TITLE:

An experiment to investigate the effect interference has on Memory Recall.

Alice Foster Coursework

Aim: To determine the effect that interference will have on Memory recall.

Hypothesis: Interference will cause an effect on memory recal l.

IV: Interference
DV: Successful Memory Recall

Introduction

What is memory? Cara Flanagan (97) gives the following definitions of memory,

- The mental function of retaining data i.e. learning.
- The storage system which holds the data.
- The data that is retained.

We use our memory all the time without even realising it. We remember how to read, write, open doors, shut doors etc, for normal every day things.

In order for us to remember information, memory goes through 3 stages:

- Encoding
- Storage
- Retrieval

Encoding is how we store information into our memories and can be done in 3 forms: -

- Visual – You see the image you are trying to recall
- Acoustic – You hear the information in your mind
- Semantic – You understand and remember the meaning of information stored

Storage is the information that we have encoded, in our minds, until we need it. Retrieval is when we use the information that we have encoded and stored.

There are 3 main theories to explain Memory. Richard Atkinson and Richard Shiffrin (1968) proposed the Multi-Store Model. They suggested that memory was a series of processes.

Sensory memory is where information is stored for a few seconds, until it is encoded. If information is not encoded it will fade from the sensory memory. If it has been encoded it will pass into Short-Term memory (STM). STM can only store between 5 and 9 pieces of information (7 is a 'magic' number i.e. +2 or -2). If information stored in short-term memory is rehearsed it will pass into Long-Term Memory (LTM). If not, it will fade from STM, very quickly. Long-Term Memory is where we store information that has been rehearsed or repeated. LTM has unlimited capacity.

The Multi-Store model describes memory being stored in processes i.e. a, then b, then c etc. It is a very mechanical way of working.

L Peterson & M Peterson (1959) carried out tests to see how long we can store information in our STM. Their participants were given trigrams (such as XPJ, AKM) and were asked to count backwards, aloud, in 3's. As they could not repeat or rehearse the information, it faded from STM.

B Murdock (1962) carried out 'Free recall' experiments. He called out a number of words and asked the participant to try to remember the words, in whatever order they could manage. The results of this showed the Recency effect and the Primacy effect. Geoffrey Shoesmith (04) defines the Recency effect by stating, "…when participants are manipulated into concentrating attention on later information about a person, they are more likely to remember that later impression – this referred to as the Recency effect." Cara Flanagan (97), defines the Primacy effect by stating "The tendency for first received information to dominate subsequent impressions."

The participant firstly recalled the words that were called out last (the Recency effect). B Woods (04) states, "This is evidence that the last few words were still stored in Short-term memory. The words that were called out first were also recalled (The Primacy effect). As the participant was able to rehearse these words, they were stored in L.T. M.

Another explanation of memory is the Level's of Processing Model. This model proposes that the deeper we process the information; the more likely we are to retain it. It talks about 3 different levels of processing –

- Structural level (Appearance)
- Phonetic level (Sound)
- Semantic level (Meaning)

Craik and Lockhart (1972) tested this and found that there was more information processed at semantic level than acoustic level and that information processed at structural level was remembered least. This theory also discussed elaboration and how if we elaborate on information we will retain it better (Semantic level), a deeper process.

F Bartlett (1932) came up with the Constructive or Reconstructive model of memory. Where the other theories describe memory as being an exact copy of what we have seen, heard or understood, the constructive approach discusses how we adapt our memories to fit into our own lives or experiences i.e. to construct (or reconstruct) our memories. He discusses that what we don't remember, we 'fill in the gaps'. This is how we try to make sense of information.

There are also theories to explain forgetting. One of which is the interference theory. This theory suggests that other information that we have previously stored or things we experience whilst trying to remember new information, can weaken our ability to store the new information. This is known as interference and there are two kinds, Retroactive Interference and Proactive Interference.

B Woods (04) defines Retroactive Interference; "Retroactive interference occurs when information you have received recently interferes with your ability to recall something you learned earlier." So basically it is when a new memory interferes with an old one. Likewise, Proactive Interference is when an old memory interferes with a new one. C Flanagan (97) defines Proactive Interference as "Learning one set of data first interferes with later learning."

Underwood & Postman (1960) investigated this by giving a list of paired words to the participants to learn. They then halved the group and gave the experimental group a second list to learn but did not give this list to the control group. This list was similar to the first list. The participants were asked to recall the first list of words.

The researcher intends to investigate the affect interference will have in Memory recall.

METHOD

DESIGN:

The experimental design which the researcher chose to use was the repeated measures design. This was chosen because the same participants are tested in both experimental conditions and control conditions. "Therefore all participants are exposed to the IV and tested on the DV." (C Flanagan '97)

Another method which could have been used was counter balancing but as this experiment was carried out at a band rehearsal, the researcher decided that this method was inappropriate as it was time consuming and the participants had to return to their practice.

The researcher used two different lists of words. The researcher planned two conditions and are as follows: -

Condition A - Without Interference
Condition B - With Interference

EXTRANEOUS VARIABLES:

- The researcher will ensure that all participants are given the same words.
- That all participants were given the same amount of time to learn the words.

EXTRANEOUS VARIABLES CONTROL:

- In both conditions, the researcher ensured that the same amount of time was given between learning and recall.
- The time allocated when recalling the words was the same.
- The only interference that occurred was set up by the researcher.
- The experiment was carried out before the band rehearsal, to ensure there was no outside noise during the experiment.

ETHICAL CONSIDERATIONS:

- The researcher will ensure that participants are over 18 years of age.
- The researcher will reassure participants of confidentiality.
- The researcher will offer participants the right to withdraw at any given time, before, during or after the experiment.
- The researcher will not use participant's names or personal information when writing report.
- The researcher will not force anyone to participate and will make them aware they can stop at any time.
- The researcher will thank everyone for taking part and will debrief everyone after the experiment is complete.

PARTICPANTS:
As the researcher was carrying out the experiment during a band rehearsal, it was more convenient to use opportunity sampling as participants were easily accessible as they all belonged to the band. "Anyone who is available, and agrees to take part in research can become a participant." (B Woods 2004) This type of sampling was economical and very quick.

In order to have a bigger and more accurate representative of the population, Random Sampling may have been used , but opportunity sampling proved to be more appropriate to this experiment.

10 adults participated in this experiment.

MATERIALS:
Cue cards for the researcher
Two lists of fifteen words
Twenty sheets of A4 paper
Ten pens
A radio
A mobile phone
Notes on Debriefing
A stopwatch
An assistant to help with interference (As previously arranged)

PROCEDURE:
Before the experiment began, the researcher set up the room by spacing 10 single desks around the room and placing an A4 page and pen on each desk.

The experiment was carried out in a separate room, in the same building of the band rehearsal.

When everyone was seated, the researcher thanked everyone for agreeing to take part in the experiment. The researcher also reminded everyone that they were free to leave at anytime.

The researcher then read out a list of standardised instructions. The researcher asked the participants if they wanted these instructions read out again. The participants agreed that this was not necessary.

In condition A, the researcher informed the participant's tat she was going to call out a list of fifteen words and that they were not to write anything at this time.

When the researcher had called out the list of words, giving a three second interval between each word, she informed the participants to list as many words that they could remember onto the sheet in front of them.

When two minutes were up, the researcher collected the pages and informed the participants that there will now be a five minute break. The researcher began a conversation with participants about the weekend.

At this point, another band member entered the room to chat to participants. This had been previously arranged by the researcher.

The researcher told the participants that five minutes was up and that they were going to begin again. The researcher handed out everyone another A4 sheet and turned on the radio for condition B.

At this point, the other band member left the room, as previously arranged with the researcher.

The researcher informed the participants that she was going to call out another fifteen words and that they were not to write anything at this time.

Once the researcher had called out the words, again leaving a three second interval between each word, she asked the participants to list as many words as they could remember onto the sheet in front of them.

A few seconds after the participants started writing, the other band member, who had left the room, started phoning the researcher's mobile phone. (This had been previously arranged with the researcher)

The researcher had to empty her bag in order to find the phone and to turn it off. At the point the other band member returned to the room and pretended to look for something and was making quite a bit of noise as he kept dropping and banging things.

When two minutes were up, the researcher collected the sheets.

The researcher debriefed participants and thanked everyone for taking part.

STANDARDISED INSTRUCTIONS

- You are going to hear a list of 15 words.
- You will then be given 2 minutes to recall as many words as you can.
- Please write your answers on the page provided.
- Please do not talk among yourselves.
- You will have a 5 minute interval to relax.
- You will then be given another list of 15 words.
- You will be given a further 2 minutes to recall those words.
- Please feel free to leave at any time during this experiment.

DEBRIEFING

Thank you all for agreeing to be part of this experiment.

Please note that all findings and results will be kept strictly confidential.

If at anytime you feel you do not want your information included in my results, please let me know.

The purpose of my experiment was to investigate how interference affects recall of information

Are there any questions? A copy of the results will be available next week at band practice.

RESULTS:

The results of the experiment are as follows:

PARTICIPANT	NO. OF WORDS RECALLED WITHOUT INTERFERENCE (Condition A)	NO. OF WORDS RECALLED WITH INTERFERENCE (Condition B)
ONE	6	5
TWO	4	3
THREE	2	7
FOUR	9	6
FIVE	5	4
SIX	5	5
SEVEN	7	5
EIGHT	5	8
NINE	6	3
TEN	3	5

Participant three's results more than trebled in condition B, whereas participant nine's results halved in condition B.

Below is a table summarising if the participants recalled more or less in each condition

PARTICIPANT	MORE OR LESS WORDS RECALLED WITHOUT INTERFERENCE (Condition A)	MORE OR LESS WORDS RECALLED WITH INTERFERENCE (Condition B)
ONE	MORE	LESS
TWO	MORE	LESS
THREE	LESS	MORE
FOUR	MORE	LESS
FIVE	MORE	LESS
SIX	SAME	SAME
SEVEN	MORE	LESS
EIGHT	LESS	MORE
NINE	MORE	LESS
TEN	LESS	MORE

Six participants out of ten recalled more words in condition A. Three participants out of ten recalled less words in condition A.

As you can see, participant six recalled the same amount of words in each condition.

Charts:

Chart 1

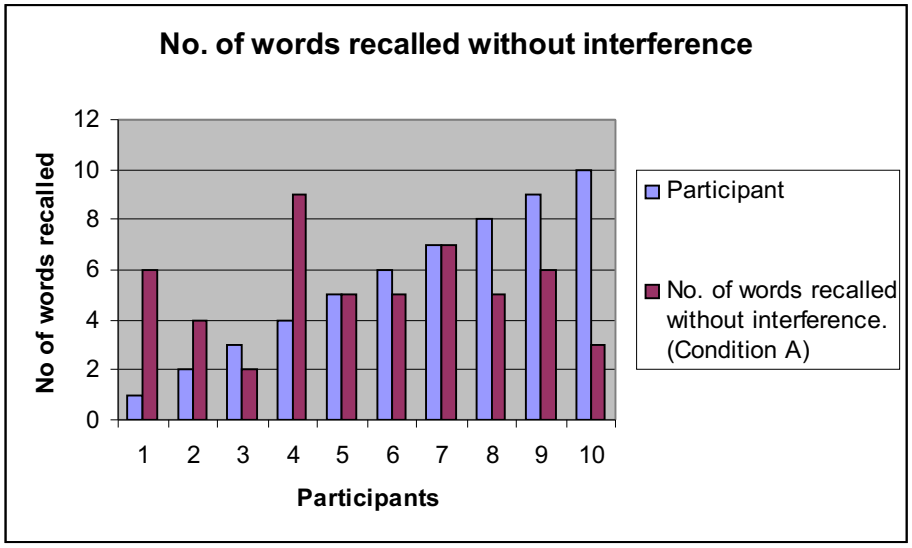


Chart 2

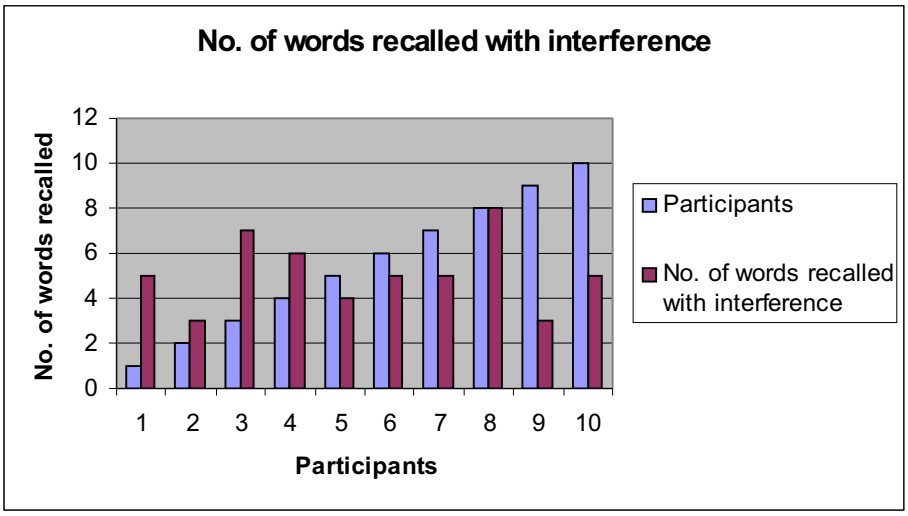


Chart 3

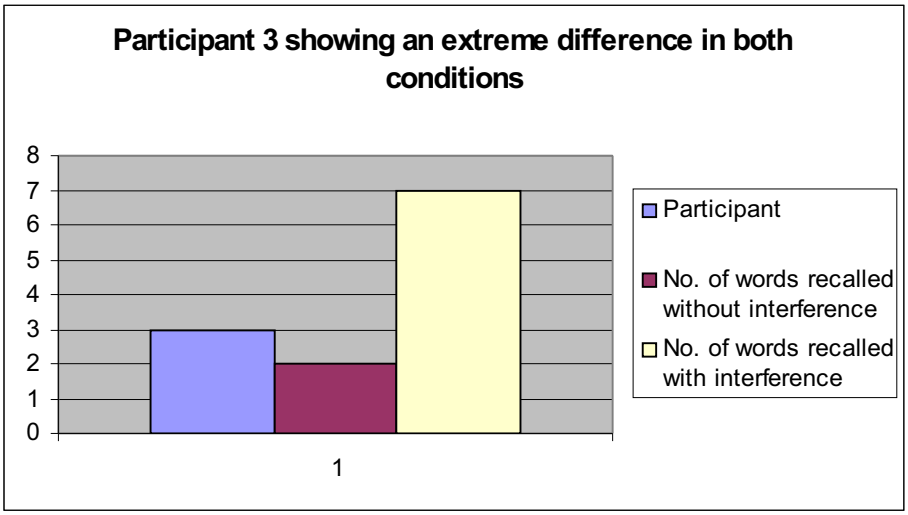


Chart 4

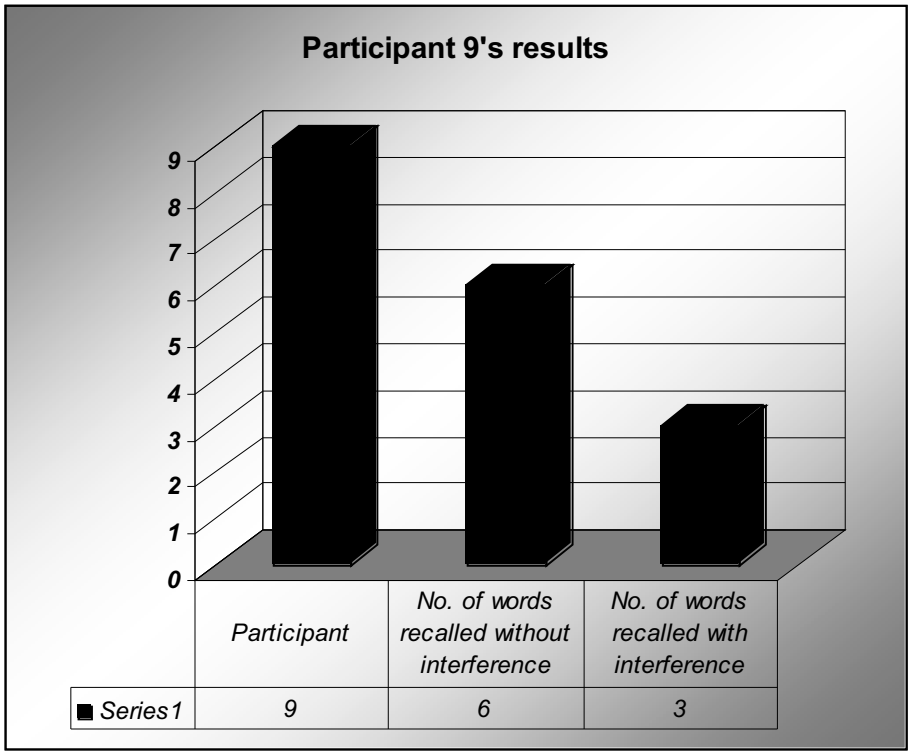


Chart 5

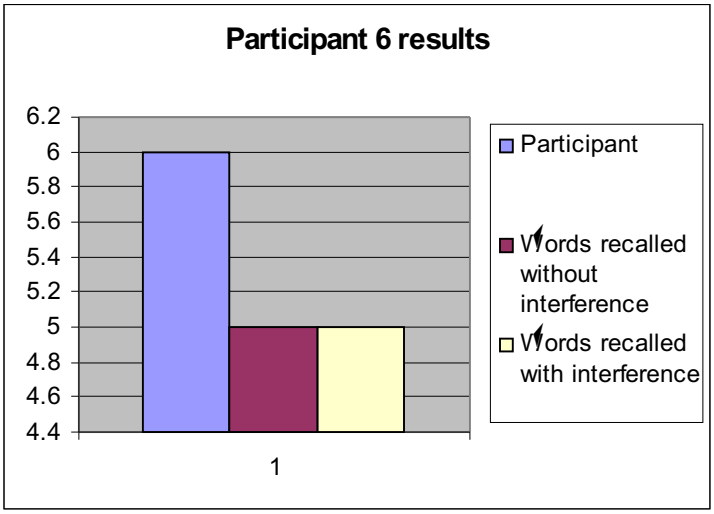
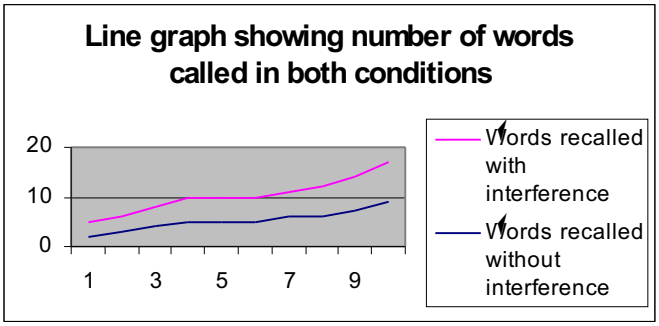


Chart 6



Mode

Condition A – Without Interference

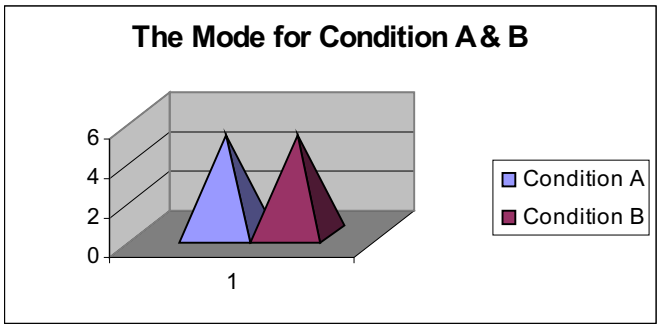
6, 4, 2, 9, 5, 5, 7, 5, 6, 3

The mode for 'without interference' is 5.

Condition B – With Interference

5, 3, 7, 6, 4, 5, 5, 8, 3, 5

The mode for 'with interference' is 5.



Median

Condition A - Without interference

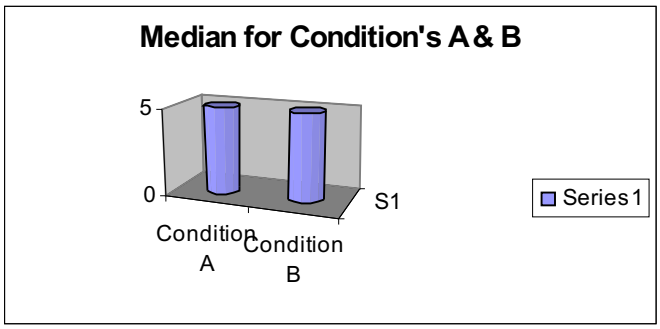
2, 3, 4, 5, 5, 5, 6, 6, 7, 9

The median for 'without interference is 5.

Condition B – With interference

3, 3, 4, 5, 5, 5, 5, 6, 7, 8

The median for 'with interference is 5.



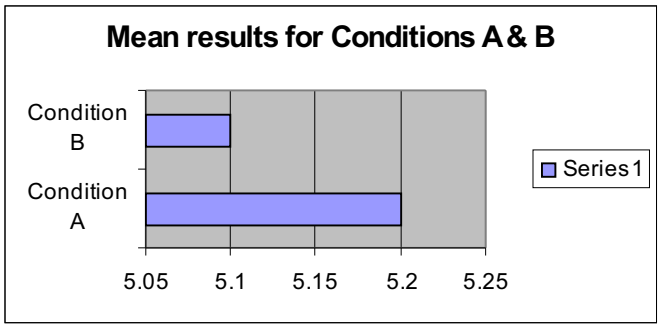
Mean

Condition A – Without Interference

Total 52 / 10 = 5.2

Condition B – With Interference

Total 51 / 10 = 5.2



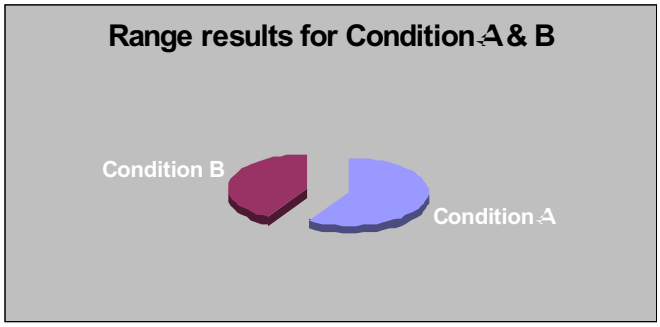
Range

Condition A – Without interference

9 – 2 = 7

Condition B – With interference

8 - 3 = 5



DISCUSSION

Interpretation

The results of the experiment showed a slightly higher number of words were recalled without interference than when there was interference. This still supports the study carried out by Peterson & Peterson (1959) which I mentioned in my introduction. These results support the Hypothesis which was, Interference will cause an effect on memory recall.

The researcher was also very interested to see in what order the participants recalled the words (although the researcher had emphasised to the participants that order was not important). The results showed that without interference, the majority tended to recall words that were called at the start, the end or both. Very few recalled words which were called out in the middle. With interference, the results were quite similar. This would support the studies carried out by Underwood & Postman (1960) and is an excellent example of the Primacy and Recency effect. Geoffrey Shoesmith (04) states "Study of memory suggests that we tend to remember the first items in a list and the last items – more so than the items in the middle." This can also be known as the Serial Position effect.

Evaluation

The participants responded well to the study. The researcher had everything set up and planned out in advance which helped the experiment to go smoothly. The participants all understood the instructions but unfortunately some participants did begin to make up words when they couldn't remember anymore, even though the researcher did emphasise that it was not a 'race or competition'.

As the researcher mentioned previously, it may have been better to have used random sampling in order to give a more accurate representative of the population. But this was not possible due to time restraints.

It may have been interesting to have carried out this experiment again by giving participants the words to see when learning. This may have changed results as participants would have been encoding the information visually as opposed to acoustically. The results could have been hampered due to nerves as participant would not know what this experiment is for until debriefing.

Conclusion

This experiment supported the Hypothesis that was Interference will cause an effect on memory recall.

As only a small sample was used, the researcher would not be confident about generalising the results although the researcher's results were consistent with theories and other studies.

The only problem the researcher found was that participants were extremely nervous before they began. When they began condition B, the participants may have relaxed or possible guessed what the experiment was for therefore could bias the results.

The researcher learned through further reading for this study the importance and vast affect that rehearsal and interference may have on Memory recall.

References & Bibliography

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INDEX

APPENDIX

Condition A

Without Interference

Condition B

With
Interference

Cue Cards