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Abstract

The aim of this study was to investigate into the Primacy and Recency effect. The study was based on Glanzer and Cunitz's research (1966) who suggested that when remembering words, if given an interference task, the recency effect will be virtually eliminated. It was therefore predicted that when a group of participants were recalling words after having an interference task there would be little, if no recency effect. However it was also predicted that when an interference task was not involved there would be both a primacy and recency effect. The experiment was conducted on two groups of participants, 20 in each group. They were all students between the age of 16 and 18. This was an independent experiment. The findings from this study indicated that there was less of a recency effect when using an interference task than when not.

Introduction

The aim of this investigation to find out whether people remember material at the beginning of a list better than material at the end. A further aim is to show that when participants take a memory test with the involvement of an interference task there is no recency effect.

The recency effect can be defined as the tendency to recall items at the end of the list more readily than those in the middle (about the last 25%). The recency effect occurs due to the last lot of information still being in short term store. A familiar example of the recency effect is the observation that a pop group is only as good as their last hit song. People tend to remember things more clearly if they have happened recently. The recency effect can be measured using free recall, where participants are shown a list of words, and the later asked to recall them. The recency effect is shown by the fact that the last few words in the list are usually remembered better than the middle. However, Glanzer and Cunitz (1966) found that counting backwards for only 10 seconds between the end of the list presentation and the start of recall (thus producing an interference task) virtually eliminated the recency effect, but had no other effect on recall. This can be explained by the fact that the counting backwards 'interfered' with the process of creating memory and so this wiped out the words towards the end of the list. It can be seen that the rest of the list was not affected by the interference task, as they were now in long-term memory store.

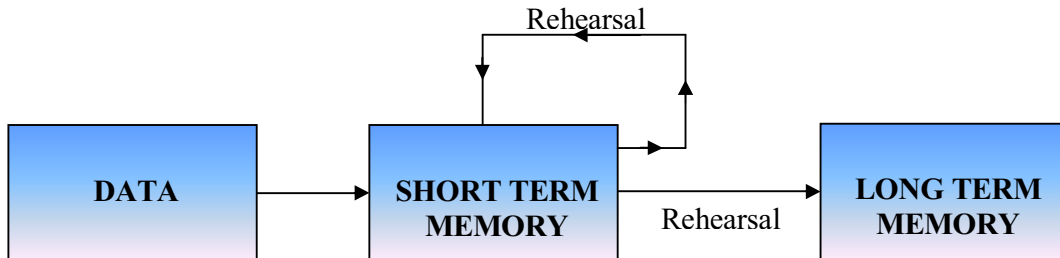
In Glanzer and Cunitz experiment the participants recalled the first few items in the list much better than those in the middle, this is known as the primacy effect. The primacy effect can be defined as a high level of free recall of the first items in a list (about the first 25%). The primacy effect depends mainly on rehearsal, in that the words at beginning of the list are rehearsed for longer than those in the middle. The primacy effect was shown by Rundus and Atkinson (1970), who asked their participants to rehearse out loud any of the words they wanted to during list presentation.

The recency effect is found when the results of a free recall task are plotted in the form of a serial position curve. Generally, this curve is U-shaped, and the recency effect corresponds to the tail of the U on the right. This tail indicates that words presented at the end of a list of to-be-remembered items are better remembered than words presented in the middle of this list. It is called the recency effect because these items were the ones presented most recently to the subject in the memory experiment.

The primacy effect is found when the results of a free recall task are plotted in the form of a serial position curve. Generally, this curve is U-shaped, and the primacy effect corresponds to the tail of the U on the left. This tail indicates that words presented at the start of a list of to-be-remembered items are better remembered than words presented in the middle of this list. It is called the primacy effect because these items were the ones presented first to the subject in the memory experiment.

The diagram below shows the multi-store model of memory designed by Atkinson and Shiffrin (1968). It shows us how rehearsal is a vital part of the memory system. This model of memory can help to explain why interference will eliminate the recency effect. The recency effect is part of the short-term memory store, in that it is

the last piece of information taken in and so, like all information, it goes into short-term store first. What allows us to remember this information is through rehearsal, thus temporarily keeping it in short-term memory store. It is therefore clear to see that if rehearsal is taken away, as it is through an interference task, then there will be no recency effect.



Experimental hypothesis

If given a list of words to remember, involving an interference task, when recalled there will be a strong primacy effect, and little, if no recency effect. This, one tailed hypothesis was formulated as previous research has indicated the existence of a primacy effect, and the elimination of the recency effect when using an interference task. However when undertaking the same task without interference there should be both a primacy and recency effect.

Null hypothesis

If given a list of words to remember involving an interference task, when recalled there will be no difference between how strong the recency and primacy effect is.

Method

Within this investigation there are two groups of participants, consisting of 20 different people in each group. The participants used were all 'A' level students and were asked at random if they willing to take part. Some of these students studied psychology at 'A' level themselves and so may have known what the investigation was about, thus possibly affecting the final results. The type of design being used is that of independent measures. There are two main variables in this investigation, which will later be correlated; these are 'word number' and the total number of times each word was remembered by the participants.

Materials used

Instruction sheet, Data collection sheet.

Procedure

It was decided that 20 words would be randomly picked and then used to find out if the primacy effect and recency effect existed. The words were kept the same in each in order to keep the two experiments as similar to each other as possible However the investigation included an interference task in one case and so therefore there should be no recency effect and so it is important that the findings from this investigation show this.

Experiment 1 – With Interference task

1. *Participants were asked if they were willing to participate in a psychological investigation.*
2. *Participants were then given verbal instructions as to what to do. They were told that they would be given a sheet of paper with a list of words on that they had to memorise. They were told they had forty seconds to memorise the words. See appendix A*
3. *When the time limit was over the sheet of paper was taken by one of the experimenters and the participants were then instructed as to what to do next. They were told to count backwards in threes from one hundred in one minute.*
4. *Once step three had finished the participants were given a blank sheet of paper. The participants were then told that they had exactly one minute to write down as many words from the list that they could remember. The paper was then collected by one of the experimenters*
5. *Participants were debriefed as to the purpose and aims of the investigation*

Experiment 2 – Without Interference task

1. *Participants were asked if they were willing to participate in a psychological investigation.*

2. *Participants were then given spoken instructions as to what to do. They were told that they would be given a sheet of paper with a list of words on that they had to memorise. They were told they had forty seconds to memorise the words.*
3. *When the time limit was over the sheet of paper was taken by one of the experimenters.*
4. *The participants were then given a blank sheet of paper. The participants were told that they had exactly one minute to write down as many words from the list that they could remember. The paper was then collected by one of the experimenters*
5. *Participants were debriefed as to the purpose and aims of the investigation*

Results

Results were gathered simply by collecting the individual results from each participant and then putting the scores together in two separate tables. One table showed the results when using an interference task and the other when not using an interference task. These tables can be seen in appendix B and C respectively.

From the results found it can clearly be seen that there is less of a recency effect in the experiment using an interference task. The total number of the last five words remembered in the experiment including the interference task is 157 compared to a total of 216 in the experiment without the interference task thus supporting Glanzer and Cunitz research. However, rather oddly fewer words were remembered in all sections of the words in the experiment using the interference task. This shows that there is perhaps the possibility that an interference task affects all parts of the memory.

Below are results from the experiment with the interference task. The calculations for this can be seen in appendix D

	Condition 1-Interference task	Condition 2- Non Interference
Mean - First 5	1.5	2
Mean - Last 5	1.1	1.9
Mean - Middle 10	1.7	1.9
Total Mean	4.3	5.8
Mode words recalled	5	7

Furthermore the graph shown in appendix E (Graph 1) shows how many words were recalled in total for each condition

The Mann Whitney U test was carried out on the data. This test was chosen as, firstly the investigation was of an independent measures design, as different participants were used in each condition. In addition the investigation was looking for a difference in the recency effect from the two conditions.

The value of both N1 and N2 was 20 (number of participants in each condition). The calculated values of U and U' were 294.5 and 105.5 respectively. These values exceeded the critical values in the table at the significance of 0.005. Although, U' did not exceed the critical value of 114 in the table for the test at $p < 0.01$ significance level for a one tailed hypothesis. The results are therefore significant at the 0.01 level of significance ($p < 0.01$) for a one tailed hypothesis. . Blow is a summary table for the results of the Mann Whitney U test.

N1	N2	Value of U'	Critical value of U'	Hypothesis	Probability value
20	20	105.5	114	One tailed	0.01

Discussion

From the results found it can clearly be seen that there is less of a recency effect in the experiment when using an interference task. Furthermore, it can also be seen that there was both a primacy and recency effect in the non-interference experiment. It is therefore clear to see that the results found support the experimental hypothesis.

The total number of the last five words remembered in the condition with the interference task was 157 compared to a larger 216 in the condition without an interference task thus supporting Glanzer and Cunitz research. However Glanzer and Cunitz found that an interference task virtually eliminated the recency effect, whereas in this condition the recency effect was only reduced slightly. Strangely fewer numbers of words were remembered in all sections of the words in the experiment using the interference task. The average number of times words were recalled in the interference experiment was 4.3, compared to a much larger 5.8 in the non-interference experiment. This shows that there is perhaps the possibility that an interference task affects all parts of the memory.

Upon looking at graph 1, it is clear that a primacy and recency effect does not exist in each condition. As said in the introduction a primacy and recency effect exist if a graph of the results forms the shape of a U. Whilst both sets of results, they do not form perfect U shapes and so are not entirely conclusive. The primacy corresponds to the left hand side of the graph, and the recency to the right. On both sides the graph is generally higher than in the middle, and this is conclusive evidence that both a primacy and recency effect exist.

It is also clear that there is a higher recency effect in the non-interference condition than in the interference task condition. Graph 1 again suggests this. This is because towards the end of the end of the graph the non-interference data rises very steeply whereas the interference data stays fairly low throughout. Also evidence of this is that of the mean scores. The average participant remembered 1.1 words out of the last five in the condition with the interference task compared to 1.9 being remembered in the non-interference condition. Further evidence of this is the mode of each condition. The mode number of words recalled in the condition with interference was 7 compared to 5 in the condition without interference.

The biggest difference in recall was on the final word. This is likely to be the case as it is the last part of the recency effect and so is easy to recall for those without an interference task.

There are however a number of limitations and problems to this investigation. Firstly, the words used in the investigation could have created a problem. For example there may have been generally easier words to remember at the beginning of the list than at the end. (Some words are longer than others). It can also be argued that the words with a similar meaning or related words can be remembered easily through categorising. An example of this are the words 'door', 'window', and 'glass', all used in the experiment. A further problem is demand characteristics, a problem that often occurs in psychological investigations. This is a problem because many of the students that took part could have also been studying psychology at college and thus

know what the aims of the investigation were. This is then likely to change the outcome of the investigation.

Another problem is confounding variables. For example the time of day participants took the experiment. Certain individuals work better in the evening than others, and so if a participant took the experiment late in the evening, there results may be different to if they took the experiment in the early morning.

To make improvements to the experiment, better choice of words would be needed. The words chosen must not be related or sound like each other in anyway, as this will affect the final outcome. By doing this the results would become more accurate and so therefore more accurate conclusions could be drawn from them.

Conclusion

The findings showed that the primacy and recency effect existed when recalling a list of data. The findings also showed that an interference task reduces the recency effect. In conclusion it can be seen that the stated hypothesis was supported by the results and that the results were found to be significant at the 0.01 level of significance ($p < 0.01$). The null hypothesis can therefore be rejected.

References

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- ◆ Drever, J. (1979) The Penguin Dictionary of Psychology
- ◆ http://web.psych.ualberta.ca/~mike/Pearl_Street/Dictionary/contents/S/short_term_memory.html

Appendices

Participant number	Number of last 5 recalled without interference	Rank	Participant number	Number of last 5 recalled without interference	Rank
1	2	30	21	2	30
2	1	14	22	1	14
3	1	14	23	2	30
4	1	14	24	1	14
5	1	14	25	1	14
6	2	30	26	1	14
7	3	37	27	1	14
8	2	30	28	1	14
9	2	30	29	0	1.5
10	3	37	30	1	14
11	3	37	31	1	14
12	0	1.5	32	2	30
13	3	37	33	1	14
14	1	30	34	1	14
15	3	37	35	1	14
16	2	30	36	1	14
17	2	30	37	1	14
18	1	14	38	1	14
19	1	14	39	1	14
20	4	40	40	1	14
	Total	520.5		Total	315.5

The sum of the ranks for the lowest total = T.

- ◆ T = 315.5
- ◆ N1 = 20
- ◆ N2 = 20

These values were then put into the formula shown below

$$U = \frac{N_1 N_2 + N_1(N_1 + 1)}{2} - T$$

$$U = \frac{20 \times 20 + (20 \times 21)}{2} - 315.5$$

$$400 + 210 - 315.5 = 294.5$$

$$U \text{ therefore} = 294.5$$

$$U' = N_1 N_2 - U$$

$$20 \times 20 - 294.5 = 105.5$$

$$U' \text{ therefore} = 105.5$$

As U' is the lowest of U and U', 105.5 (U') was used on the critical values table

A level of significance at $p < 0.01$ was used as 105.5 exceeded values in the table for a 0.005 level of significance. The critical value for this was 114