

# Learning and memory research paper

[Education](#), [Learning](#)



## **Introduction**

Learning and memory constitute a very important aspect of person's life. They determine the kind of life a person has to live. However, because it is the brain which initiates these processes, then it means that learning and memory is just but a function of the state of the brain. In other words, if the brain is normal, then the learning process would take place normally. Hence, alteration of the normal state of the brain may result in alteration of the learning process.

Although several researches concerning the brain have been done, there is no specific research that is meant to specifically describe the relationship between the state of brain and the learning process. In other words, the information is spread in different sources and none of this information is comprehensive. This is to say that there are different bits of information in different sources. This research therefore aims at collecting information from various sources and then integrating them into one comprehensive paper that can allow easier retrieval.

## **Hypothesis**

There is no significant relationship between the learning and memory process and the state of the brain. Another hypothesis was that there is no significant relationship between inclusion of more than one sense organ in learning process (MacLeod, 2010).

## **Research design**

A correlation study design was done to determine the effects of brain health on the learning process and the memory of the elderly as well as midlife

individuals. In the article reviewed, Individuals of ages ranging from 25 years to 68 years from the mental rehabilitation centre were used as the subjects of the study. Several tests were carried out. Their medical histories were first analyzed after which some had to undergo brain scan. For those who could still remember their past experience, they were interviewed. Several cognitive skills were then carried out on each of the patient. Additionally, another research was conducted on the effect of involving more than one sense in learning process and memory. In one of this research individuals had to shout a certain word and in other, they had to read silently. Finally, after going through several tests, the information was collected for analysis. However, most of the work was also from the review of the articles about learning process, memory and the brain.

## **Literature review**

Learning and memory is a complex process that takes place in the brain. The human brain is a very complex and obscure machine and many factors can hamper with its functioning. The learning and memory process entails physiological, neuro anatomical, neurostructural and neurochemical processes of the brain. The basic units of the brain are the neurons. Neurons are therefore the nerve cells in the brain that allows the normal functioning of the brain.

Physiologically, loss of memory or learning ability can occur when neurons responsible for controlling voluntary muscles get degenerated or die due to a particular condition. These neurons are called motor neurons. They are located in the central nervous system as well as the spinal cord, peripheral nervous system. These neurons facilitate some imperative communication

connection between the nervous system and the muscles. However, if both the motor neurons in the brain as well as motor neurons in the spinal cord disintegrate or die, there would be no transmission of information from the brain to the muscles. This makes the muscles lose their functions and therefore gradually get weakened and waste away.

Neurochemically, it is believed that there are special chemicals in the brain that are responsible for the impulse transmission. These chemicals are broadly classified as neurotransmitters. Acetylcholine is one of the main neurotransmitters responsible for the transmission of the impulses. Studies have found that the concentration of this chemical in the brain is directly proportional to the level of memory. That is why nutritionists recommend a high intake of proteins as these proteins would help in supplying nutrients necessary for the synthesis of acetylcholine. In the next section of this paper, the disorder, which is mainly involved in influencing the learning and memory process, shall be explored. The actual disorder is dementia (Biernacki, 2007).

## **Dementia**

Dementia is one of the conditions that have a close association with the learning and memory. It is a term used to describe those conditions that affect the brain. People with dementia have significantly altered logical functioning that interferes with normal learning and memory. This means that they cannot act intellectually. They also lose their ability to solve problems and control their emotions, and they may experience individuality changes and behavioral problems such as constant arguments, striking out and agitations.

The fact that dementia is a collective term implies that it has multiple causes. Some disease conditions may cause dementia. Such diseases include Alzheimer's. This disease leads to the formation of plaques and fibrils in the neural cells. These plaques are unusual clumps of a certain protein along with degenerating pieces of neurons and other cells. The fibrils are called Neurofibrillary (Hughes et al, 2006). They are actually groups of tiny projections, which are twisted and are found within neurons. These forms of fibrils are largely made up of a microtubule protein. However, in Alzheimer's condition, the microtubule protein is changed in a way that causes it to weave into pairs of filaments that collect into tangles. This makes microtubule lose its work and hence they break up. This collapse of the neuron's transport system may impair communication between nerve cells and cause them to die.

Patients may experience memory mutilation in early stages of the development of this disease, poor judgment, and slight changes in personality. As disease advances, patients begin to lose the ability to control motor functions. As Alzheimer's disease advances, it begins to affect the person's emotions and behavior. Most people with Alzheimer's disease eventually develop symptoms such as Deterioration of language skills, agitation and loss of memory (MacLeod, 2010).

## **Diagnosis**

Patient's history is one of the first areas of assessment for the patient. The patient would be asked to give some of the symptoms he or she has experienced in the past. Additionally the patient's medical history and social history is also taken so as to help during diagnosis. However, patient's

history alone cannot result in comprehensive diagnosis.

Nevertheless, scanning of the brain can be carried out. Such test is used to identify any abnormalities that are associated with dementia. In addition, the state of the brain's cortex can be identified through this scanning process.

This process can recognize alterations in the brain's configuration and role that suggest that the patient has Alzheimer's disease (Hughes et al, 2006).

In an attempt to expound on the relationship between dementia and the learning and memory process, it is important to first explore how the learning process as well as memory is initiated in the brain

## **The biological neuron network**

The concept of biological neuron network is used to describe those mechanisms that underlie the impulse transmission on the brain of the living organism and how the impulse transmission process can result in appropriate action. The term synapse must be described before the actual mechanism of biological neuron network could be dealt on. Synapse is a junction between two neurons.

During impulse transmission, an impulse is supposed to move from presynaptic to post synaptic section of the neuron. The rate and frequency of impulse movement along the synapse varies. Synaptic efficacy therefore is a term used to describe this rate. According to Hebbian theory, the learning processes involve the synaptic plasticity. The synaptic plasticity is a term used to describe an increase in synaptic efficacy as a result of recurring and relentless stimulation of postsynaptic cell by presynaptic cell. This idea can be put in a layman's language this way (MacLeod, 2010).

Let us assume that the persistence or repetition of a given activity tends to

bring about cellular changes that add to its steadiness.... if an axon of cell Y is closer to excite a cell X and continually or steadily takes part in firing it, it will provide conducive conditions for development or metabolic change to takes place in one or both cells such that Y's efficiency, as one of the cells firing X, is increased. In other words, this theory tries to explain how association among certain stimuli may strengthen the learning process. It believes on the fact that cells that fire together works together in other words, the general idea is that any two cells or systems of cells that are repeatedly active at the same time will tend to become 'associated', so that activity in one facilitates activity in the other. Additionally, some researches have shown that learning process and memory can be enhanced through manipulating brain. Manipulation can be done by involvement of many senses. These include incorporating more than one sense. Sense of speech, sight and feelings can lead to better results (MacLeod, 2010).

### **Learning, memory and the biological neuron system**

In the brain, the learning process swell as the memory is initiated through a biological neuron network. It is believed that the memory process begins from impulse transmission. During impulse transmission, an impulse is supposed to move from presynaptic to post synaptic section of the neuron. Depending on the state of the neuron, the rate of transmission would vary. A very health neuron would enhance this transmission rate. Contrary, a degenerated neuron may not facilitate the transmission process (Biernacki, 2007).

## **Impact of dementia on biological neuron system**

Dementia can affect the biological neuron network in many ways. For better understanding, it is important for us to categorically analyze these ways.

Firstly, we shall explore how dementia can physiologically affect the learning process.

### **Physiological effects**

Physiologically, loss of memory or learning ability can occur when neurons responsible for controlling voluntary muscles get degenerated or die due to a particular condition or illnesses. These neurons are called motor neurons. They are located in the central nervous system as well as the spinal cord. These neurons facilitate some fundamental communication connection between the nervous system and the muscles of the body. The motor neurons in the brain transmit information to the motor neurons in the spinal cord (MacLeod, 2010).

However, if both the motor neurons in the brain as well as motor neurons in the spinal cord degenerate, there would be no transmission of messages from the brain to the muscles. This makes the muscles lose their functions and therefore disintegrate slowly. Due to this, the patients would experience variation in cognitive functions such as dejection and problem with decision-making and memory (Buijssen, 2005).

### **Neurological elements effects**

Neurostructurally, researchers have found that there is a gene responsible for the development of cerebral cortex. Cerebral cortex is a part of the brain that plays a key role in important functions such as speech development,



memory, concentration and perception. The structural features of this cortex have a lot of influence on the memory and learning process.

Neurochemically, it is believed that there are special chemicals in the brain that are responsible for the impulse transmission.

These chemicals are broadly classified as neurotransmitters. Acetylcholine is one of the main neurotransmitters responsible for the transmission of the impulses. Studies have found that the concentration of this chemical in the brain is directly proportional to the level of memory (Hughes et al, 2006).

### **Behaviors associated with dementia**

There are several behaviors associated with dementia. These behaviors vary depending on the progression of the condition. For example, the behaviors associated with early cases of dementia include. Inability to perform more than one task at a time, trouble in solving problems, taking longer to perform more complex mental activities. In some cases, a patient with dementia would experience speech problems, such as identifying of familiar things. Moreover, a person may forget familiar routes, change his or her own character and even loss his social skills.

However, as dementia gets worst, the behaviors also change and such behaviors would be there. Additionally, some cases like forgetting important and basic things or even forgetting of oneself may arise. Difficult in sleeping, reading or writing may also occur in some patients. These notwithstanding other myriads of symptoms such as poor judgment may occur (Biernacki, 2007).

## **Treatment**

The aim of medication is to control the symptoms of the conditions.

Management strategy to be adopted depends on the condition causing the dementia. Some treatment may force people to stay in the hospital for a short time. These people are expected to adhere to medication if they are improving their state. Current researches have demonstrated that some kinds of mental exercises can help dementia. Managing conditions that can lead to bewilderment often greatly improve mental functioning.

Such conditions include: poor nutritional status, low red blood cell count as a result of anemia, hypoventilation as a result of hypoxia, high stress level, heart conditions like heart attack, other illnesses and thyroid disorders as these are have some part to play in the mental functioning (Buijssen, 2005). Additionally, brain state can be improved through manipulating brain in a certain way. This manipulation can be done through enticement of the mind.

## **Conclusion**

From the research, it is now clear that the learning process and memory is determined by the state of the brain. This is evidenced by the fact that individuals with dementia have low level of learning skills as well as low memory levels. We can therefore conclude that there is a significant relationship between the learning process, memory and the condition of the brain. The article is thus worthwhile as it clearly depicts the relationship between the learning process, memory and the state of the brain.

Additionally, it is also important to note that learning process can be manipulated through involvement of some enticing attachments like rewards (MacLeod, 2010).

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