

## **PSYCHOLOGY COURSEWORK**

# **The Effect of Semantic Organisation of Information on Recall in the Short Term Memory**

**BY GINA COLLIER**

### **INTRODUCTION**

#### **Abstract**

The experiment contained within this coursework is a replication of the experiment conducted by Bower *et al* (1969). Subjects were recruited by the experimentors and asked to take part in a psychological study. They were given standardised instructions, stimuli and debriefing. The experiment itself was to test the level of recall of the subjects who were split into two groups randomly and one of two stimuli depending upon which group they were in. One group had an organised list of words and one had an unorganised list of words. The point of the experiment being that it is believed that the group that learnt the organised list of words should have a higher level of recall than the other group.

This coursework is going to use the principles of cognitive psychology. These are that it is possible to explain behaviour by referring to mental processes such as memory, even though these processes cannot be observed directly. Mental processes are presumed to process information in the same way that a computer does.

I am going to conduct a lab experiment to investigate into memory. There are two types of memory, long and short term. Short term memory is where information that we are currently concentrating on is stored. Eysenck (19980 says that short term memory contains information in the psychological present. Long term memory, by contrast, contains information that we have stored but are not currently thinking about.

The Multi-Store model of memory shows the relationship between long and short term memory.

Atkinson and Shiffrin (1968)

|                         |           |                                  |           |                                 |
|-------------------------|-----------|----------------------------------|-----------|---------------------------------|
| Sensory stores<br>decay | attention | Short term store<br>displacement | rehearsal | Long term store<br>interference |
|-------------------------|-----------|----------------------------------|-----------|---------------------------------|

However, what happens when we want to remember something? Sometimes there are failures in the mechanisms of storage or retrieval. This leads to one forgetting information. I am going to concentrate on retrieval and how organisation of information can affect it.

Tulving and Pearlstone (1966) did an experiment on free recall. They showed that when subjects are asked to memorise long lists of words, they tended to remember four times as many words when they were given cues. The same effect occurs, but not as great when the lists are organised. This is because organisation acts as a cue in retrieval.

Human memory is highly organised. The more organised information is the more likely we are to remember it. In a way, similar to Tulving and Pearlstone's experiment, when subjects are given categorized word lists in a random order and tested in free recall, the almost invariable result is that words are recalled category by category. This phenomenon is known as categorical clustering. This demonstrates the way in which information is structured and organised by the knowledge stored in the long term memory.

Bower *et al* (1969) conducted an experiment to see whether organisation would affect recall in the short term memory. Bower presented subjects with either an organised word list or the same list randomised. To ensure that the subjects were using short term memory, a distraction task was given. The distraction task prevents rehearsal of the information taking place and so the information remains in the short term memory. In a test of free recall, the results showed that the subjects recall from the organised list was greater than that of the randomised list.

### **Rationale**

I am going to replicate the experiment of Bower *et al* (1969). This will give further evidence that semantic organisation of information greatly improves recall in the short term memory. There will be modifications, these are that the word lists do not contain any long or abnormal words. This is so that they do not stand out to the subject and so are better remembered. The distraction task will be difficult so as to fully capture the attention of the subject.

### **Aim**

The aim of this experiment is to see whether organisation of information aids recall in the short term memory.

### **Alternative Hypothesis (1 tailed)**

Recall for the subjects which learnt the organised list of information will be higher than that of the subjects which learnt the same list randomised.

## **Null Hypothesis**

The recall for the subjects which learnt the organised list of information will be the same as that of the control group. Any differences will be due to chance.

## **METHOD**

### **Design**

The design for this experiment is independent measures. This means that different subjects were used in each condition this is to prevent the subjects from learning the information (order effects), i.e. rehearsal, which would put the information into long term memory. The subjects formed two groups, the experimental and the control group. The experimental group were those that learnt the organised information and the control group were those that learnt the same list but the information was randomised. To minimise individual differences between the groups, the subjects were randomly allocated to each condition.

Within this experiment, the independent variable (IV) is organisation of the information and the dependent variable (DV) is free recall. To control any random variables the subjects were not only randomly allocated to each condition but standardised instructions, word lists and debriefings were given.

The words, or stimuli were developed between myself and my colleague, Nghia Ton. We wrote down words which we heard or saw most often over a few days. We then narrowed the list down until we had what we thought were very basic words which most people will have heard of or used. The distraction task was also developed between myself and Mr. Ton. Counting backwards seemed like a good idea as one would have to concentrate on it, so to make it a little harder we decided to count in fours from forty in reverse.

### **Participants**

There were twenty subjects, ten male and ten female. Ten of these were from the home environment and ten from the college environment. All of them were between the ages of thirteen and twenty. This only represents an accurate sample of the younger generation for a purpose, this being that older generations tend not to have such a good level of recall due to their ages.

The sample taken was opportunistic. This means that people who were in the right place at the right time were sampled. This is opposed to a random

sampling when subjects are chosen from many different places at many different times.

### **Apparatus**

The stimulus materials consisted of word lists. The list for the control group is randomly organised. (see appendix I) The list for the experimental group is the same words as for the control group but organised (see appendix II) A stop watch was used to time the distraction tasks and learning times.

### **Procedure**

The subjects were given a set of standardised instructions (see appendix III) which stated that they were to receive a word list of fifteen words and allowed twenty seconds learn them. After this they were to be given a distraction task which was to count in fours in reverse from forty to one for forty seconds. Then a test of free recall was to be given. Following this a verbal debriefing was to be given (see appendix IV) which stated the aim of the study and the reason why the subjects were not fully told what the experiment entailed. This being because fully informed consent would have lead to the subjects attempting to organise the word lists themselves. This is justified because the subjects did not come to any harm and were fully debriefed afterwards.

The experiment(s) were to be conducted in a quiet room not containing any other stimuli which may aid the subjects recall. This is an attempt to control any extraneous variables.

## **RESULTS**

The first thing to compare is the mean values of both of the conditions.(see appendix V) For the experimental condition the mean is 10. In the control it is 5.1. The mean for the experimental condition is nearly double that of the control condition, thus showing a significantly higher level of recall for the experimental condition, meaning that the alternative hypothesis seems to be correct.

Table 1.3 shows the measures of tendency and dispersion. (see appendix V) In the control condition the mean is 10 and the median is 9.5. This shows that the mean has not been distorted by any anomalous results. However, the difference between the two is larger than that for the control condition, showing that a particular result may have been slightly anomalous.

The standard deviation for each condition is rather low, suggesting that all the results were around the mean value. The standard deviation for the control condition is higher than that of the experimental condition, this being due to the fact that some subjects may have automatically organised the information themselves, thus leading to higher recall for some and not for others.

Graph 1 shows the subject against the number of words recalled. Both conditions show a steady positive trend. The control condition covers the larger range of words recalled and at subject 8 moves up by two words. This looks like a relatively sharp increase, but levels out in accordance to the other scores. The experimental condition climbs quite steeply and does not have as many plateaus as the control condition, showing a steeper positive trend.

There are not any anomalous results contained within this graph.

## **DISCUSSION**

I have decided to reject my null hypothesis and accept my alternative hypothesis. Meaning that recall for the subjects which learnt the organised word lists was higher than that of the subjects that learnt the same word list but randomised. This is because the results for the experimental group are much higher than that of the control group. The results for the experimental group cannot be due to the subjects being better at remembering as the subjects were randomly allocated to each condition.

My experiment supports Bower *et als* experiment in so far as to say that semantic organisation of information does aid recall in the short term memory. However, as previously stated, the results may have been altered by the individuals ability to recall information. This is said to be a random error. It is not a confounding variable which is an uncontrolled constant random error which result in anomalous results.

Validity of a psychological measure is the extent to which it does measure what it is intended to measure. Therefore, was this experiment actually measuring memory or was it measuring the subjects word knowledge or reading ability? To answer this, one must look at the word lists. (see appendix I) The words are very basic everyday objects/actions, therefore I would expect that all of the subjects were familiar with them. Therefore, this experiment was a good test of memory with a high resemblance to how memory is used in real life.

However, I could have used items that are usually found on a shopping list, therefore increasing the resemblance to how memory is used in real life. I believe that my study is valid but could be improved as mentioned above.

To ensure that the results from this experiment were reliable, I ensured that standardised instructions, procedure and stimulus materials were used. Standardisation means that all of the subjects receive exactly the same material. Meaning that no subject has a more 'in depth' instruction than the next. If one did this would confound the results.

I could have improved the reliability of the results by using one experimenter instead of two, thus reducing room for error in delivery of the oral debriefing and replication of the study.

Due to my results supporting Bower *et als* experiment, it shows consistency. This proves that the theory of semantic organisation of information leading to higher recall is a reliable finding.

My sample is an attempt at an accurate representation of the population, therefore my results should be able to be generalised to the public. However, my sample is opportunistic, this means that questions will be raised as to whether my sample is representative of the population. believe I achieved this by choosing equal numbers of male and female and equal numbers from the home and college environment. Therefore varying levels of intelligence, ability and knowledge.

The experiment was a field study. Therefore subjects were in their natural setting, not a controlled laboratory. Also, the subjects knew me and so did not behave in an abnormal way which would affect the validity. I believe this experiment has a very high ecological validity due to this and the fact that the test had high resemblance to how memory is used in real life.

In conclusion, I believe that my experiment was a valid and reliable look into the effect of semantic organisation on recall in the short term memory. It could have been improved though, as previously mentioned.

My experiment supports the findings of Bower *et al* (1969) and I believe that conclusions can be drawn from my results as were from Bower's experiment.

## REFERENCES

Atkinson, R.C and Shiffrin, R.M (1968) Human memory: a proposal system and it's control processes. In K.W Spence and J. Spence (Eds) *The psychology of learning and motivation Vol.2*. Academic Press.

Bower, G.H, Clark. M, Lesgold, A + Winzenz, D. (1969) Hierarchical retrieval schemes in recall of categorised word lists. *Journal of verbal learning and verbal behaviour*, 8, 323-343.

Eysenck, M. (1998) Memory. In M. Eysenck (Ed) *Psychology : an integrated approach*. Harlow, Addison-Wesley Longman.

Mandler, G. Organisation and memory. In K.W Spence and J. Spence (Eds) *The psychology of learning and motivation, Vol.1*. New York: Academic Press, 1967.

Tulving, E. and Pearlstone, Z. (1966) Availability versus accessibilty of information in memory for words. *Journal of verbal learning & verbal behaviour*. 5, 381-391.



## **APPENDIX I**

**Vice**

**Pen**

**Skip**

**Wade**

**Saw**

**Feather**

**Balloon**

**Punch**

**Spanner**

**Hammer**

**Watch**

**Stone**

**Walk**

**Climb**

**Chisel**

## APPENDIX II

**Chisel**

**Climb**

**Balloon**

**Hammer**

**Punch**

**Feather**

**Saw**

**Skip**

**Pen**

**Spanner**

**Wade**

**Stone**

**Vice**

**Walk**

**Watch**

## **APPENDIX III**

### **Instructions**

You will be given a list of fifteen words. You will be allowed twenty seconds to read and remember them.

When the time is up, you will then count in reverse from forty to zero in fours for forty seconds.

You will then have to recall as many words as possible in any order.

## **APPENDIX IV**

### **Debriefing**

The aim of this study is to see if people have a better level of recall if information is organised. It is proposed that organisation will act as a cue and aid recall of information in the short term memory.