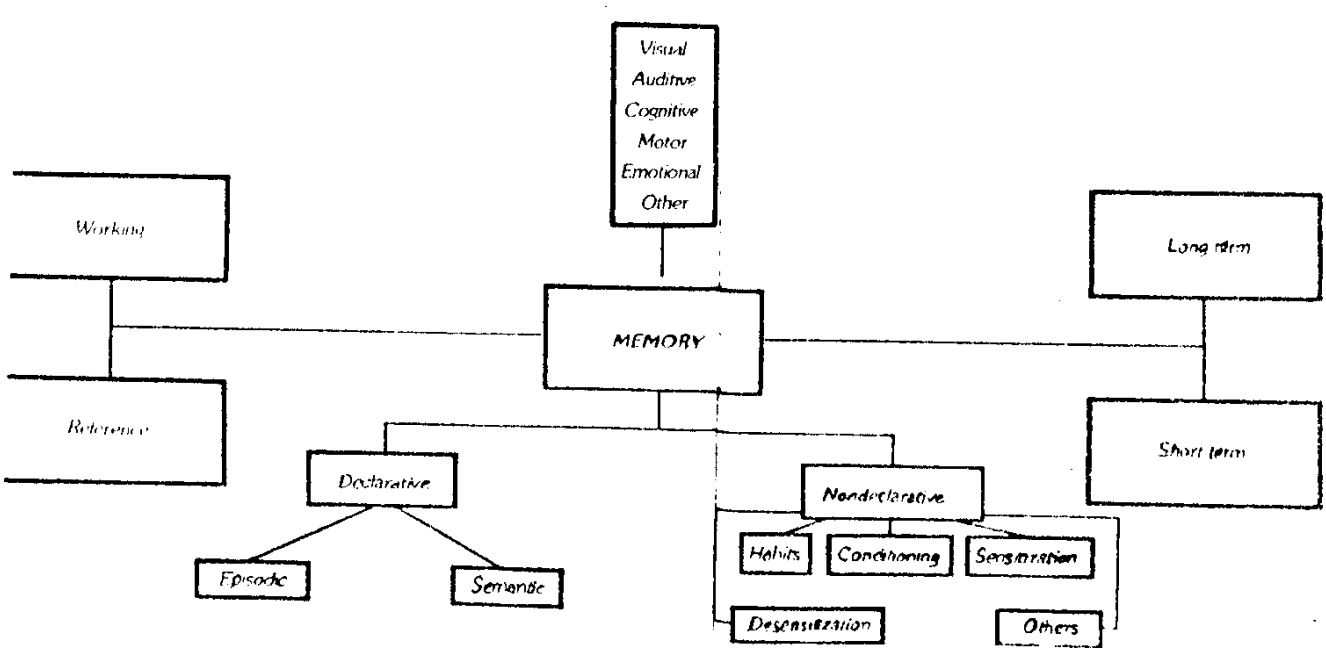
To understand the whole phenomenon of memory some basic types may be defined as bipolar groups:

Declarative/ non-declarative memory

Short term/ long term memory.

Reference/ working memory.

Non associative/ associative memory (table 1)



Declarative memory:

Declarative memory is memory that is associated with other cognitive functions in such a way that the stored information can be consciously retrieved when certain words or images are evoked. In the process of declarative memory, the information obtained from an experience is codified and then stored in the form of a very specific representation of that experience, the information is later recuperated in such a way that it is consciously recognized as being derived from a past episode. Declarative memory may express itself verbally, or in other actions, or it may serve to deduce other factors about the external world. It is located in the higher centers (cortex, limbic lobe, diencephalon). It is associated with intelligence and language. Its maximum development is seen in man e.g. someone learning to operate an apparatus will have to know how to put it on, which buttons to press in special sequence, how to modulate the apparatus according to his needs and how to put it off. Latter on, when faced by a similar experience he will have to look at the key and buttons, then start to remember the steps of the operation sequentially as he learned them before.

Non declarative memory:

Involves a whole series of processes in which a pattern for responding or behaving in a particular way is laid down and stored following repeated incremental exposure to a situation. This

phenomenon is present throughout the animal kingdom and mediates motor and sensory tasks and basic behaviour.

Non-declarative memory is characterized by:

1- Relationship between memorization and the repetition of the triggering fact or information.

2- Lack of conscious awareness of what has been learned

3- Inability to remember specific events (place, time) related to the learning process.

Non-associated and associative memory:

The above types of memory are non-associative, that is to say, they are based on the single stimulus single response relationship. In contrast, there are types of memory which are associative. This means that the production of a response depends upon the interaction of two or more stimuli. In classical conditioning, an animal learns to relate two stimuli in such a way that the stimulus which beforehand was ineffective becomes capable of eliciting a response (conditioned stimulus) after it has been associated over a certain period of time and a varying number of times, with another strong stimulus that is capable of producing the response (unconditioned stimulus).

Working memory and reference memory:

There are, on one hand, memory components common to different tasks, on-the-other hand, components that are strictly related to the stimulus, the situation or the information received. In the