

# [The to spatial memory whereas the left hippocampal](https://assignbuster.com/the-to-spatial-memory-whereas-the-left-hippocampal/)

Thehippocampus is belongs to the limbic system and it is located in the medialtemporal lobe of the brain (Squire & Zola-Morgan, 1991). It has thefunction of regulating the emotions of individual and also plays an important rolein spatial navigation. Besides that, hippocampus plays an important role in thestorage of both explicit and declarative memories. Therefore, it is beingdescribed 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, researchhave also noted that right hippocampal volume is related to spatial memorywhereas the left hippocampal volume is associated with verbal memory (Zammit etal., 2017). The hippocampus also plays an important role in the consolidation ofnew memories as it consists of the required capacity to store information (Squire, 1998, cited in Kramer et al., 2007). Howmemory is formedAccordingto Tulvings and Craik (2000, cited in Sternberg& Sternberg, 2012), memory isthe method that individuals retain on the previous experiences to utilize that existinginformation.

Bjorklund, Schneider andHernandez 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. Formationof memory involves encoding, consolidation, storage and retrieval. The firststep in creating a memory involves encoding which is aprocess where the construct that can be stored in brain and it is changed fromthe perceived item of interest ( Nadel, Hupbach, Gomez, & Newman-Smith, 2012). Consolidation is a process where the memory trace becomes stableafter the acquisition.

It is a process where the signals between neuronsincreases. There are two types of consolidation which is the cellularconsolidation and also system consolidation (Wixted & Cai, 2013, citedin Genzel & Wixted, 2017). For example, cellularconsolidation occur a few hours after learning. It stabilizes the memory trace. However, system consolidation happens when memories develop cortical neuronswhich lead it to become independent of hippocampus. Storageis a process where the information are being keep in the memory. For example, the long term and short term memories (Nervid, 2015).

Besidesthat, encoded information were filtered and other information that are notrequired were being forgotten. Retrievalis a process where the information that were previously stored were being re-accessso that it is accessible to consciousness (Nervid, 2015). The patternof neural activity that was related to specific data were repeated by brainwhich recreate the experience. Nonetheless, the information is not the samewith the initial experience as there is an awareness of the present situationis mixed in order to differentiate the actual experience from the memoryrecall. Relationshipbetween hippocampus and memoryHippocampus involves in the formation of new memories. Besidesthat, hippocampus also involve in recognition of new events, places and alsostimuli Zammitet al., 2017).

Previous research have indicated that greater hippocampal volumeis proportionately superior memory performance. Accordingto Erickson et al. (2009), it indicated that larger hippocampal volume iscorrelated to greater spatial memory. It has demonstrated that the elderly whohave higher level of fitness activity have higher level of spatial memoryperformance and also higher level of hippocampal volume. Hence, it shows thataerobic fitness can prevent the decline in cognitive ability among the elderlyas individuals who involved in fitness activity have higher level ofhippocampal volume and better memory performance.  Besides that, Latal, Patel, Liamlahi, Knirsch, Tuura and Rhein (2016) had conducted a study to study the relationship betweenhippocampal volumes, working and spatial memory among adolescents who underwentsurgery for congenital heart disease (CHD). The result had indicated that thereis a decline in hippocampal volume among the adolescents who underwent thesurgery.

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

Inaddition, another research was conducted to examine the relationship between hippocampalvolumes and performance on verbal and non-verbal episodic memory (Jackson, Miller and Banks, 2015). Based on the result of the study, it wasfound that there is a significant positive correlations between hippocampalvolumes and both verbal and non-verbal memory.. Astudy was conducted by Riggins, Blankenship, Mulligan, Rice and Redcay (2014) toinvestigate the relationship between hippocampal volume and episodic memory inchildren who aged 4 years old and 6 years old. The study had shown that theassociation between hippocampal volume and memory is greater 6 years oldchildren as compared to 4 years old children. Therefore, it suggested that as childrengrows older, the hippocampus develops which lead to the advancement in memory.

Inspite of that, Chaddock et al. (2010) have conducted a study to investigate therelationship between aerobic fitness, hippocampal volume and memory functionsamong the preadolescents who aged between 9 and 10 years old. There is apositive correlation between aerobic exercise and hippocampus. Wheel running isan 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 aerobicfitness level is associated with greater hippocampal volume during development. In spite of that, Hillman et al. (2008) had suggested that aerobic fitness willlead to higher relational memory among the preadolescents. Therefore, it is suggestedthat individuals who engaged in aerobic will have flexible memory throughprefrontal hippocampal interaction. Therefore, individuals who have higherfitness level also have larger hippocampal volume. Therefore, it shows thatindividuals who have greater hippocampal volume have better relational memory.

Inconclusion, hippocampal volume is associated with memory process. Besides that, Research have indicated that there is an association between hippocampal volumeand memory performance. In addition, researches have supported that greater hippocampalvolume is associated to better memory performance. Therefore, individual whohave a higher hippocampal volume will have better memory performance.