

The to spatial  
memory whereas the  
left hippocampal



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The hippocampus belongs to the limbic system and it is located in the medial temporal lobe of the brain (Squire & Zola-Morgan, 1991). It has the function of regulating the emotions of individual and also plays an important role in spatial navigation. Besides that, hippocampus plays an important role in the storage of both explicit and declarative memories. Therefore, it is being described as the conscious recall of facts and events (Eichenbaum, 1999; Maguire, Burgess & O'Keefe, 1999; Squire, 1992, cited in Rubin, 2015).

Also, hippocampus plays an important role in memory process. Besides that, research have also noted that right hippocampal volume is related to spatial memory whereas the left hippocampal volume is associated with verbal memory (Zammit et al., 2017). The hippocampus also plays an important role in the consolidation of new memories as it consists of the required capacity to store information (Squire, 1998, cited in Kramer et al., 2007). How memory is formed According to Tulving and Craik (2000, cited in Sternberg & Sternberg, 2012), memory is the method that individuals retain on the previous experiences to utilize that existing information.

Bjorklund, Schneider and Hernandez Blasi (2003, cited in Sternberg, 2012) had defined memory is also mechanism which is related to storing, retaining and also retrieving information from the previous experience. Formation of memory involves encoding, consolidation, storage and retrieval. The first step in creating a memory involves encoding which is a process where the construct that can be stored in brain and it is changed from the perceived item of interest ( Nadel, Hubach, Gomez, & Newman-Smith, 2012).

Consolidation is a process where the memory trace becomes stable after the acquisition.

It is a process where the signals between neurons increase. There are two types of consolidation which is the cellular consolidation and also system consolidation (Wixted & Cai, 2013, cited in Genzel & Wixted, 2017). For example, cellular consolidation occurs a few hours after learning. It stabilizes the memory trace. However, system consolidation happens when memories develop cortical neurons which lead it to become independent of hippocampus. Storage is a process where the information are being kept in the memory. For example, the long term and short term memories (Nerid, 2015).

Besides that, encoded information were filtered and other information that are not required were being forgotten. Retrieval is a process where the information that were previously stored were being re-accessed so that it is accessible to consciousness (Nerid, 2015). The pattern of neural activity that was related to specific data were repeated by brain which recreates the experience. Nonetheless, the information is not the same with the initial experience as there is an awareness of the present situation mixed in order to differentiate the actual experience from the memory recall.

Relationship between hippocampus and memory Hippocampus involves in the formation of new memories. Besides that, hippocampus also involve in recognition of new events, places and also stimuli (Zammit et al., 2017).

Previous research have indicated that greater hippocampal volume is proportionately superior memory performance. According to Erickson et al.

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(2009), it indicated that larger hippocampal volume is correlated to greater spatial memory. It has demonstrated that the elderly who have higher level of fitness activity have higher level of spatial memory performance and also higher level of hippocampal volume. Hence, it shows that aerobic fitness can prevent the decline in cognitive ability among the elderly as individuals who involved in fitness activity have higher level of hippocampal volume and better memory performance. Besides that, Latal, Patel, Li and Lahti, Knirsch, Tuura and Rhein (2016) had conducted a study to study the relationship between hippocampal volumes, working and spatial memory among adolescents who underwent surgery for congenital heart disease (CHD). The result had indicated that there is a decline in hippocampal volume among the adolescents who underwent the surgery.

The research have also shown that the decline in hippocampal volume is related to poor memory and also verbal functions among the adolescents. A study was conducted by Kramer et al. (2007) to investigate the relationship between hippocampal volume and the retention of information over a delay among Alzheimer' disease individuals. The study was conducted by measuring free recall and their retention of information after a delay. It was found that there is a relationship between hippocampal volume and delayed recall. Individuals who have greater hippocampal volume have better memories performance in both free recall and delay tasks (Kramer et al., 2004).

In addition, another research was conducted to examine the relationship between hippocampal volumes and performance on verbal and non-verbal episodic memory (Jackson, Miller and Banks, 2015). Based on the result of <https://assignbuster.com/the-to-spatial-memory-whereas-the-left-hippocampal/>

the study, it was found that there is a significant positive correlation between hippocampal volumes and both verbal and non-verbal memory.. A study was conducted by Riggins, Blankenship, Mulligan, Rice and Redcay (2014) to investigate the relationship between hippocampal volume and episodic memory in children who aged 4 years old and 6 years old. The study had shown that the association between hippocampal volume and memory is greater 6 years old children as compared to 4 years old children. Therefore, it suggested that as children grow older, the hippocampus develops which lead to the advancement in memory.

In spite of that, Chaddock et al. (2010) have conducted a study to investigate the relationship between aerobic fitness, hippocampal volume and memory functions among the preadolescents who aged between 9 and 10 years old. There is a positive correlation between aerobic exercise and hippocampus. Wheel running is an exercise that boost the memory process of individual (Vaynman et al. 2004; van Praag et al. 2005, cited in Chaddock et al., 2010).

Therefore, it is suggested that higher aerobic fitness level is associated with greater hippocampal volume during development. In spite of that, Hillman et al. (2008) had suggested that aerobic fitness will lead to higher relational memory among the preadolescents. Therefore, it is suggested that individuals who engaged in aerobic will have flexible memory through prefrontal hippocampal interaction. Therefore, individuals who have higher fitness level also have larger hippocampal volume. Therefore, it shows that individuals who have greater hippocampal volume have better relational memory.

In conclusion, hippocampal volume is associated with memory process.

Besides that, Research have indicated that there is an association between hippocampal volume and memory performance. In addition, researches have supported that greater hippocampal volume is associated to better memory performance. Therefore, individual who have a higher hippocampal volume will have better memory performance.