

Relationship between Short- Term Memory and Gender of 18- 20 Years

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ABSTRACT

The aim of the research was to assess Relationship between short- term memory (STM) and gender of 18- 20 years. Short term memory is a storage capacity which is extremely small. Memory is very important because cognitive tasks can be completed only with sufficient ability to hold information as it is processed. It's been observed that the females are considered to have greater short- term memory as compared to men. The ability to store information vary from person to person as STM can stores limited information. The capacity could range from 5 to 9 meaningful items in 18- 20 years. The research was conducted by collecting sample from college students age between 18- 20 years. The data type used in this experiment is interval type. The tools that were used were three lists of 10 meaningful words. Each list was presented to both female and male. This was found when both males and females were presented with 3 lists of meaningful words. The results reflected that females exhibited better short term memory as compared to men. The analysis of the test score was done by t- test. It was used to determine significant difference between the male and female participants in recall probability on the word recall test. After the analysis of data, the alternative hypothesis got accepted and null hypothesis got rejected. The value of paired t test was -3.789 . This indicates that $-3.789 < 0.05$. Therefore, the alternative hypothesis got accepted.

Keywords: *Short term memory.*

Memory is the cognitive processes which involves information that is encoded, stored and retrieved. Encoding refers to gathering information from the outside world through sense organs in the form of chemical and physical stimuli. After the encoding processing stage, the information goes for storage. Storage is the second memory stage. In storage process, the information stored and maintained for a brief periods of time. Finally, the third process is the retrieval of stored information. Whenever any information is required, the storage area comes into play to recall the previous information. In order to retrieve information, a lot of rehearsals has to be made in order to recall information in long run.

Memory is a cognitive process which tries to perceive information from environment and then stored by sense organs. Memory can be stored in various forms- sensory memory (SM),

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short term memory (STM), long term memory (LTM). SM refers to information which an individual perceives through their sense organs (i.e. visual, auditory, gustation, somato-sensory and olfactory). It could only hold sensory information for a brief period of time, less than one second after an item has been perceived. This memory cannot be prolonged without rehearsals. There are two common types of sensory memories: iconic and echoic memory. STM is a memory capacity which has been focused in this research. The STM is believed to be sustained for a brief interval of time or few seconds in the mind. The term short-term memory was coined by Miller, Galanter and Pribram in 1960 (Baddeley, 2003). The process in the cognitive system which talks about the limited capacity which is responsible for holding information during short- term memory processing. The expose of short term memory is very brief and limited. STM needs rehearsals or trials to remember. Otherwise, the memory finally leads to forgetting. STM is a consciously stored information for approximately 20-30 seconds. (Cherry, K. A., 2007). This processing is commonly known as Working Memory. Later, in 1968, Atkinson and Shiffrin used their model described about "short-term store". According to the George A. Miller (1956) experiment was conducted showing that the store of STM was ranging between 5- 9 items (also known as "The magical number 7 ± 2 "). Chunking is the best method to increase capacity of memory. Another effective way could be through maintenance rehearsals and would send information to LTM.

Baddeley & Hitch (1974) proposed an alternative to the multi-store model of memory, known as working memory model. The term working memory refers to a brain system that provides temporary storage and manipulation of the information which is necessary for complex cognitive tasks as language comprehension, learning and reasoning. It tries to keep information consciously in mind while transforming it and using it, to achieve some goal. The types of memory which we need to read, plan future activities, do the crossword/Sudoku or follow the news headlines.

Working memory is limited in capacity, which means that we cannot store and manipulate endless amounts of information.

Working memory has 3 concepts:-

1. Phonological loop: It is believed to hold speech and other auditory-based information. A limited number of sounds can be stored and until it is not rehearsed, it starts decaying within 2 seconds. It deals with acoustic information, like speech.
2. Visio- spatial pad: It stores visual and spatial information just like phonological loop, the capacity of this sketch pad too is limited.
3. Central executive: It's a part of the prefrontal cortex at the front of the brain appears to play a fundamental role in short-term and working memory. It tries to organizes the information from the phonological loop, visuo- spatial sketch pad as well as from the long- term memory. Like a true executive, it allocates attention resources to be distributed to various information. It is needed to perform a given cognitive operation and monitors, plans and controls behaviour.

In 2000 Baddeley proposed Episodic Buffer, recently added to STM storage. It tries to hold all information from all sensory modalities. It tend to bind all that information from sensory modalities and stores in LTM if attended carefully. If not attended carefully it would decay or fade away.

Short- term memory is transient i.e. it is a temporary encoding as it has a back-and-forth relationship with Long term memory. If the information in short term memory is rehearsed

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the items can be maintained indefinitely and goes to our long term memory. When this rehearsal of information is stopped, forgetting happens.

“Chunking” is a method of gathering information to increase the capacity of STM which varies with the meaningfulness of the material. A chunk is a memory unit and it is not affected by physical environment.

METHODOLOGY

Sample

The age group for a sample taken in an experiment of memory was 18- 20 years. The sample selected was from middle socio- economic status. The minimum educational qualification of participants taken for an experiment was 12th pass. Total number of participants taken as a sample were 100 i.e., 50 males and 50 females (1:1). The medium of the test was English. The sample techniques used was simple random sampling. The sample was taken from Amity University, Mumbai.

Instruments

The experiment consisted of 3 Lists i.e. List 1, List 2 and List 3. Each list consisted of 15 meaningful words. Participant was given a list and after reading list ones, the list was taken away. The subject was given 30 seconds to recall the items from each list. The same procedure was followed for 2 different lists.

Scoring of each list was carried out by calculating the total number of items recalled by participant. The scoring of the 3 lists was carried out by finding the mean of the all the 3 Lists.

Calculations to find out the mean for the 3 Lists, following steps need to be followed:-

$$X_1 + X_2 + X_3 = X$$
$$X/3$$

Example-

If the participant scores 9 in List 1, scores 7 in List 2 and scores 8 in List 3. The mean was calculated-

$$9 + 7 + 8 = 24/3 = 8$$

After finding out the mean for all the 100 participants, comparison between males and females was made by using statistical techniques.

Procedure

The permission was taken from the Vice Chancellor of Amity University, Mumbai for conducting a project. The experiment was conducted on the sample. The subjects were called inside the room, one- by- one. Consent of the subject was taken before conducting the test. Each participant was asked to fill the demographic details. Following instructions were given to the participants, “You will be presented with some Lists and each list consists of some words such as- DOG etc. One list will be given at a time. You have to read the list aloud once. After reading the list, the paper will be taken back. You will be given 30 seconds to recall the words. The items can be recalled in any order.”

“Now I will present you with another list – read it once like before and I will ask you to recall it. The items can be recalled in any order.”

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RESULTS

Table 1. The table showed the statistical description of the data.

Descriptive Statistics						
	N	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
STM	100	2.0000	8.6667	5.523333	0.1348612	1.3486120
Valid N (listwise)	100					

The table shows the statistical description of the data. Through table it could be evident that the sample size data was 100 participants. Using statistical analysis, the mean of 100 sample was 5.52 and standard deviation (SD) for the sample came out to be 1.34.

Table 2. This table is showing the group statistics for different genders

Group Statistics					
	Gender	N	Mean	Std. Deviation	Std. Error Mean
STM	M	50	5.286667	1.4365018	.2031520
	F	50	5.760000	1.2234296	.1730191

The table described the short term memory of participants in each gender criteria i.e. male and female. Mean of male and female participants were 5.28 and 5.76 respectively. The standard deviation for male was 1.43 and for female was 1.22.

Table 3. This table is showing Independent Samples Test.

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
				F	Sig.	t	Df	Sig. (1-tailed)	Mean Difference	Std. Error Difference
		Lower	Upper							
STM	Equal variances assumed	1.948	.166	-1.774	98	.0395	-.4733333	.2668452	-1.0028789	.0562122
	Equal variances not assumed			-1.774	95.578	.0395	-.4733333	.2668452	-1.0030467	.0563800

The table was describing the t- test score of the sample i.e. -1.774. The Degree of freedom (df) for the sample was 98 and the significance for 1-tailed hypothesis significance for testing was 0.0395.

DISCUSSION

The purpose of the research was to observe that the female participants have greater short term memory as compared to the male participants.

After the analysis of scores, it was interpreted that the null hypothesis (H_0) of the research was that there is no significant difference between STM of both male and female.

Memory is the process in which information is encoded, stored, and retrieved. There are three types of memory: SM, STM and LTM. The STM is believed to sustain information for approximately 20-30 seconds. The process is able to hold limited capacity of information during STM processing. The exposure to STM is very brief and limited. STM needs consistent rehearsals or trials to remember a required information. If the information is not rehearsed could lead to decay or forgetting.

The null Hypothesis (H_0) was that there was no significant difference between short term memory of both male and female participants.

The alternative hypothesis (H_A) of the experiment was that the female participants have greater short term memory as compared to the male participants.

T- Test was used to test the null hypothesis which was -1.774 and significance for one tailed testing is 0.03. This shows that the value at 95% confidence interval is less than 0.05. (i.e. $0.03 < 0.05$)

According to the table it was concluded that null hypothesis (H_0) was rejected and the alternative hypothesis (H_A) was accepted.

A study conducted by *H. Stumpf* and *Richard Lynn* demonstrated statistically significant short-term memory advantages in women. The study demonstrated that females have been found to have an advantage in recalling auditory and olfactory stimuli, experiences, faces, names and the location of objects in space. The study was examining by looking for sex differences in performance on the California Verbal Learning Test. The results were found that females were better on short-term memory recall and Symbol-Digit Modalities Test. The research was concluded that the females have demonstrated to have better verbal memory.

Dr. Selwin Gabriel and *Dr. Sridevi, G.* (2016) conducted a research in Chennai and stated that females definitely have better short term memory than males. The results showed that females were able to respond with a good short term memory.

Sailesh Sai Kumar et al (2013) conducted a study on a difference in STM in healthy males and females of Kerala. Through their study, it was observed that females are having more STM words and picture than males.

The research hypothesis was “Female participants have greater short term memory as compared to the male participants.”

The Dependent Variable of the research paper was STM.

The Independent Variable of the research paper was Gender; male and female.

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The sample criterion for research was 18- 20 years. The size of a sample was 100 college students i.e., 50 males and 50 females. The sample was taken from middle socio economic status. The survey was conducted in Amity University, Mumbai.

Three lists consisting of 10 meaningful words (each list) was used for the research. The permission was taken from the college authority and even the consent of the students was taken. After the data was collected from the from college students, scoring and interpretation was done. It was observed that the alternative hypothesis (H_A) was accepted. The null hypothesis (H_0) was rejected.

According to the analysis of research conducted, it was observed that the hypothesis got accepted and the null hypothesis was rejected.

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Conflict of Interest

The author declared no conflict of interests.

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