

CONVENTIONS OF REPORTING ON PSYCHOLOGICAL INVESTIGATIONS

Although there is no single accepted way of writing up a psychological investigation, over the years a style has evolved which has become the convention for writing up an investigation. An article submitted for publication will have a **Title Page** identifying the author's name and institution. This page can be removed so that when the article is subjected to *peer review*, the author is anonymous.

The first thing the reader will read is the **Abstract**:

ABSTRACT

The aim of this study was to investigate whether a leading question could influence the recall of eyewitnesses. Participants were shown a video of an incident involving two cars and then asked to answer questions about the footage. One group of participants were presented with the question "How fast was the car going when it *hit* the other car?", whereas for a second group the word 'hit' was replaced with '*smashed*' in the same question. It was predicted that the word 'smashed' would produce a higher average estimate of speed than the word 'hit'. A Mann Whitney U test showed that the prediction was supported at the 0.01 significance level. It was therefore concluded that a leading question can influence the recall of eyewitnesses, and this supports the findings originally reported by Loftus and Palmer (1974).

Although the Abstract is the first thing the reader will read, it is the last thing that the writer will write. This is because it is a *Summary* of what the study is about. It includes information about the **aim**, **method**, **results**, and the **conclusion** that was drawn. Having read the Abstract, the reader can decide if s/he is sufficiently interested to read all of the article.

After the Abstract comes the **Introduction**:

INTRODUCTION

The aim of this study is to investigate whether a leading question can influence the recall of eyewitnesses. It has long been known that eyewitness testimony is not always accurate, and can be influenced by a number of factors. These include race (Brigham and Malpass, 1985), clothing (Brigham and Malpass, 1985) and hearing views expressed by other people (Memon and Wright, 1999).

One of the most important factors that influences eyewitness testimony is misleading questions. For example, in one study, Loftus (1975) had two groups of participants view a film of a car travelling along a road. Both groups were then asked the same ten questions about the film, except for one question which was changed. The first group was asked: "How fast was the white sports car going when it passed the *Stop* sign while travelling along the country road?". The second group was asked: "How fast was the white sports car going when it passed the *barn* while travelling along the country road?". The difference was that a *Stop* sign did appear in the film, but a barn did not. After a week, ten new questions were asked, the final one of which was: "Did you see a barn?". Only 2.7% of the first group said 'yes',

compared with 17.3% of the second group. Thus, the suggestion that there was a barn had influenced the second groups' memory of the event.

A similar study was conducted by Loftus and Zanni (1975). Participants saw a short film of a car accident, and then answered questions about it. Some were asked: "Did you see *the* broken headlight?", whereas others were asked: "Did you see *a* broken headlight?2. despite the absence of a broken headlight in the film, those presented with the first question, which implies that there was a broken headlight, were significantly more likely to say 'yes'.

One of the most famous studies into the effects of asking a leading question was conducted by Loftus and Palmer (1974). They showed participants a 30 second tape of two cars involved in an accident. The participants were then asked a number of questions about the accident. One group was asked: "About how fast were the cars going when they *hit* each other?". In four other groups, the word *hit* was replaced by *smashed*, *collided*, *bumped*, or *contacted*. Loftus and Palmer found that the word *smashed* produced the highest estimate (40.8 mph) and *contacted* the lowest (31.8 mph), with estimates for the other words falling in between these extremes. These results show that simply changing the verb in a question can exert a small but statistically significant effect on the way information is recalled from memory.

In a follow-up study a week later, the *smashed* and *hit* participants were asked: "Did you see any broken glass?", even though there was none. 32% of the *smashed* participants answered 'yes', compared with only 14% of the *hit* participants. The use of the word *smashed* had seemingly influenced the participants' memory of the seriousness of the accident, and therefore they were more likely to place broken glass at the scene.

These studies echo the view that after witnessing an event, a person can be exposed to information that influences their memory of the event, even if the event is visual and the information verbal. However, it is acknowledged that when misleading information is blatantly wrong, it does not affect memory. Unless information is blatantly incorrect, then, research consistently shows that misleading questions can influence recall of an event.

This study will attempt to replicate this finding using two of the five conditions that featured in Loftus and Palmer's (1974) experiment. On the basis of Loftus and Palmer's findings, the following directional hypothesis will be tested: Participants who witness an event involving two cars will produce a higher average estimate of their speed when the word *smashed* is used in a question about how fast the cars were travelling than participants who witness the same event when the word *smashed* is replaced by the word *hit* in the same question. The null hypothesis is that there will no difference in participants' average estimates, and any difference there is reflects the operation of chance factors.

The Introduction functions as a 'background', giving the reader information about other research that has been done in the area the article is about. Once this information has been presented, the writer will explain how the study s/he has done relates to the other research. The Introduction typically ends with a statement of the hypothesis that has been tested in the investigation.

The next section describes what happened in the study and is called the **Method**. In Psychology, it is typically broken down into sub-sections headed **Design and Overview**, **Participants** (who the study was done on), **Apparatus** (what equipment was used), and **Procedure** (how the study was carried out):

METHOD

Design and Overview

The study consisted of two experimental conditions. Two groups of participants saw the same video footage of an incident between two cars and were then presented with identical questionnaires about the footage, except for one question. The first group was asked "About how fast was the car going when it *smashed* into the car travelling in the other direction?". The second group was asked the same question. However, the word 'smashed' was replaced by the word '*hit*'. The independent variable is the type of word used in the critical question, and the dependent variable is the estimated speed (in mph) the participant writes down. An independent subject design was used, so that the same stimulus material could be used for both conditions. To control for demand characteristics, single blind control was used and informed consent was not obtained from the participants. However, after the experiment all of the participants were debriefed as to the study's purpose.

Participants

The participants were selected using availability sampling. The sample was a class of thirty sixth form students aged between sixteen and seventeen. Half of the participants were male, and half were female, although no analysis was carried out to test for a sex difference. The experimenter did not know the participants so this was not a source of bias. The participants were not psychology students.

Apparatus

The apparatus used in the experiment consisted of a one minute long incident involving two cars, taken from a video called 'Police, Stop!'. There was also a video player and television and the questionnaires relating to the film, for the participants to complete. The questionnaire consisted of five questions relating to the incident shown in the video. The independent variable was contained in the second question.

Procedure

A classroom was used as the laboratory, and contained chairs, tables, and the television and video player. The television was placed in a position where it could be seen by all of the participants. The questionnaires were placed on the participants' desks face down so that the contents could not be seen. The participants were then told that they were about to witness a video of an incident involving two cars and that they would be asked to complete a questionnaire when the video had finished.

The participants were asked to remain silent throughout the experiment. The video was then played. When it had finished, the participants were told to turn over their questionnaires and read the instructions at the top of the sheet before answering the questions. When each participant had finished answering the questions, the questionnaires were collected and the participants were thanked for their time. The experimenter then debriefed the participants by explaining to them that there were in fact two types of questionnaire, one containing the word '*hit*' in the second question and one containing the word '*smashed*' in the same question. The experimenter also explained the significance of the difference and what the hypothesis of the experiment was. The participants were then reassured that their questionnaires would remain confidential.

The important criterion in the Method section is whether we, as readers, would be able *replicate* the study just by reading the writer's account of it. If we can, then it has been well-written. If we start asking questions like "How was that bit done?" then it has not been well written.

The next section tells us what was found in the study. This is the **Results section**:

RESULTS

Table one (below) shows the mean and standard deviation of the estimated speeds for the 'hit' and 'smashed' conditions.

	Mean of estimated speeds (mph)	Standard Deviation
'Hit' Condition	60.0	13.5
'Smashed' Condition	78.3	21.0

Table 1: Means and standard deviations of the two conditions

There is not that much difference between the two conditions in terms of the standard deviations. However, in both conditions the standard deviations are large indicating a lot of variation around the mean values. Figure one (below) is a bar chart showing the difference between the means of the estimated speeds in the two conditions.

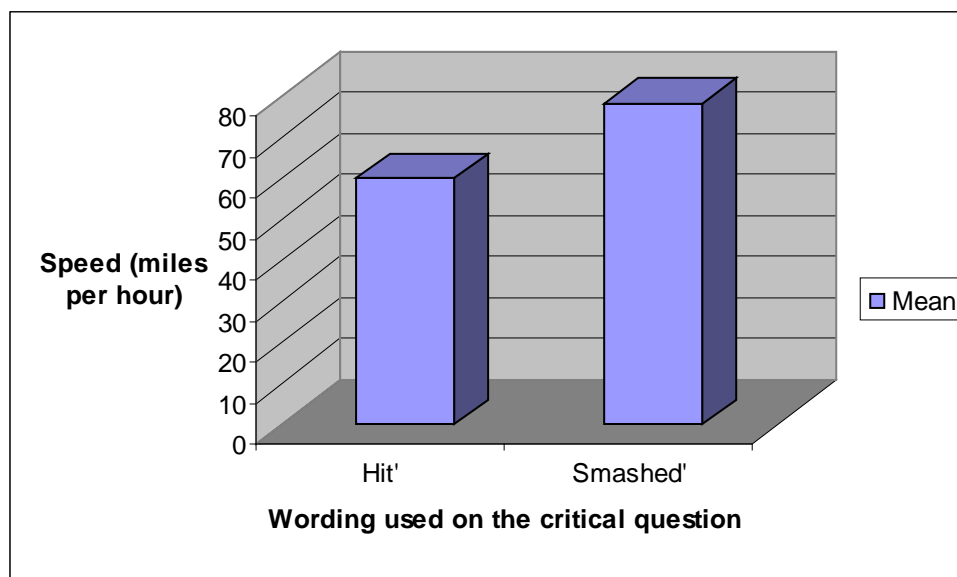


Figure 1: Bar chart of the mean estimated speeds of the two conditions

The difference between the two means is 18.3 mph. The '*smashed*' condition (78.3mph) produced a higher estimate of speed than the '*hit*' condition (60.0mph), and therefore the experimental hypothesis is supported. The standard deviation in the '*smashed*' condition is larger than that in the '*hit*' condition. This means that there was a greater variation of estimates made by participants in the '*smashed*' condition than in the '*hit*' condition.

A Mann Whitney U test was used to discover whether the difference between the mean estimated speeds was statistically significant. This method is appropriate as it can be used with an independent groups design (as in this experiment), when a difference is being tested for (as in this experiment). Although speed is a ratio level of measurement, and the Mann-Whitney converts ratio into ordinal level data it is still appropriate to use to test for a difference.

The calculation of the Mann Whitney U test can be found in Appendix 3. The calculation produced a value of $U = 55$. When N_1 is 15 and N_2 is 15, the tabled value of U at the 5% significance level for a directional test is 72. Since the calculated value (55) is less than the tabled value, the difference between the two conditions is statistically significant at $p < 0.05$. A significantly higher average estimate was provided in the smashed condition (Average=78.3mph) than the hit condition (Average=60.0mph). In fact, the difference is significant at the 1% significance level, since the critical value for a uni-directional test is 56 and the calculated value (55) is lower than this. Therefore the null hypothesis can be rejected and the experimental hypothesis accepted with 99% confidence ($p < 0.01$).

The Results section contains both numerical descriptive statistics (such as means and standard deviations) and pictorial descriptive statistics (such as bar charts). Importantly, it contains the outcome of the inferential statistical test that was used to analyse the data, and hence whether the experimental hypothesis was supported or not.

The last major section is called the **Discussion**. In this, the writer attempts to explain the findings in terms of both the experimental hypothesis and other research that has been conducted in the area. The writer will also identify limitations of the study and suggest appropriate modifications. The writer will also make suggestions for further research and discuss the implications of the findings.

DISCUSSION

The results of this study clearly show that changing a word in a question can affect recall of an event. This is consistent with Loftus and Palmer's (1974) findings that the participants in the 'smashed' condition perceive the speed of the vehicle to be faster than the 'hit' participants. Loftus and Palmer explained their results in terms of 'memory as reconstruction' theory. This means that the participants' memories of the event were changed and not simply added to. Because the findings of this study support Loftus and Palmer, presumably the same explanation can be applied. However, there are some differences between these results and those of Loftus and Palmer, which also need to be explained.

One such difference is the level of difference between the two sets of participants. In Loftus and Palmer's study the 'hit' participants made an average estimated speed of 34mph, whilst their 'smashed' group of participants made an average estimated speed of 40.8 mph. Thus, there was a 6.8mph difference between the two groups. In this study the hit participants made an average estimated speed of 60mph, while the smashed participants' average was 78.3mph. This is a difference of 18.3mph between the two groups.

So, while the results of this study support Loftus and Palmer, the difference between the results is greater. This implies that the word 'smashed' had a greater effect on the participants in this study than in Loftus and Palmer's, whilst the effect of the word 'hit' was approximately the same. This could be due to the stimulus used. The footage used in this study may have been more dramatic than that of the original. Because 'hit' is quite a broad term and could imply a wide range of speeds, whereas 'smashed' is more specific and implies a high-speed crash, the word could exert a greater effect than it did in the original study, whilst the word 'hit', created a similar response. Indeed, as the estimated speeds in this study are higher than those in the original, this would seem a likely explanation.

One difference between the conditions can be seen by looking at the standard deviations for both groups. The standard deviation shows how spread out the estimates are from the

participants. The standard deviation for the 'hit' participants was 13.5 while for the 'smashed' participants it was 21. This shows that there was a greater variation of estimates from those participants in the 'smashed' condition than those in the 'hit' condition. Thus it would seem that some of the 'smashed' participants were more influenced than others. Considering that all of the 'smashed' participants were presented with the same stimulus and same questionnaires, it would seem that this could only be explained by the differences between the participants themselves. Therefore, perhaps, personality played a role and by chance there was a wider range of results in the 'smashed' condition than in the 'hit'.

There are also some limitations with this study. For example, although none of the participants were psychology students, they may have friends who are studying psychology and had relayed Loftus and Palmer's experiment to them. This would lead to either the participants being 'helpful' and producing the desired answers or the 'screw you' effect where the participant deliberately produces an estimate they know is not expected by the experimenter.

To control for this, it would be wise to use younger students, such as GCSE pupils, who have not been exposed to any Psychology and thus would have no knowledge of the original experiment. Another limitation of the study is that not all of the participants were old enough to have learnt how to drive. Therefore, those who were old enough and learning to drive may have had an advantage over the other participants, as they may have been more accurate at estimating the speed of the vehicle. To modify this, it would again be better to use GCSE pupils, none of whom would be old enough to drive.

The implications of these, and Loftus and Palmer's findings, are quite serious. They mean that questions which are often asked in a courtroom do not necessarily produce accurate answers. Indeed, such questions could lead some innocent people to being wrongly condemned. This does not mean, however, that eyewitness accounts are to be discredited. However, it has been suggested that the effects of leading questions can be reduced if the witnesses are interviewed in a structured way, following the events in strict sequence (Bekerian and Bowers, 1983). In this case, witnesses would not be affected by the biased wording of the following questions. To test this it would be interesting to partially replicate Loftus and Palmer's study again, this time with the questions in chronological order. Alternatively, the participants could be interviewed, as they would be were it a real accident or crime. Then we could find out whether interviewing in a structured way really can reduce the effects of leading questions in eyewitness testimony.

The final section is called **References**. Here, the writer identifies the source for each of the studies that were referred to in the Introduction and elsewhere. This is in case the reader wants to find one of the studies the writer has referred to. The references are written in alphabetical order.

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