

GCSE Psychology Coursework

Introduction

Research Method: Laboratory experiment

Design: Repeated measures

Relevant area of specification: Cognitive Psychology

Aim

Is recall of information improved when it is processed at a deep level rather than a shallow level?

Background Research

Atkinson and Schiffrin proposed that memory can be thought of as a process which memory is divided into structural components including short-term memory (STM) which has a limited duration, and long-term memory (LTM) which has an unlimited duration. According to Atkinson and Schiffrin's theory, information is passed from short-term to long-term memory through the process of rehearsal or repetition.

Craik and Lockhart projected a different way of interpreting the evidence that short-term and long-term memory, are two different stores. They claimed that the idea of rehearsing information did not clarify whether or not the information gets stored in LTM. For information to be stored in LTM then the materials have to be deeply processed; however if the material is processed briefly then it would not be registered in LTM.

Craik and Lockhart say that memory is a by-product of the way we process information. According to Craik and Lockhart, the more deeply we process information, the more likely we are to remember it.

The three levels of processing they describe are:

Level 1 – Structured, or Shallow level
Visual – What the word looks like
E.g. Is the word uppercase?

Level 2 – Phonetic or Phonemic
What it sounds like
E.g. Does the word rhyme with...?

Level 3 – Semantic
What the word looks means
E.g. Does the word mean the same as?

Each of these questions required participants to process information at different levels. Question 1 required shallow processing. Question 2 required phonetic or

phonemic processing. Questions 3 and 4 required semantic processing; Participants were asked to answer yes or no, in each case Participants were then given an unexpected test of recognitions.

It was assumed that only the first two tasks involved processing of meaning semantically. There were two groups: those that were asked to try to remember the words in intentional learning format and those that were not incidental learning. A free-call test followed which showed the same results for the incidental compared to the intentional learners. However recall was over 50% higher following the semantics tasks compared to the non-semantic tasks for those who were asked to recall unrelated words and 83% higher for those who were asked to recall related words.

Hypothesis

'More words will be recalled in Condition B, which requires phonemic processing than words in Condition A, which requires shallow processing.'

Method

Design

I am going to carry out this investigation using a repeated measures design. This is an experiment design in which the same participants are in each condition. This reason why I am using repeated measure design is because it is statistical power relative to sample size which is important in many real-world research situations. Repeated measures designs use the same subjects throughout different treatments and thus, require fewer subjects overall; because, the subjects are constant, the variance due to subjects can be partitioned out of the error variance term, thereby making any statistical tests more powerful.

Independent Variable

- I am going to producing a list of 30 nouns which are commonly used in the English language. The list of words would be randomly divided into two. In Condition A, half of the words would be written in upper case letters and the other half in lower case letters and each word would have the questions: 'Is the word in the list?' However in Condition B a category question would be generated. The category question would be: 'Is the word in the list?' For each condition, half of the answers should be 'yes' and half of them 'no'. Participants would be asked to recall words in both section A and B.
- Another independent variable is to change the order of the words listed in each section of which the words

Dependent Variable

- I am going to be using the same words for each participant and produce standardised instructions which would be read out to each participant to ensure that the procedure is carried out the same way of each

participant and that all participants receive the same amount of information about the investigation.

Controlling Variable

To make sure all the variables are controlled, all the participants are going to undertake the same experience except in the independent variable, and so a standard procedure, with standardised instructions, is developed and followed for each participant.

Ethical Considerations

Ethics are the desirable standards of behaviour we use towards others. If we have ethically, then we treat others with respect and concern for their wellbeing. Researchers have legal and moral responsibilities to those who help them in their research. Every individual has rights, and these must be respected and protected.

The privacy of participant must be protected. This includes confidentiality, observations and the right to withdrawal if participants feel uncomfortable.

To keep confidentiality, I need to make sure participants and the data gained from them, is anonymous unless they give their full consent. ▲Also if participants initially agree, and then decide to withdraw that agreement at the end of the study or after they have been debriefed, all data and information about them must be deleted from the research.

▲Another ethical consideration which needs to be respected is the right for participants to withdraw from the investigation. Even when participants agree to take part in an experiment, they do not know the extent to which you will encroach upon their feelings, emotions or sense of what is appropriate. This why it is important that I receive informal consent from my participant; also tell them they are able to withdraw at any time during the research if they wish to do so.

The participant suffering from distress also needs to be taken into consideration as I need to ensure that those taking part in the research will not be caused distress. Participants also need to make sure they are protected from physical and mental harm.

Participants

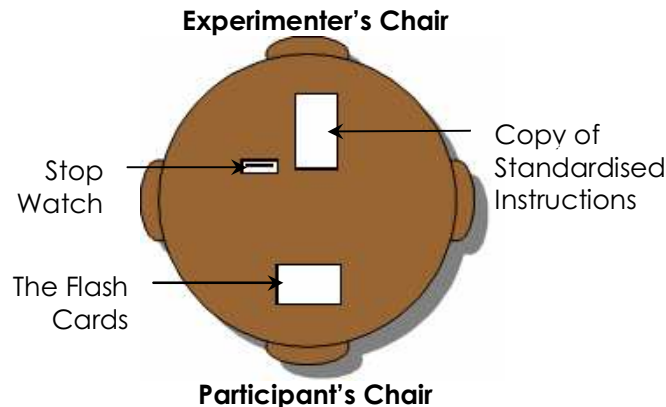
The target population I am using for my investigation are 15 to 18 year old students and I am experimenting on a sample of 15 participants.

The type of sampling method I am using for this investigation is opportunity sampling. I am using an opportunity sampling method because it relies on participants who are more easily accessible. It is also ideal for age criteria and is quick and cheap in comparison with the other methods. Furthermore anyone who is available, and agrees to take part in the research, can become a participant.

Materials

For this investigation I would need the follow materials:

- ▲ quiet room or area
- ▲ table and chairs
- 30 flash cards with the relevant words and questions (▲ppendix ▲)
- ▲ copy of the standardised instructions (▲ppendix B)
- ▲ consent letter signed by teacher (▲ppendix C)
- ▲ timer



Procedure

Standardised Procedures

To ensure that all participants have the same experience, I have to ensure that they are all tested:

- In the same place, with the same equipment and materials placed in the same way.
- Under the same conditions, so the level of lighting, noise and heat remains the same for all participants; so the participants won't get distracted
- ▲t roughly the same time of day, as people may have behave differently if tested at nine o'clock in the morning rather six o'clock at night; so participants won't feel tired if it is late in the evening or early in the morning.

Standardised Instructions

Participants would be given identical instructions in exactly the same way to ensure nobody is at a disadvantage.

How I carried out my research

1. First, I produced a list of 30 nouns which are commonly used in the English language. I then randomly divided the list of words into two. I named on of the set of words Condition ▲ and the other Condition B. In Condition ▲, half the words were written in upper-case letters and the other half in lower-case letters. The list of words was titled under: 'Is the word in upper-case letter?' The other set of words, Condition B was under a question: 'Is the word a type of food'. For each condition half the answer was 'yes' and the other half was 'no'.
2. Each of the 30 questions was then written on a piece of card with the appropriate question on the back.

3. I then collected the data by inviting a participant into a quiet room and reading out the standardised instruction to address to them the ethical issues, such as: consent to withdrawal and deception and confidentiality. The participant is shown the first word and the relevant questions are reads out. Each word is shown for 10 seconds and they are presented in a different, random order for each participant. Once all 30 questions have been asked, a free-recall test is completed by asking the participant to recall as many of the words as possible on a blank sheet of paper.
4. Once my experiment was complete I then recorded my results.

~~(Look at Appendix A, to see the words used in Condition A and Condition B. Appendix B, to see the standardised instructions used in the experiment.)~~

Results

Recording Data

My data from the research was collected independently. Here are my results from my research:

| Participant Number | Number of words recalled in Condition A | Number of words recalled in Condition B | Total number of words recalled |
|--------------------|---|---|--------------------------------|
| P1 | 9 | 10 | 19 |
| P2 | 10 | 11 | 21 |
| P3 | 8 | 9 | 17 |
| P4 | 7 | 12 | 19 |
| P5 | 8 | 11 | 19 |
| P6 | 9 | 9 | 18 |
| P7 | 10 | 12 | 22 |
| P8 | 9 | 13 | 22 |
| P9 | 8 | 10 | 18 |
| P10 | 8 | 11 | 19 |
| P11 | 9 | 10 | 19 |
| P12 | 7 | 9 | 16 |
| P13 | 10 | 12 | 22 |
| P14 | 11 | 13 | 24 |
| P15 | 8 | 10 | 18 |
| Total | 111 | 162 | 293 |
| Mode | 8 | 10 | 19 |
| Median | 9 | 11 | 19 |
| Mean | 7.4 | 10.8 | 19.5 (1dp) |
| Range | 4 | 5 | 9 |

I drew a table to show results because it is an accurate way of showing data. It shows all the participants who were involved in my research and

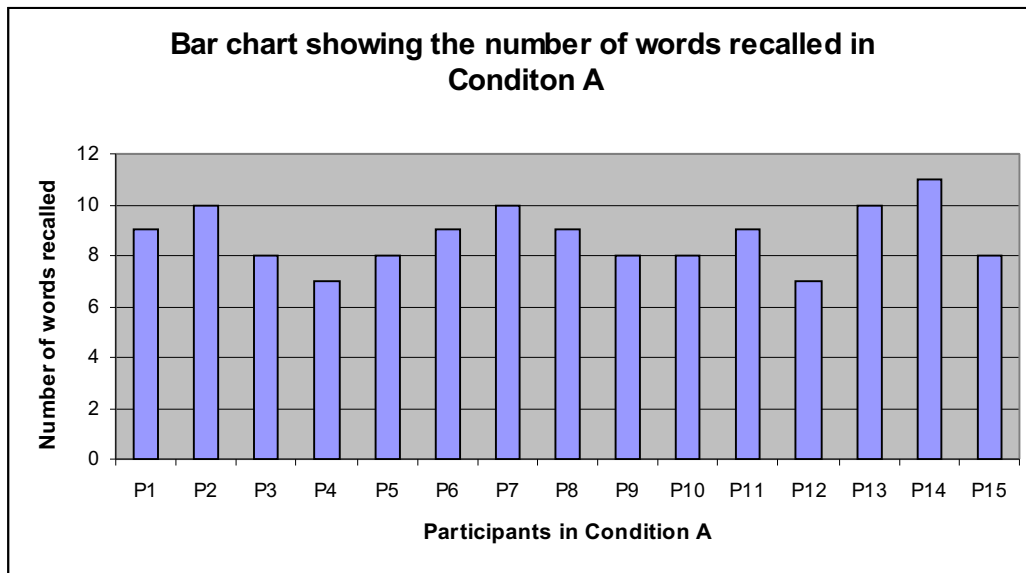
their scores. Using a table of results allows me to see all my participants' results and allows me to compare them against the other conditions.

Presenting Data

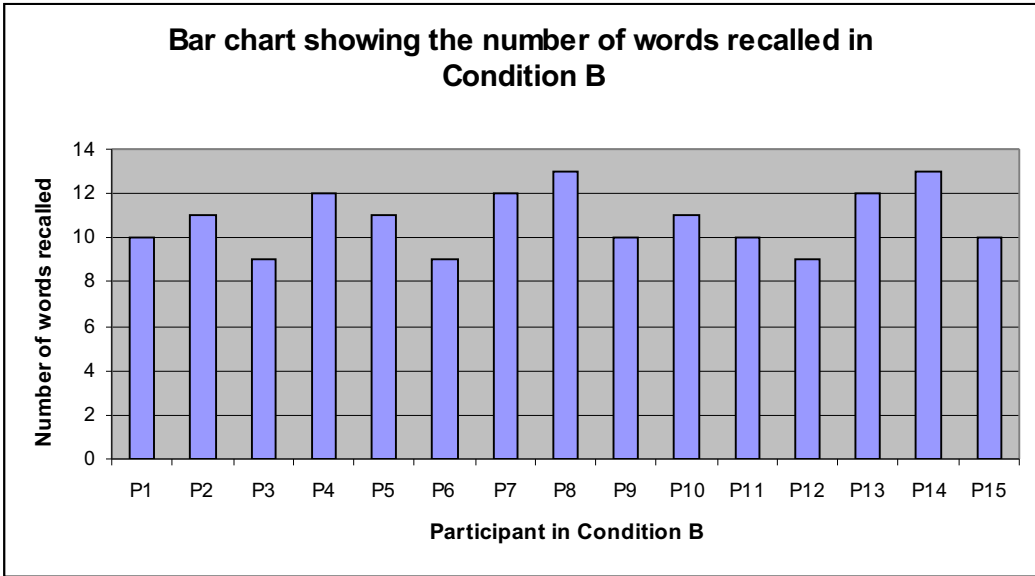
In order to make my data easier to understand, I have presented it visually in various forms.

Bar Chart

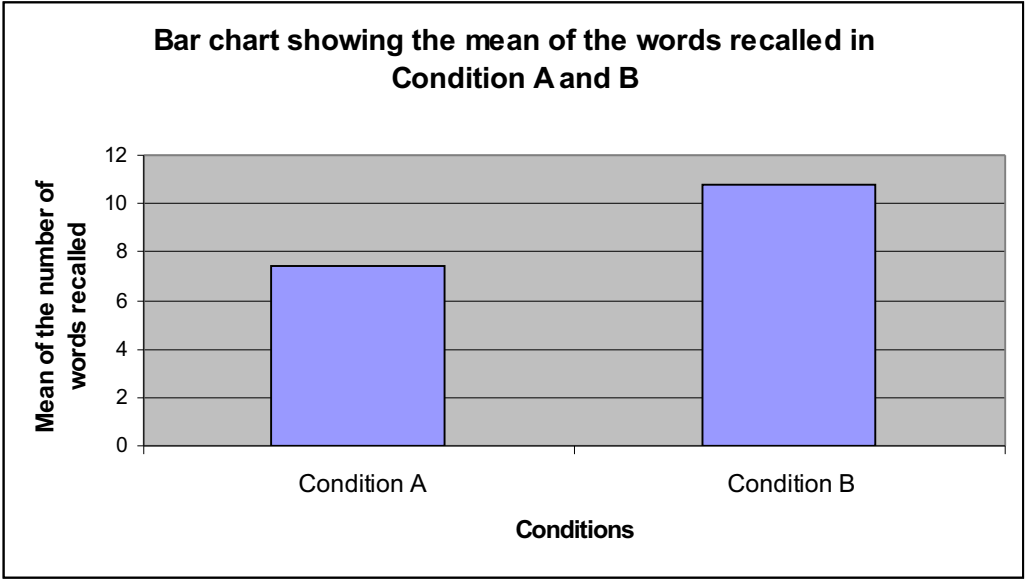
I used a bar chart to demonstrate my results because it shows the amount of times something occurs and they are also very useful to show the means and see the relationships between the two conditions.



This graph shows that the highest number of words recalled in Condition A is 11 and the lowest amount of words recalled is 7.



This graph shows that the highest number of words recalled in Condition A is 13 and the lowest amount of words recalled is 9. The overall results received from my participants in Condition B, is higher than words in Condition A.



This shows that more words were recalled in Condition B than in Condition A.

Analysing Data

Mode

The mode is the number which occurs most often in a set of data.

Number of words recalled in Condition A: 8

Number of words recalled in Condition B: 10

Total number of words recalled: 19

Median

The median is the middle number when the set of results is put in order from lowest to highest.

Number of words recalled in Condition A:

7 7 8 8 8 8 8 9 9 9 9 10 10 10 11

Median = 11

Number of words recalled in Condition B:

9 9 9 10 10 10 10 11 11 11 12 12 12 13 13

Median = 11

Total number of words recalled:

16 17 18 18 18 19 19 19 19 19 21 22 22 22 24

Median = 19

Mean

The mean is the most common measure of average. To calculate the mean of any set of numbers: Add the numbers together to obtain a total. Divide the total by the amount of numbers. The mean reflects all the scores in the data. Here are the means of my research:

Number of words recalled in Condition A:

$$\frac{9 + 10 + 8 + 7 + 8 + 9 + 10 + 9 + 8 + 8 + 9 + 7 + 10 + 11 + 8}{15} = \frac{111}{15} = 7.4$$

Number of words recalled in Condition B:

$$\frac{10 + 11 + 9 + 12 + 11 + 9 + 12 + 13 + 10 + 11 + 10 + 9 + 12 + 13 + 10}{15} = \frac{162}{15} = 10.8$$

Total number of words recalled:

$$\frac{19 + 21 + 17 + 19 + 19 + 18 + 22 + 22 + 18 + 19 + 19 + 16 + 22 + 24 + 18}{15} = \frac{293}{15} = 19.5 \text{ (1dp)}$$

Range

The range is the calculation by taking the lowest scores away from the highest score. The range shows the spread of scores from lowest to highest. The ranges in this case are:

Number of words recalled in Condition A:

$$11 - 7 = 4$$

$$\text{Range} = 4$$

Number of words recalled in Condition B:

$$14 - 9 = 5$$

$$\text{Range} = 5$$

Total number of words recalled:

$$25 - 16 = 9$$

$$\text{Range} = 9$$

I found that the mean in Condition A is 7.4, which is far from the mean I calculated for Condition B which is 10.8. This suggests that there is a small difference between both scores, which has been confirmed when I calculated the median in Condition B, which is 11. However, the mode is not very close to the mean and median which suggests that there may actually be a difference between the results in the two conditions.

This is confirmed by the range, which is greater in condition B than in condition A, because the lowest and highest score are fairly different in B. Comparing the range for each condition highlights the extreme scores, whereas a comparison of the mean does not. This is why calculation of the range is very useful. Now having identified this difference between conditions, I can then say whether this is due to the independent variable or to another variable in the participants, for example their memory ability.

Discussion

Interpretation

The results support my hypothesis, which was: 'More words will be recalled in Condition B, which requires phonemic processing than words in Condition A, which requires shallow processing.' My research confirmed Craik and Lockhart's theory of memory; this is because they said the more deeply we process information, the more likely we are to remember it. In my experiment Condition A required shallow processing and Condition B required phonemic processing. I found that there was a higher number of words recalled in Condition B than Condition A. This shows that we are likely to remember more words which require phonemic processing than shallow processing.

Evaluation

My overall research followed smoothly. The participants understood and responded well to my instructions, and justified my hypothesis.

Conclusion

This experiment was based on Craik and Lockhart's theory on memory. Its aim was to see whether recall of information improved when it is processed at a deep level rather than a shallow level?

I found out that we are able to remember more information when you recall in deep level processing than shallow processing. As words in shallow processing would store the information in the short-term memory rather than the long-term memory.

This result supports the findings of Craik and Lockhart's study and concludes that processing information at a deep level would store the information in the long-term memory.

Bibliography

To guide me in my investigation I used: 'Understanding Psychology by Barbara Woods'.