Title:

Testing the location/position of the names in a list in determining the likelihood that it is recalled with and without delay.

Introduction:

Numerous researches have been undertaken over the years to investigate the position of items (such as words, letters, or numbers) in a list in determining the likelihood that the item is recalled. This is known as the serial position effect. Specifically, it suggests that items in the beginning and end of a list are more likely to be remembered and thus recalled. The superior recall of items in the beginning of a list is known as the primacy effect, while the superior recall of the items in the end of a list is called recency effect.

The fascination in memory and memory systems has lead to several experiments having been carried out on this topic. "Memory is an active, information processing system that receives, organises, stores and recovers information." The currently accepted view of memory comes from the Atkinson and Shriffin model of memory (also called the information-processing model of memory), which states that there are "three distinguishable kinds of memory (sensory, short-term and long-term memory) with each representing a stage through which information passes in a sequential way as it is processed". This model is used to explain the serial position effect, and it focuses on the short term and long term memories. It describes that the primacy effect is due to the presence of long term memory since items in the beginning of a list are more likely to be effectively rehearsed and thus sent to LTM (long-term memory). This is supported by the research done by Rundus (1971). In this study, the participants were asked to rehearse out loud, and their rehearing was recorded. After reviewing the recordings, Rundus (1971) found that participants spent more obvious rehearsal to the first few items on the list. Furthermore, in order to support the view that LTM is responsible for primacy effect, Welch & Burnett (1924) ensured that all the items in a word list were rehearsed an equal number of times by participants. In this study, participants were asked to only rehearse the items while they were being presented. As a result, the primacy effect was either reduced or eliminated among the participants since superior recall of the items in the beginning of a list was not evident. Therefore, they found that by having participants attempt to transfer all of the items into long-term store, the primacy effect is reduced. Research done by Glanzer & Cunitz (1966) showed that primacy is improved when the items are read out to subjects at a slow rate, since it allows the participants to undertake extensive rehearsal.

Similarly, the presence of recency effect was dedicated to the short term memory by again using Atkinson and Shriffin model. Glanzer & Cunitz (1966) showed that delaying recall of items in a list by 30 seconds destroyed recency effect, causing recall of words to be similar to ones in the middle. This is explained by the duration of short term memory being 18-30 seconds, beyond which information generally cannot be retained in STM without rehearsal. Furthermore, this had no effect on the primacy effect, showing that the two separate memory systems are present (in addition to sensory memory).

Following these past findings, the Year 12 Psychology students of Box Hill High School tested the serial position effect on 12-14 year old participants from the same school. Their aim was to investigate serial position effect, particularly recency effect and STM as well as primacy effect and LTM. They had two hypotheses. Firstly, they hypothesised that the serial position of the names in the list of 15 names will influence the mean percentage of students of between the ages of 12-14 that recall the names.



The independent variable here was the position of the words in the list while the depended variable was to find out the mean percentage of recall of words from the various positions (i.e. beginning, middle and end) in the list.

Moreover, they hypothesised that a time delay of 30 seconds will negatively influence the mean number of words recalled at the end of the list while not affecting those at the start and middle of the list. The independent variable was implementing time delay or not between reading out of items and recall of items. The depended variable was to find out the mean percentage of recall of words from the various positions (i.e. beginning, middle and end) in the list.

Methods:

Participants:

The target population from which selection was possible was from any year 7 or 8 classes. 46 participants were involved in this study to test serial position effect with and without a delay between reading and recall. Participants consisted of 30 males and 16 females aged between 12-14 years.

Convenience sampling was carried out as any class that were free were used. The participants were allocated into separate seats, facing each other so that they don't copy each others' answers. However, there wasn't random allocation evident (the two classes weren't randomly, such as via coin toss, placed into the two groups)

Materials:

The materials required for performing this experiment include providing each student with a piece of paper, pen, and the experimenters possessing a timer, data sheet and two lists of the 15 names (List A and List B).

Procedure:

- 1. One of the researchers read out instructions to participants that they had to first listen to the reading of the words and then listen to the instructions of the another student
- 2. Then the participants were read out a 15 names list one-by-one with a second interval (they were not allowed to write down anything)
- 3. Then, after the items were read, another student distracted the participants by following the experimenter's body movements for 30 seconds
- 4. Then the participants were told to write down all the words they could remember, without any order, within 2 minutes
- 5. After this, each word from the list, in chronological order, was read out and the number of students who correctly wrote name down was counted.
- 6. This process was repeated for each of the 15 names
- 7. For the second list, again 15 names from a different list (list B) was read out
- 8. This time the participants were told to immediately free recall the names in any order by writing them down on a piece of paper
- 9. Again the number of people that wrote down each name down was recorded for all of the 15 names



- 10. This process was repeated by the other Psychology class but the order was reversed (i.e. the delay was given last to them and immediate recall was done first).
- 11. A table was constructed with the two classes reporting their results for both of their experiments

Repeated measures design was carried as same participants were involved in both the control and experimental conditions. The main disadvantage of this technique is that it causes order effects, which is when the order in which the experimental task was carried out, influences the results through prior practice from previous experience or boredom from the previous experience. To control this extraneous variable, counterbalancing was achieved since for one class the distracter was done first while for the other class the immediate recall was done first. This way each condition would occur equally often in each position, and so order effects are unlikely to affect results.

The NHMRC National Statement on Ethical Conduct in Research Involving Humans was not met in this experiment, and hence would not be accepted by the ethics committee. The participants' results and names were not kept confidentially as they were reported in the assessment and their written consent was not obtained to do this. Voluntary participation was also not met as they had no choice but to take part in the research. Furthermore, they did not give informed consent as, although they were briefly told the basic nature of the experiment, they were not informed of the exact nature and the deception (distracter). The experimenter's also did not get parents' consent form signed and so their consent was not appropriately documented. Withdrawal rights were also not met as the participants were not told that they could leave the experiment if they wished to without needing to provide reasons.

Debriefing was, however, done as the participants were told of the purpose of the distracter and were asked if they had any questions or problems. Moreover, the researchers behaved in a very professional way towards the participants and did not bring any ill repute to the profession of psychology or psychological research.

Results:

List A

Word position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of correct responses	17	23	10	8	11	17	6	22	16	8	9	14	25	28	26
Mean Recall rate (% correct)	37	50	22	17	24	37	13	48	35	17	20	30	54	61	57





List B

Word position	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
No. of correct responses	27	27	25	14	23	23	8	11	21	10	13	21	18	20	23
Mean Recall rate (% correct)	59	59	54	30	50	50	17	24	46	22	28	46	39	43	50





Serial position effect with delay

Discussion:

The first hypothesis of the investigation was supported since the serial position of the names in the list of 15 names influenced the mean percentage of students of 12-14 year old participants that recalled the names. The free recall without the time gap produced both primary and recency effects. The last 3 words were remembered at the greatest rate percentage of 54, 61 and 57 respectively. This is because these items have remained in the participants' STM since they were allowed to immediately recall.

The next most evident was the first 3 items with a mean percentage recall being 37%, 50% and 22% respectively. This is because items presented at the start of the list are more likely to be rehearsed (maintenance rehearsal by vocally or sub vocally reciting the names or elaborative rehearsal by making a story out of the names) and transferred to LTM (especially if elaborative rehearsal was used). The items in the middle (especially those in the 5th and 7th) are least recalled. This because they are shown too late to be rehearsed extensively and are shown too early to be retained in STM.

The findings from this experiment reflect that of past findings on the serial position effect, such as the Glanzer & Cunitz (1966) research. However, 6th, 8th and 9th positions were remembered at high percentages with 37%, 48% and 35% respectively, although they were in the middle. This is likely because those names were distinctive to the participants. For instance, Mitchell was a very well known student for them. Similarly, Pauline (in position 8) was a novel name and Marcus is a recognised name since posters of him were put up in the walls. An expected U-shape graph was produced.

The second hypothesis was not supported since, when the time gap was implemented, there was still recency effect while the primacy effect remained intact. Here, the primacy effect is the most pronounced with 59% mean recall for the first two items on the list and 54% for the third. This is expected because the participants had greater time to extensively rehearse the items. However, the recency effect is still present despite the time delay as the last 3 words had an average recall of 39%,



43% and 50% respectively. This is not in accordance with past research such as the Glanzer & Cunitz (1966) investigations, where they found that time delay caused recency effect to be destroyed. The most likely reason that the year 12 Psychology class obtained contrasting results is because of experimental error. The participants were incorrectly instructed to write down the words by one of the experimenters and then told to stop. The confusion somewhat weakened the recency effect but not enough to make a significant contribution. The recency effect was thus still present because a delay of 30 seconds was not given. The results are not reliable either as, if repeated next time without this mistake, then it would have likely to have produced the expected result. In this experiment, an unexpected U shape curve was produced and the comparison of the two graphs (with the first one acting like a control) shows that they are similar, although the second U-shape is less prominent.

Other extraneous variables include participant effects, experimenter effect and situational variables. Participant variables affect results when unique individual characteristics of the participants (such as their innate ability to memorise the lists or the knowledge that they can rehearse the items during the 'distraction') might have enabled some to perform better while others to perform worse. This could have been reduced/avoided by using a wider variety of participants (i.e. random sampling). Experiment effect/bias is when incorrect calibration or recording of results, or differing treatment of participants, either consciously or subconsciously, impacts upon the DV. For instance, pulling faces or laughing while the items in the middle are read out could cause its inferior recall. This could have been avoided/reduced by using a double blind procedure in which an external person outside the experiment would record the results of the research. Situational variables are the environmental differences between the recall of the items under the different conditions. For instance, the differing noise level or the humidity level could have impacted on the DV in addition to, or in place, of the IV. This could have been avoided/reduced by ensuring that the same conditions were present for both classes (although the time was not much of a difference, the weather might have been a factor).

Furthermore, another extraneous variable associated with the experimental design was order effects (such as practice effects or fatigue after the first experiment) which can positively or negatively influence the results of the second experiment. This was avoided by using counterbalancing.

Limitations include the names possibly having some personal meaning to the participants (another participant variable), where some might be able to relate it to their unique experience. To avoid this, non sense syllables should be used like it has been in various past researches. Nonsense syllables have no meaning so the individual cannot relate it to their own experiences. Also, if matched participants design was used, then this could have been reduced. Another limitation is the class size. More than just 46 participants would result in more accurate and reliable results. Moreover, a random sampling technique using a wider variety of participants of different ages and equal proportion of gender would yield even more accurate results since it ensures that every member of the target population has an equal chance of being a part of the research. The Glanzer & Cunitz (1966) research also had equal proportion of both genders.

A test of significance is done to find out if the mean scores of two groups (e.g. the control and experimental groups) differ significantly. Test of significance used for this experiment was the t-test, which is a "mathematical procedure that involves a comparison of the means of two groups". The t-test provides a t value which is checked against a set of p values. A p value of 0.05 was previously set. The results were statistically significant with p < 0.05. This means that less than 5% of the change in DV (mean recall rate in the different positions) occurred due to chance, meaning more than 95% of the change in DV occurred due to the IV (whether or not time delay was present). Hence, it is possible to conclude that the hypothesis was supported.



The results of the second experiment were statistically insignificant with p > 0.05. This means that more than 5% of the change in DV (mean recall rate in the different positions) occurred due to chance, meaning less than 95% of the change in DV occurred due to the IV (presence or absence of time delay). Hence it is not possible to conclude that the hypothesis was supported.

The results from the first experiment can be generalised to the target population since it was statistically significant and 46 students out of roughly 280 year 7 and 8 students (16%) were involved in the experiment. The second experiment cannot be generalised to the target population as the results were statistically insignificant. Neither of the experiments was possible to be generalised to the wider population. This is because the participants involved were of a narrow range of age (12-14). In real life, it is not very common to remember lists of names although it is possible. However, it is more possible to remember sentences or paragraphs.

References:

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