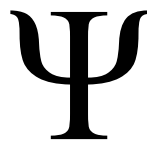


Internal Assessment Psychology SL

An experiment to investigate the effect of leading
questions on memory



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Abstract

The aim of this experiment was to investigate whether people are influenced by leading questions.

The investigation was a replication of the famous study of Loftus and Palmer (1974).

In the experimental set-up with the independent variable being the verb (“contact” and “smash”) that differed in the two conditions, the dependent variable was the speed estimated by the participants when recalling the stimulus (a picture of a car crash) from their memory.

The results indicated that verbal connotations (schema) could influence the retrieval of memory and result in false reconstructive memory.

Likewise, the results showed a clear linkage between the wording of a question and what is recalled by the participant, which is in the line with the original study by Loftus and Palmer so the conclusion is that the verbs communicated some information about the answer, i.e. the answer was influenced by the existing knowledge in schemas.

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Introduction

Memory can be defined as the retention and use of prior learning. The psychological study of memory has contributed greatly to the understanding and dealing with certain situations that arise within the legal system, such as the issue of eyewitness testimonies and how reliable they are. Many of the early studies on memory (e.g. Bartlett, 1932) demonstrate how memories are not accurate records of our experiences, even though we would like to think so. Remembering is rather an active process involving trying to make sense of the world according to existing knowledge. This knowledge is, according to Bartlett, stored in schemas. The schemas, i.e. simplified mental representations of knowledge, influence memory to a great extent as they interfere with processing of knowledge and create distortions. Bartlett conducted a study where English participants were to serially reproduce a North American folk tale. The participants were unfamiliar with the style and content of the story, and thus it quickly changed to fit their ideas of the world – the story became shorter, more coherent, more conventional, and more clichéd.

The study supports Bartlett's idea of *reconstructive memory* – the participants tried to make sense of the story according to their existing schemas. Allport and Postman conducted a similar experiment in 1947 that supported this interpretation.

Bartlett's view of memory as reconstructive is supported by Loftus, who mainly deals with the issue of reliability of eyewitness testimonies. A study of Loftus and Palmer (1974) found that the wording of a question can greatly influence the witness' recall of certain events. The researchers tested the effect of changing single words in certain critical questions on the judgement of speed based on a video of two cars colliding. When the verb "contacted" was used, the average speed estimation was 31.8mph, whereas "smashed" created an average speed estimation of 40.8 mph. Thus it seems that misleading questions influence the retrieval of memory, as the connotations of a word (the schema) will communicate information about the answer.

However, these findings were criticised by Yuille and Cutshall (1986), who investigated a real life event concerning the eyewitness testimony in a robbery case. The recalling of the witnesses was very accurate despite misleading questions. Although this is true, Loftus has pointed at great problems with the reliability of eyewitness testimonies.

In spite of the criticism it is clear that schemas do play a role in retrieval, and so we decided to replicate the experiment of Loftus and Palmer with the aim of investigating whether schemas interfere with information processing.

Method

Design

The design was a laboratory experiment, which allows for control and establishment of a cause-effect relationship between the independent and the dependent variable. The independent subject design used chosen to avoid order effects.

The independent variable (IV) was the verb used, i.e. “contact” or “smash”, and the dependent variable (DV) was the speed estimated by the 20 participants.

For demand characteristics to be avoided, two extra questions were inserted to divert the attention from the actual question (the speed estimation). Random allocation of participants to the two experimental conditions was used to counter-balance the individual differences of the participants. Also, in the standardised instructions we informed the participants that we wanted individual answers as to avoid conformity.

In order to address ethical considerations we informed the participants of their rights to withdraw at any time and presented them with briefing¹ and debriefing² notes. At all times the experiment aimed at causing no physiological or psychological discomfort to the participants. They all signed a note of informed consent.³

Participants

The target population was selected to be IB students at our school and in order to gather an easily available sample we choose a convenience sample. The target population was required to be 16 years or older and should not be psychology students, as they might be familiar with the study being replicated. Random sampling procedure was used to pick 25 random students within the target population, and 20 of them agreed to participate in the experiment (N=20). The division between genders was quite even (10 girls and 10 boys).

The participants were split into two experimental groups in that they received the two kinds of questionnaires randomly in order to counter-balance for participant variables.

Apparatus/Materials

- Consent Form⁴
- Briefing Note/ Standardised Instructions⁵
- Debriefing Note⁶
- Picture of car crash⁷
- Questionnaire 1⁸
- Questionnaire 2⁹
- Stopwatch

¹ See Appendix 2

² See Appendix 3

³ See Appendix 1

⁴ See Appendix 1

⁵ See Appendix 2

⁶ See Appendix 3

⁷ See Appendix 4

⁸ See Appendix 5

⁹ See Appendix 6

Procedure

The experiment took place in a room where noise and other disturbing factors were avoided. To address the issue of ethics the participants signed a consent form and the standardised instructions concerning the focus of the experiment and the participants' rights to withdraw were read aloud. It was at the same time made clear that individual answers were required and that talking should be avoided.

The participants were then presented with a picture of a car crash and were given one minute to observe it before the picture was removed.

The mixed questionnaires were then given to the participants. The questionnaires invited the participants to estimate the speed of the car before it crashed. The verb varied from "contact" to "smash" in the questionnaires.

The questionnaires were collected after a few minutes, and a debriefing note explaining the objective of the experiment was given to the participants, who were also informed of their right to ask questions and know the results of the experiment.

Results

The questionnaires were sorted into two groups depending on their experimental condition. The raw data is assembled in two tables.¹⁰

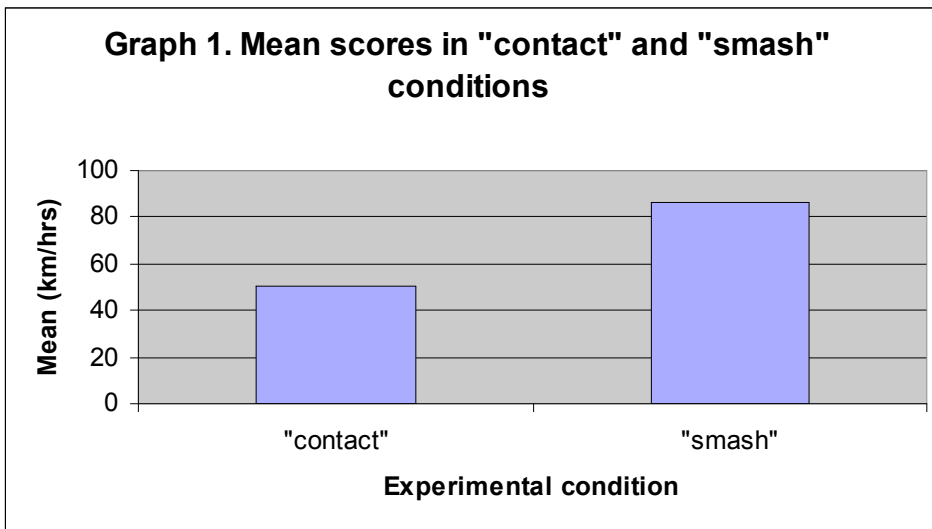
In experimental condition 1 (“contact”) the speed estimation varied between 20 km/hrs and 90 km/hrs (range 70), whereas the range in condition 2 (“smash”) was significantly higher – here, the speed estimation varied between 45 km/hrs and 150 km/hrs (range 105).

The mean scores and the standard deviation in the two experimental conditions are calculated in appendix 9 since we are dealing with interval statistical data. The mean scores describe the average estimation of speed by the participants, whereas standard deviation describes the numerical measure of spread of data (see table 1). The results are shown in the table below.

Table 1. Mean and Standard Deviation scores in “contact” and “smash” conditions

N = 20	Mean (km/hrs)	Standard deviation (km/hrs)
Experimental condition 1 (“contact”)	50.5	23.03
Experimental condition 2 (“smash”)	86.7	31.00

The results reveal a difference in the mean estimation of speed between the two questionnaires. The mean score when the verb is “smash” showed to be 71.68% higher than the mean score when the verb is “contact”.¹¹ The difference is illustrated in graph 1 below.



¹⁰ See appendix 7 and 8

¹¹ See appendix 9

Discussion

The results of our experiment are fully in line with the study of Loftus and Palmer, i.e. it suggests that the connotations of a word (schema) can influence the response given by the participant.

The participants were introduced to a misleading question and behaved as expected. The mean estimated speed was significantly higher when the word with dramatic connotations, “smash”, was used than when the less dramatic word “contact” was the verb, which suggests that people process information according to their existing mental representations of knowledge, i.e. schemas.

Thus our conclusion is that the verb communicated information from the schema concerning the speed and this interfered with the retrieval of memory and caused differing results in the two experimental conditions. It seems that the wording does affect the retrieval of memory, which Loftus and Palmer proposed in 1974 after having obtained similar findings. The effect of language on memory is very relevant in eyewitness testimonies because it can lead to erroneous recalling of witnessed events. This was clearly demonstrated in our experiment as well as original study conducted by Loftus and Palmer.

The primary strength of our experiment is the ability to control the experimental variables as all interfering variables are avoided in the closed experimental environment. The independent variable (the verb) was easily manipulated and created differing dependent variables in the two experimental conditions.

However, there also seems to be limitations to our experiment; the convenience sample clearly resulted in sample bias as not every layer of the population is represented. Also, some people insisted upon chatting with each other during the experiment and they might have discussed the results and thus altered them as a result of conformity.

Another limitation is the lack of ecological validity. This was also one of the main points that Loftus was criticised for. The experiment is performed in an artificial environment – in real life the participants would witness the event in a more dramatic manner, and might have some involvement in the situation or the people involved, which could make them pay more attention. Therefore it can be difficult to generalise these findings to real life, which was also the conclusion of the study by Yuille and Cutshall (1986).

Culture might also be a factor – all of these studies are conducted in Western countries, and research of memory within other cultures might prove cultural differences in recalling specific events.

For future moderations a more representative sample could be suggested, i.e. the sample should represent the population as a whole and not only IB students. To avoid the unwanted communication between participants during the experiment they could be placed in separate rooms. If the issue of culture should be addressed the experiment could be conducted in a country whose culture differs from the Western one as to compare the results between cultures. Ecological validity could be improved by examining the results from a naturally occurring experiment as Yuille and Cutshall did.

References

Bartlett, F.C. (1932) Remembering, Cambridge: Cambridge University Press. (In Gross)

Gross, Richard (2001) Psychology – The science of Mind and Behaviour, Fourth Edition, Hodder and Stoughton, p. 308-309, 311-315.

Loftus, E.F. and Palmer, J.C. (1974) Reconstruction of automobile destruction: An example of the interaction between language and memory, Journal of Verbal Learning and Verbal Behaviour, edition no. 13, pp. 585-589. (In Gross)

Yuille, J.C. and Cutshall, J.L. (1986) A case study of eyewitness memory of a crime, Journal of Applied Psychology, edition no. 71, pp. 291-301. (In Gross)

Appendices

Appendix 1

Sample Consent Form (signed by participants)

<p>Sample Consent Form</p> <ul style="list-style-type: none">• I have been informed about the nature of the experiment• I understand that I have the right to withdraw from the experiment at any time, and that any information/data about me will remain confidential• My anonymity will be protected as my name will not be identifiable• The experiment will be conducted so that I will not be demeaned in any way• I will be debriefed at the end of the experiment, and have the opportunity to see the results <p>I give my informed consent to participating in this experiment</p> <p>Name and date _____</p> <p>Contact Number _____</p>

Appendix 2

Briefing Note/Standardised Instructions

“You will now be participating in a psychology experiment, where we will be testing your ability to retrieve memory. You can withdraw from the experiment at all stages and we will debrief you at the end. Your participation will naturally be anonymous. Please do provide us with individual answers – talking should be avoided.”

Appendix 3

Debriefing note

“The aim of this study was to investigate whether your estimated speed would differ when the verb used changed between “contact” and “smash”. You all provided us with useful results and we appreciate your participation. You are naturally welcome to read our report when it is finished. Do you have any questions?”

Appendix 4

Picture of car crash used



Picture found at <http://bhs.brook.k12.wv.us/BHS/Clubs/SADD/pics2000/carcrash.JPG>

Appendix 5

Questionnaire, experimental condition 1 (“contact”)

Psychology experiment on memory

1. What colours were the cars? _____ and _____
2. How many cars were in the picture? _____
3. About what speed did the cars contact each other? _____ km/hrs

Appendix 6

Questionnaire, experimental condition 2 (“smash”)

Psychology experiment on memory

1. What colours were the cars? _____ and _____
2. How many cars were in the picture? _____
3. About what speed did the cars smash into each other? _____ km/hrs

Appendix 7

Raw data, experimental condition 1 (“contact”)

Participant no.	Answers to question 1	Answers to question 2	Estimation of speed, x
1	Silver and brown	2	70
2	White and white	2	55
3	Yellow and brownish	Many	80
4	Brown and white	3	40
5	White and maroon	A lot	90
6	White and white	3	20
7	Beige and white	3	35
8	White and white	2	35
9	White and light brown	3	50
10	Silver and beige	3	30

Appendix 8

Raw data, experimental condition 2 (“smash”)

Participant no.	Answers to question 1	Answers to question 2	Estimation of speed, x
1	Off-white and white	2	100
2	Light brown and white	2	90
3	Yellow and white	2	80
4	Silver and white	2	110
5	Dirty and dirty	3	50
6	White and white	2	150
7	White and white	100	45
8	White and whitish	4	87
9	Brown and white	3	60
10	Yellow and white	3	95

Appendix 9

Mean: $\mu = \sum x / n$

Experimental condition 1 (“contact”): $\sum x = 505$ km/hrs, $n = 10$ participants

$$\text{Mean} = \frac{505}{10} \text{ km/hrs} = \underline{\underline{50.5 \text{ km/hrs}}}$$

Experimental condition 2 (“smash”): $\sum x = 867$ km/hrs, $n = 10$ participants

$$\text{Mean} = \frac{867}{10} \text{ km/hrs} = \underline{\underline{86.7 \text{ km/hrs}}}$$

Mean percentage difference between condition 1 and 2: $\frac{86.7-50.5}{50.5} \cdot 100 = \underline{\underline{71.68\%}}$

Appendix 10

Standard deviation: $\sigma = \frac{\sum x^2 \cdot f}{n} - \bar{x}$

Standard deviation in experimental condition 1 (“contact”): **23.03**

Standard deviation in experimental condition 2 (“smash”): **31.00**