

Internal Assessment
Replication of Loftus and Palmer (1974)

Siddharth Mahendraker
Psychology HL
Word Count: 1418

December 12, 2013

Abstract

This paper investigates the influence of leading questions on memory by replicating the famous study conducted by Loftus and Palmer in 1974. After watching a video of a car crash, participants are asked a leading question wherein the verb describing the collision is controlled (“smashed”, “hit”). The question asks the participants to estimate the speed of the collision (and hence recall it from memory). The results indicate that the schemata associated with the verb in the leading question influence the recall of the event, and result in an inaccurate reconstruction of the memory. More specifically, mild verbs such as “hit” resulted in lower speed estimates, while more intense verbs such as “smashed” elicited higher speed estimates. As in the original study, these results support the conclusion that leading questions do indeed have a significant influence on memory, specifically recall, as they introduce new information which may trigger certain schemata and hence interfere with memory retrieval.

Contents

1	Introduction	1
2	Method	1
2.1	Apparatus	1
2.2	Procedure	1
2.3	Design	1
2.4	Participants	2
3	Results	2
4	Discussion	3
5	References	3
6	Appendix	4
6.1	Materials and Apparatus	4
6.2	Raw Data and Calculations	4

1 Introduction

Memory is the cognitive process which deals with the storage and retrieval of information. It is well known that memory, particularly the retrieval of memory, is terribly inaccurate. That is, memory does a very poor job of storing and retrieving the exact information we're trying to remember. The inaccurate nature of memory was first rigorously accounted for by Bartlett in 1932 [1]. He suggested that rather than record information, memory is actually a reconstructive process; new information is processed according to information we already know. This pre-known information is stored in mental structures called schemata, which provide a framework for organizing information.

Based on his ideas, Bartlett claimed that memory distortions were due to information being processed through our personal and cultural schemata. He investigated this claim by conducting an experiment. English participants were asked to serially reproduce an Aboriginal story which contained many elements specific to Aboriginal culture. Unfamiliar with the style of the story, participants' memory of the story quickly changed to accommodate their cultural schemes; the story became shorter, details deemed insignificant by the englishmen were removed and new more conventional details were added. In turn, these results supported Bartlett's idea of reconstructive memory based on schemes.

Based on the idea of reconstructive memory influenced by previously known information, Loftus and Palmer wanted to find out whether the use of leading questions (questions which suggest an answer) could affect recall. In a study conducted in 1974 [2], the researchers performed an experiment wherein participants were shown footage of two cars colliding and were asked a leading question about the speed of the collision. The leading question contained a controlled verb describing the incident ("contacted", "hit", "smashed"). It was found that the verb used had a significant effect on the speed estimate. More specifically, dramatic verbs such as "smashed" elicited high speed estimates, while milder verbs such as "contacted" elicited low speed estimates. This seems to indicate that leading questions do indeed influence the retrieval of memory; the schemata evoked by the control verb interfere with the retrieval of information about the event.

In this paper, we attempt to replicate Loftus and

Palmer with the same aim; to investigate whether leading questions affect memory retrieval.

2 Method

2.1 Apparatus

- Consent form
- Debriefing form
- Video of car crash
- Questionnaire with the "hit" condition
- Questionnaire with the "smashed" condition
- Computer

See the Appendix, subsection 1 for more information.

2.2 Procedure

To make sure ethical procedures were being followed, participants signed a consent form and were verbally reminded about their rights before the experiment had begun.

Participants were then individually guided into a quiet room and seated in front of a computer. A segment of a video depicting car crashes was shown to each participant. The video itself was part of a compilation of car crash videos obtained from around Europe. Each participant only saw the video segment once. The clip was 8 seconds long, and featured an accident between a car turning onto the road and another car coming in from the right. After watching the clip, participants were asked to fill out a randomly chosen questionnaire, which asked them a variety of specific questions about the accident.

After the experiment was over, participants were verbally de-briefed and given a debrief form which explained the objectives of the experiment in greater detail.

2.3 Design

To allow for a controlled environment and to establish a clear cause and effect relationship, a laboratory experiment design was used. The independent variable is the verb used in the critical question of

the questionnaire. The dependant variable is the estimate of the speed of the cars in the witnessed collision, as an answer to the critical question in the questionnaire.

In an attempt to avoid demand characteristics, 4 extra questions were added to the questionnaire to shift the focus away from the critical question regarding the speed estimate. Furthermore, to reduce experimenter's bias (esp. resulting from the use of opportunity sampling), the study was conducted using a double blind design. Questionnaires containing the two verbs used as the independent variables ("hit", "smashed") were shuffled in a random order, and then distributed to participants in a random fashion. Neither the experimenter nor the participant knows the value of the independent variable until after the experiment is over.

Ethical guidelines were also stringently followed. Before the experiment, participants signed consent forms wherein they were made aware that their data will be kept confidential, that no personal data or information will be taken and that they have the right to withdraw themselves and their data from the study at any time. Participants were also debriefed after the experiment and reminded of their aforementioned rights.

2.4 Participants

In order to quickly and easily gather data, an opportunity sample was used. Participants were chosen from the population of grade 11 and 12 student at school who don't take psychology. This prevented students who were familiar with the study from participating. Ten participants were chosen in total, all of whom agreed to participate in the study. The participants were randomly split into two experimental groups based on the questionnaires they received.

3 Results

The responses to the questionnaire were tabulated and the central tendency and dispersion of the results were calculated. Of the 10 questionnaires returned, 6 responded to the "smashed" condition and 4 responded to the "hit" condition. The mean speed estimated in the "hit" condition was 40 km/hr, with estimates ranging from 30-50 km/hr (a range of 20 km/hr). In contrast, the mean speed estimated in

the "smashed" condition was significantly higher at 60 km/hr, with a much wider dispersion ranging from 40-90 km/hr (a range of 50 km/hr).

The mean estimated speeds describe the average speed estimates of the participants and the ranges describe how spread apart (or how close) the various data points were.

This same information has been graphed and tabulated below.

Condition	Mean (km/hr)	Range (km/hr)
"hit"	40	20
"smashed"	60	50

Figure 1: Mean and range results for "hit" and "smashed" conditions.

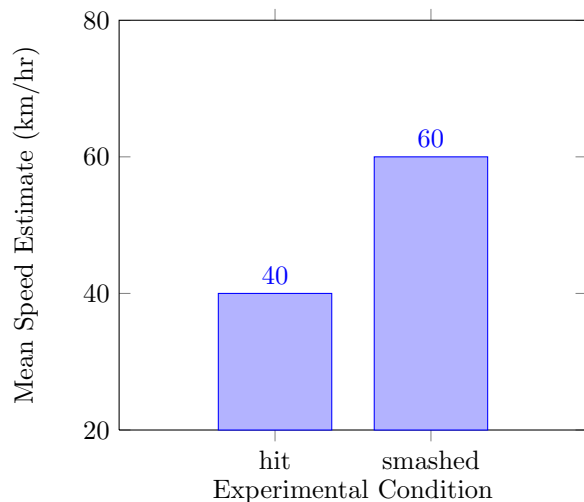


Figure 2: Comparison of mean speed estimates.

The results clearly show a difference between the speed estimates in the two experimental conditions. The mean speed estimates in the "smashed" condition are 50% higher than the mean speed estimates in the "hit" condition.

See the Appendix, subsection 2 for the raw data and calculations.

4 Discussion

The result of our experiment clearly suggest that the use of leading questions does indeed influence memory. As in the original study conducted by Loftus and Palmer, the mean speed estimate was significantly higher in the “smashed” condition than in the “hit” condition. Based on the reconstructive theory of memory proposed by Bartlett, these results could be explained due to the triggering of the schemata associated with the respective verbs “smashed” and “hit”. The intense, dramatic schema associated with the word “smashed” elicited higher speed estimates, while the milder, less intense schema associated with the word “hit” elicited lower speed estimates.

In conclusion, extra information obtained from the schemata associated with the verb in the leading question interfered with the retrieval of memory, causing differing mean speed estimates in the two experimental conditions. This conclusion closely resembles that of Loftus and Palmer, who also showed that the schema associated with the verb used in the leading question interfered with memory retrieval.

Despite the solid conclusions we were able to draw, this experiment suffers from several limitations both in its design and its procedure. Firstly, the extremely small sample size and the use of opportunity sampling introduced significant bias to the results, as not every stratum of the population was represented. Furthermore, although a double blind design was used, the experimenter (due to the sampling method used) may have inadvertently chosen participants who were more likely to give answers he expected or wanted. As in the original study, the experiment lacked ecological validity, as participants were shown a video of a car crash rather than the real thing. In the real life event, they might have been able to assimilate more information about the crash, perhaps even enough information to disregard the extra information communicated in the leading question. Furthermore, the quality of the video of the car crash was far less than ideal; unlike our eyes and ears, the image wasn’t very high resolution and the sound was fair. Therefore, the net information communicated in the video was far less than what would have been communicated in real life. Lastly, the experiment does not directly address the fact that these verbs have interfered with the recall of the memory of the car crash, rather, it only shows that these verbs

interfered with the recall of the speed at which the crash occurred. To ascertain whether the real memory of the crash were affected, I would have to test whether other elements likely to be associated with the verb’s schema were present in the participants’ memories. Otherwise, it could be argued that the extra information communicated in the leading question helped the participant choose a more accurate speed, and no memory was really altered. In the original study conducted by Loftus and Palmer, a second experiment was used to establish the fact that the memory was truly modified.

Conducting this experiment over, I would definitely expand the sample population and use a less biased sampling method, such as random sampling. This would reduce the bias introduced by the small population and allow the findings of the study to easily generalize. The ecological validity of the experiment could also be improved by attempting to use real life car accidents and accident witnesses, however, this remains difficult and dangerous.

5 References

- [1] F.C. Bartlett. *Remembering: A Study in Experimental and Social Psychology*. Cambridge University Press, 1932.
- [2] E.F Loftus and J.C. Palmer. Reconstruction of automobile destruction; An example of the interaction between language and memory. *Journal of Verbal Learning and Verbal Behaviour*, 1974.

6 Appendix

6.1 Materials and Apparatus

Item	URL
Consent form	http://bit.ly/VKofDc
Debriefing form	http://bit.ly/YH07gc
Video of car crash	http://bit.ly/11Rrb20
Questionnaires	http://bit.ly/Xrwn5T

Figure 3: URL locations of the materials used in this study.

6.2 Raw Data and Calculations

Participant	Speed Estimate	Condition
1	50	hit
2	40	hit
3	30	hit
4	40	hit
5	70	smashed
6	90	smashed
7	40	smashed
8	50	smashed
9	60	smashed
10	50	smashed

Figure 4: Raw data of both experimental conditions.

The mean for both experimental conditions was calculated using the following formula,

$$\mu = \frac{1}{n} \sum x.$$

Therefore,

$$\begin{aligned} \mu_{\text{hit}} &= \frac{1}{4} \sum x \\ &= \frac{1}{4} \cdot 160 \\ &= 40. \end{aligned}$$

And,

$$\begin{aligned} \mu_{\text{smashed}} &= \frac{1}{6} \sum x \\ &= \frac{1}{6} \cdot 360 \\ &= 60. \end{aligned}$$

The range for both experimental conditions was calculated using the following formula,

$$\text{range} = \max x - \min x.$$

Therefore,

$$\begin{aligned} \text{range}_{\text{hit}} &= \max x - \min x \\ &= 50 - 30 \\ &= 20. \end{aligned}$$

And,

$$\begin{aligned} \text{range}_{\text{smashed}} &= \max x - \min x \\ &= 90 - 40 \\ &= 50. \end{aligned}$$