

An examination of the word length effect

Introduction

Memory entails a direct, non-inferential feeling of being familiar with one's past. It does so by linking content retrieved from storage with autonomic awareness during retrieval. (Klein, 2014). For this particular experiment the focus is on the working memory. Proposed by Baddeley and Hitch in 1974, it was developed as a result of short term memory not being useful in explaining how memory processes were used in problem solving (Jones, Lecture 1). For the purpose of this experiment, the phonological loop will be the main component of focus, as this allows us to retain information over a short amount of time. It is made up of two areas: a short term phonological store with auditory memory traces that disappear quickly and an articulatory rehearsal component that can revive the memory traces. It's a component that holds and manipulates information over short periods of time. The store holds information for 1.5-2 seconds, However will fade away if not rehearsed, longer words that take more time to articulate are recalled more poorly than shorter words (Baddeley, 1975).

The word length effect is the finding that lists of short words that are easier to remember than lists of long words (Jalbert et al, 2011).

Baddeley et al (1975) observed the word length affect to trace decay during real-life rehearsal of words. Immediate serial recall for word sequences decreased with the number of syllables comprising recall. As the recall needed the writing of only three letters of each word, they discounted output delay as an explanation. The study included two word pools, one of which had 10 short and long words. Each had two pairs of items beginning with t and s and three of the initial letters were phonologically similar (c, e and d). Subjects were given list of items used and were requested to write the first three letters for each word and required to respond so that the written output would be the same for the both sets, Next, half the subjects were tested with the recall task, followed by a recognition task which was then reversed for the remaining subjects. For the recall task, the sequences were presented via headphones and monitored by the experimenter with a 1 second duration of the sequence, after the last item the subjects were asked to recall the sequence in order by writing the first three letters of each item. Testing continued until three out of four sequences were incorrectly recalled at a given length.

For the recognition task, a one second duration was presented, continued by the presentation of the first sequence in the pair. Once the first sequence was terminated, the second sequence was presented after a one second delay. After the presentation of the second sequence the subjects decided whether the sequence pairs were the same or not by writing S or D. The 10 trials in each word length condition were blocked by sequence length and within each sequence the same five different lists were presented randomly. The results of these two experiments was there was a significant effect of word length with a memory span for short words being 4.94 greater than 4.32 for longer words. It was discussed that the experiment suggested that the word length is an important mediator in both recall and recognition.

Another study that focused on the word length effect was done by Cowan et al in 1992, in which a series of experiments were carried out where delay was manipulated by varying the position of long and short words in the sequence, showing that locating long words earlier leads to longer average delay in recall and poorer overall performance, they instructed subjects to prolong or shorten pronunciation of words (Cowan et al, 1997) they obtained clear evidence that prolonged pronunciation impaired recall.

Aim

The aim of this study was to explore the word length effect.

Rationale

Studying the word length effect and working memory is important as it tests an individuals overall memory capacity and how much they are able to recall, in particular when used in education. Explained by Gravenell In 2021, it is crucial that working memory is used in and out of the classroom and required in most exercises in school, such as being able to read and define words,

Hypothesis

Participants will recall significantly more short words than long words (one tailed).

Methodology

Design

A within subjects design was used. There was one independent variable with two conditions: The independent variable was the length of the words (long and short). There was one dependent variable: The dependent variable was the number of words recalled (out of 12). Participants took part in both conditions of the experiment.

Participants

A convenience sample of 34 participants completed both conditions of this study: 2 were male and 32 female. Ages ranged from 18-49 years (Median=25.36, SD=3.41). Participants were all undergraduate students from West Wales. All participants were naive to the purpose of the experiment.

See appendix 3 for participant information sheet and consent form.

Materials

15 long words, one example would be proximity

15 short words, one example would be desk

Pen, Paper

Words presented on a large blue screen

Letter size was 72 in font "Ariel".

Transition was 2 seconds (presented every 2 seconds)

Procedure

Students are asked to memorise words given on a board presented every 2 seconds and write down as many words as they can, beginning with long words followed by short words.

See appendix 2 for standardised procedures.

Results

The following results present the findings for the word length effect.

See Appendix 5: Raw data to view raw data.

Chart 1

Median scores for long and short words.

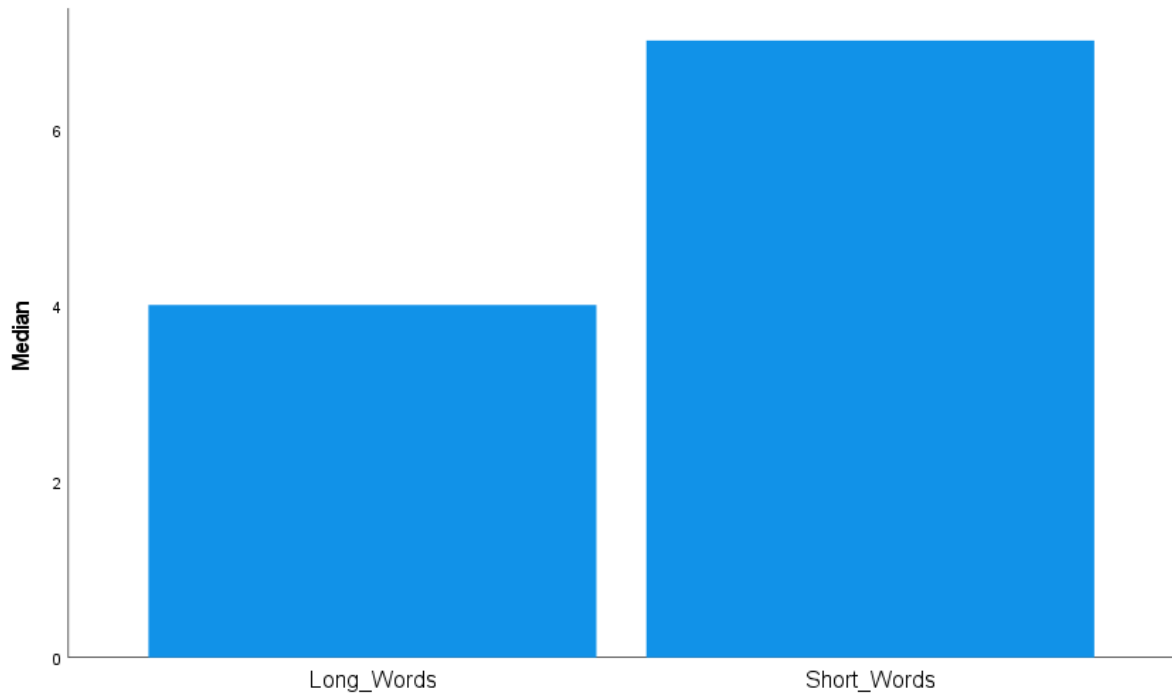


Chart one shows that short words were recalled more than long words. The median score for long words was 4 (the standard deviation for that was 1.35). The median score for short words was 7 (the standard deviation for that was 2.75).

(SD = 1.35)

(SD = 2.75)

To examine if the median scores for both conditions are significantly different to the probability of .05, the non-parametric Wilcoxon statistical test was carried out.

A Wilcoxon signed-rank test showed a significant difference between the long and short word conditions ($Z = 4.98$, $p < .001$). Median recall scores for short words were significantly better than for long words (Median: 7 and 4 respectively).

Hypothesis

The results indicate that the hypothesis that participants will recall significantly more short words than long words (one tailed hypothesis) was supported and provides support for the Word length effect.

References

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Baddeley et al., (2002) *Is the word length effect in STM entirely attributable to output delay? Evidence from serial recognition.* THE QUARTERLY JOURNAL OF EXPERIMENTAL PSYCHOLOGY, 2002, 55A (2), 353–369

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Appendices

1. Word list table

Word List Table

Condition 1 – Long Words	Condition 2 – Short Words
Transaction	Desk
Forgiveness	Leap
Physician	Mood
Proximity	Tank
Constitution	Rules
Rationalise	Roof
Interaction	Mend
Deductions	Snap
Representation	Tomb
Impatiently	Slow
Reinstate	Tape
Intimidating	Rack
Disorganised	Snore
Understanding	Lose
Illuminate	Paid

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2. Standardised procedures

To ensure that all participants have the same experience, researchers should ensure that they are all tested:

1. In the same place, with the same equipment and materials placed in the same way.
2. Under the same conditions, so the level of lighting, noise and heat remains the same for all participants.
3. At roughly the same time of day, as people may behave differently if tested at nine o'clock in the morning rather than five o'clock at night.
4. Given identical standardised instructions in exactly the same way

Standardised Instructions: these are given in the chosen location and there may be more than one set for different (IV) conditions of the investigation. The standardised instructions are important, as each participant must receive the same instructions so they understand what to do in the study. Also, it ensures that each participant is treated the same and should help eliminate experimenter effects. You can read the instructions to the participant(s), or let them read the instructions themselves.

Standardised procedure for the word length effect study

An opportunity sample of students was used. Presumptive consent was gained.

The following instructions were presented verbally:

1. Participants were asked to sit quietly facing the projector screen situated on the wall in front of them.
2. You will take part in a short memory task.
3. Please ensure that you have a pen and paper in front of you.
4. Can you all see the screen and text on the power point clearly?
5. You will be presented with 2 word lists – consisting of 15 words each.
6. Following the first list – you will be asked to write any words remembered from the list (in any order). The next 15 words were presented in the same way.
7. Participants received the long words first followed by the short words. They had 90 seconds to recall and write down the words from list one and list two.
8. Words were presented in the middle of a blue screen every 2 seconds, for 1 second.
9. The font was Arial, white, size 72.
10. Participants were thanked for their participation.
11. Participants were fully debriefed regarding the aim and hypotheses of the experiment.

Following the making of the accuracy of recalled words, raw data was analysed using a Wilcoxon signed-rank test on SPSS 26.

3.Information sheet and informed consent form

Study Information Sheet

This document provides key information regarding the study and provides details about what will be expected of you as a participant. Therefore, please read this information carefully before providing consent to take part.

During this study you will be required to do the following:

- Complete a demographics form detailing your age and gender
- Complete a 30-item paper based questionnaire measuring anxiety
 - Further instructions on how to complete this will be provided at the top of the questionnaire
- You will then be presented with a list of 30 words on the computer screen
 - Each word will be presented individually for five seconds and your task is to simply read the word
 - Whilst the words are being presented, you will be required to listen to a piece of music played through a set of headphones
- Once all of the words have been displayed, you will then be given ten minutes to complete as much of a jigsaw puzzle as you can
- After the ten minutes is up, you will be required to complete the anxiety questionnaire again.
- You will then be required to write down as many of the words as you can remember on the piece of paper provided. You will have two minutes to complete this task. Once the two minutes is up, that will be the end of the study

At the end of the study you will be debriefed by the researcher and you will be provided with the study debrief sheet.

If you feel you would be uncomfortable answering personal questions about your anxiety levels, you are advised not to take part in this study.

Due to this research involving an auditory component, you must be capable of listening to music through headphones in order to take part.

If you have any questions, please ask the researcher now.

If you are happy to take part in this study, please read and sign the consent form.

Study Consent Form

I understand that this research study is being carried out by a 3rd year Psychology Student for their dissertation, and that taking part in this study will involve

memorising a series of words beginning with short followed by long to test the word length effect.

This study will take approximately 15 minutes to complete.

I understand that participation in this study is voluntary and I am free to withdraw participation during or at the end of the study without giving a reason. I understand that once I leave the study, I will not be able to withdraw my data, as it will be anonymised. I am aware that if I have concerns about the study, I can discuss these concerns with the researcher at any time during or after the study. I understand that I will be provided with the contact details of the research supervisor at the end of the study, should I have any concerns.

I understand that the information provided by me will be held confidentially, with a code assigned in place of my name. These data will be stored indefinitely in accordance with the Data Protection Act.

I also understand that at the end of the study I will be provided with a debrief form and the opportunity to discuss any issues with the researcher.

I, _____(NAME) consent to participate in the study conducted by Alisha Phillips, Centre for Psychology and Counselling, University of Wales Trinity Saint David, under the supervision of Charlotte Greenway.

Participant Signature:_____

Date:_____

Name and signature of researcher taking consent

Study Debrief Sheet

An examination of the word length effect

Thank you for taking part in the study.

The aim of this study was **to explore the word length effect**. We specifically wanted to find out whether individuals *could remember short words more, rather than long words*.

If you wish to withdraw your data from the study, you must tell the researcher now. After this point, all of your data will be anonymised and we will not be able to trace it back to you.

If taking part in this study has raised any questions, please speak to the researcher on Alisha Phillips **and** 2218529@student.uwtsd.ac.uk or contact the academic supervisor Charlotte Greenway, C.Greenway@uwtsd.ac.uk

Thank you once again for taking time to participate in this study.

Alisha Phillips

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	 Long_words	 Short_words
1	2	5
2	5	6
3	3	5
4	1	3
5	3	2
6	4	6
7	1	4
8	5	4
9	7	8
10	3	4
11	6	12
12	4	9
13	2	6
14	3	5
15	4	9
16	5	11
17	4	7

5.Raw data(scores)

18	4	8
19	2	6
20	3	7
21	3	10
22	4	7
23	5	12
24	4	9
25	5	12
26	3	6
27	2	4
28	5	9
29	4	11
30	5	6
31	4	8
32	3	9
33	4	11
34	5	9

6.SPSS results (Wilcoxon)

