

Introduction

Memory is an important area of study in Psychology because it underpins our other cognitive processes. Memory has been defined as “the retention of learning or experience.” (Gross 1987)

There are three basic memory processes, often proposed as a sequence of ‘stages’.
The Encoding Process → Storage Process → Retrieval Process (Recall)

Encoding refers to the process involved in the learning of any information. This is then stored and recalled, which involves summoning up the stored information in the memory and bringing it into consciousness. Human memory is fallible, unlike computers, we do not have 100% recall. Recall is the result of encoding. To retrieve information stored in the memory, the same information that was available at encoding should be available at retrieval. Tulving and Pearlstone (1966) looked at memory and recall. In their study they gave subjects a list of words in categories with the category names at the top of each grouping. They then split the subjects into two groups. Both groups were tested on their memory recall of the list of words but the first group received the category names and second didn't. They found that the subjects that received the category names during the test recalled more of the words than the subjects that didn't receive the category names during recall. This piece of research will be the basis for the following study.

I will carry out an experiment to investigate memory recall due to category headings. There will be two conditions. After I have read out a list of words the first condition will recall the words onto a blank sheet of paper while the second condition will recall the words onto a sheet of paper with category headings printed on it relating to the list of words read out. Both of the conditions will be treated the same to exclude any extraneous variables.

Hypothesis

Experimental Hypothesis: A greater number of words will be recalled by subjects using category headings than by subjects that are not using category headings (one-tailed)

Null Hypothesis: There will be no significant difference in the number of words recalled between the two conditions. Any difference will be due to chance.

Methodology

Design

The research undertaken was investigated using the experimental method. The independent variable was the category headings related to the list of words read out. The dependent variable was the number of words recalled by each condition. There were two conditions in the experiment, a condition that received category headings when recalling the list of words and a condition that didn't. Both conditions consisted of students in Year 11 at Appleby Grammar School. An independent samples design was used. Both conditions were presented with the list of words and recalled them at the same time.

Participants

Twenty participants (10 girls and 10 boys) were selected by using a random numbers table. The students from Year 11, English classes at Appleby Grammar School, ages between 16 and 17 years old, (mean age 16 years 5 months) were all numbered. A random numbers table was then created, numbers were selected and the students' names were written down. The first 5 girls selected were put in condition one and the second 5 in condition two, this method was also carried out with the boys, therefore there were 5 girls and 5 boys in each condition.

None of the participants were following a course in psychology and they were not made aware of the hypothesis under investigation at the start of the experiment.

Procedure

For the experiment both conditions were in the same room. Condition A, the subjects recalling the list of words onto sheets of paper with category headings were sat at one side of the room and Condition B, the subjects recalling the list of words onto a blank sheet of paper were sat the other side. It was made certain that each subject couldn't see anyone else's answers.

Before the experiment began it was explained to the subjects what was going to happen. (*See Appendix A for the standardized Instructions read out*) Once the subjects were clear with what was happening the list of words was read out that they later had to recall. (*See Appendix B for the list of words read out*) Sheets of paper with category headings related to the list of words were then distributed to subjects in Condition A (*See Appendix C for the sheets with category headings*) and blank sheets of paper were given to subjects in Condition B. The sheets were placed face down in front of the subject along with a pen. Once each subject had a pen and a piece of paper they were then allowed to recall the list of words for 1minute 30seconds, this was timed. After the allocated time the subjects were asked to stop writing and the results from each condition was collected in. The subjects were debriefed before they left the experiment. (*See Appendix D for the precise wording of the debriefing*)

Controls

The list of words read out is in a random order, so that the subjects in Condition B (no category headings) couldn't recall them as grouped categories. Cheating wasn't an extraneous variable as it was made sure that the subjects were all spaced evenly so that they couldn't see each other's answers. Personal variables, such as reading, were considered and eliminated as the subjects were taken from an English class. The experiment was carried out in a quiet room so that noise didn't become an extraneous variable. Both of the conditions were run at the same time so there was no difference between each condition except from the independent variable. Also the sheets of paper were placed face down in front of the subjects, they all started and finished recalling words at the same time. So the amount of time allowed recalling the list of words didn't affect the results.

Measurement and Analysis

To measure what affect the independent variable was having (category headings) the number of correct words recalled by each condition and subject were counted, this being the dependent variable.

The measurement technique was reliable as a pre-test was carried out on individuals that weren't involved in the experiment and appropriate adjustments were made to the procedure.

When all results were obtained the results from the two different conditions were compared in order to find the difference between the two conditions. In order to improve the comparative analysis of the data the results were then illustrated in the form of a comparative scatter graph and a pie chart. Once the analysis had been carried out the Mann-Whitney Statistical test was used to determine whether there was a significant difference between the two conditions.

Ethics

The subjects that took part in the experiment were all above the age of consent (16 years) so parental consent was not necessary. Before the experiment began standardized instructions were read out to explain to the subjects that if they felt they were being put under any stress or pressure they could leave the experiment at any time. (*See Appendix A for the precise wording of the standardized instructions.*) The subjects were also debriefed at the end of the experiment to eliminate any feelings of failure. (*See Appendix D for the precise wording of the debriefing.*)

Results

For the experiment each subject had their own sheet to record the list of words onto. In Condition A the subjects had printed category headings on the sheet and Condition B had a blank sheet to record the words onto.

(Refer to Tables 1 and 2, Appendix E for the tables showing the subjects raw scores.)

Table 3 is a summary table showing the mean, medium and mode of the number of words recalled correctly for each condition.

	Condition A <i>Category Headings</i>	Condition B <i>No Headings</i>
Mean	11.9	10.5
Medium	11	10
Mode	10	10

Table 3.

From table 3 it can be seen that the scores from each condition are very similar. This is shown through the mode as both conditions recalled 10 words correctly. With both the mean and the medium Condition A recalled more words than Condition B.

The comparative scatter graph doesn't show a positive or a negative correlation. All that can be seen is that each condition has recalled a similar amount of words correctly, with Condition A having slightly higher points on the graph (therefore more words recalled correctly) than Condition B.

A pie chart to show the mean value of each condition.

This pie chart shows the data as descriptive statistics. It's easier to compare the different conditions results through visual diagrams. You can see that Condition A's mean value is slightly larger than Conditions B's.

In order to find out how significant the difference between the two totals of Category Headings and No Headings, allowing a firmer conclusions to be made, a statistical test was carried out on the data. The Mann-Whitney Statistical Test was used due to the two conditions being unrelated. *(See Appendix F for the calculations used.)* The value of U was found to be 68, which is more than the critical value for U at the significance level of 0.05 for a one-tailed test. In conclusion there wasn't a significant difference found between the mean scores for the two conditions.

Discussion

It was found that the mean number of words recalled correctly in Condition A (category headings) was greater than the mean number of words recalled correctly in Condition B (no headings). The difference was found to be insignificant at the 0.05 significance level.

The results of the Mann-Whitney statistical test meant that the experimental hypothesis was rejected and the null hypothesis “there will be no significant difference in the number of words recalled between the two conditions. Any difference will be due to chance” accepted.

This means that the experiment didn't show a relationship between recalling a greater number of correct words when given category headings.

The study was an experimental design. This may have put pressure on the subjects, as they could have perceived the experiment as a test. This was why the subjects were briefed and debriefed at the start and end of the experiment.

As it was an experimental design the study tended not to have a high level of ecological validity. A further study could be carried out where the subjects were shown a shopping list and asked to go round a supermarket and place all the items on the list in a trolley. The independent variable being whether the list was of random words of grouped categories, and the dependent variable being the number of correct items in the trolley.

The participants in the study may have affected the results. All the subjects were of similar age and were still in full time education. They are all taught the same and so may have the same techniques for revising/recalling words. If the experiment was to be done again subjects with a wider age range should be selected to stop generalisation. The study uses participants from the same western culture, to avoid ethnocentrism it should be carried out in a range of different cultures, to see if the same results were recorded. In the experiment a certain gender may find it easier to recall a category of words. For example, males may have found it easier to recall 'car types' than females, as generally males have more interest in that area. A positive aspect of the study is that the subjects used had a wide range of IQ's, as they were taken from a selection of English classes. This shows that the results aren't generalised to a certain IQ level.

The procedure used may have affected the number of words recalled. The list of words was read out and *then* the sheets of paper were distributed. The words would have been stored in the Short Term Memory (STM), which only has a limited storage capacity and items can become inaccessible after a relatively brief interval. The time taken to distribute the sheets of paper may have interfered with the STM recall. The methodology could be improved by distributing the sheets of paper for recall *before* the list of words was read out. The subjects were still able to recall words. This may be due to the fact that the list had everyday common words in it, so the path to recalling them from the Long Term Memory (LTM) was strong and easy to use. The category headings in Condition A may have helped the subject to recall more words overall but not correctly from the list of words read out. Sometimes, category headings can help memory recall but can cause one to remember words that weren't read out but can be included under the same category heading.

Tulving and Pearlstone (1966) were able to accept their experimental hypothesis. Their study also asked to recall a list of words with category names as the independent variable but they showed their subjects the list of words, visually. This may have had a positive effect on their results. For further work Tulving and Pearlstones' work could be repeated so the list of words could be encoded into the STM visually instead of verbally and the results from the two different experiments compared.