

Reconstruction of Automobile destruction

Elizabeth F. Loftus and John C. Palmer (1974)

People are not good at reporting numerical details, such as time, speed and distance (Bird 1927). Marshall (1969) found that subjects gave speed estimates ranging between 10 and 50 mph for a car travelling at 12mph! The more complex the event the more likely the time taken for the event to happen will be over-estimated. (Block 1974) Because people are poor at estimating they can be easily influenced by questioning, for example. In courts of law leading questions can not be asked.

Fillmore (1971) found that the words 'hit' and 'smashed' could affect the estimated speed.

Experiment 1

Method

45 students Could there be a bias? Think in terms of generalisability, or are they just trying to please their teacher?

7 films from the local safety council and police

5 - 30 second film clips, of car accidents. Not really like a real accident, therefore lacks ecological validity.

After a written account of each accident was given by each student, a series of questions was asked. The critical question was one about the estimated speed of the vehicles. What was the purpose of the written account? Did this affect the results? Loftus fails to report any details of what was written; What data could have been obtained from these accounts?

5 groups of 9 students.

Each group had a different version of the critical question.

The critical questions were:

1. About how fast were the cars going when they **hit** each other?
2. About how fast were the cars going when they **smashed** each other?
3. About how fast were the cars going when they **collided** with each other?
4. About how fast were the cars going when they **bumped** into each other?
5. About how fast were the cars going when they **contacted** with each other?

The time taken to conduct the experiment was about one and a half hour.

Table 10-1 Speed estimates for the verbs used in Experiment 1

Verb	Mean speed estimate (mph)
Smashed	40.8
Collided	39.3
Bumped	38.1
Hit	34.0
Contacted	31.8

You will notice that the verb 'smashed' produced the fastest estimated speeds, whereas the verb 'contacted' produced the slowest estimated speeds. The words in 'speed' order are smashed,

collided, bumped, hit and contacted. These differences are significant at p is less than 0.005. This was by using an Analysis of Variance (ANOVA). This looks for a significant difference between the effect of each verb (IV), but also checks that there is no difference between groups and films used (which produce random variables).

Could it be that the actual speeds of the cars produced this result?

Four of the films were staged, and therefore the speeds were accurately measured.

- The film of a car crash at 20 mph was estimated to be 37.7 mph.
- The film of a car crash at 30 mph was estimated to be 36.2 mph.
- The two films of a car crash at 40 mph were estimated to be 39.7 and 36.1 mph.

From this you can see that the subjects estimates are not related to the actual speed of the vehicle. The verb in the question has more influence!

Conclusion

1. The subject is not sure of the speed so the verb provides the answer.
2. The verb changes the memory representation.

If the second reason is true than other things might change in accordance to what the verb suggests. Experiment two is designed to test for this (ie cars 'smashed' so probably there was broken glass; it is this information that is stored).

Experiment 2

150 students were shown a film of a multiple car crash. By having a multiple car crash the scene is more complex and emotive; How could this affect the results?

The film lasted one minute, but the action was just 4 seconds long.

Three groups of 50 students were used. All students were asked to give a written description of the car accident, and then:

- One group was asked: 'About how fast were the cars going when they smashed into each other?'
- The second group was asked 'About how fast were the cars going when they hit each other?'
- The third group were not asked about the speed.

The speed estimate for the 'smashed' version was 10.46 mph. For the 'hit' version it was 8.00 mph. This difference is significant.

One week later the subjects were asked: 'Did you see any broken glass?'. This question was hidden amongst ten other "distractor" questions, in order to avoid "demand characteristics". The experimental question appeared in a random position.

Table 10-2 gives the distribution of 'yes' and 'no' responses.

Table 10-2. Distribution of "yes" and "no" responses to the question "Did you see any broken glass?"

	Verb condition		
Response	Smashed	Hit	Control
Yes	16	7	6
No	34	43	44

Notice that although most people accurately report no broken glass, more of the subjects in the 'smashed' condition report broken glass.

A chi-square shows these results to be significant.

32% of the "smashed" subjects reported seeing broken glass. 14% of the "hit" group reported seeing broken glass.

Therefore 'smashed' leads to higher speed estimates, and reports of broken glass. Table 10-3 shows the probability of saying 'yes' to seeing broken glass for different speed estimates.

Table 10-3. Probability of saying "yes" to "Did you see any broken glass?" conditionalized on speed estimates

Verb condition	Speed estimate (mph)			
	1-5	6-10	11-15	16-20
Smashed	.09	.27	.41	.62
Hit	.06	.09	.25	.50

This shows that the probability of saying 'yes' to seeing broken glass is not just related to the speed estimate, but over-ridingly by the verb's meaning.

It is a pity Loftus did not ask the students whether they remembered the previous week's question, because the question, if remembered might suggest the answer. So we are not sure which of the two alternative explanations (

1. The subject is not sure of the speed so the verb provides the answer.
2. The verb changes the memory representation.)

is likely.

Discussion

Over time, perhaps, we are unable to tell the difference between information processed during perception and information received later.

There is a link between Carmichael et al's (1932) experiment and the present experiment. They drew shapes, such as two circles joined by a horizontal line (e.g. 0-0) and labelled them as either 'dumb-bell' or 'glasses'. Depending on what label they had been given, subjects later drew either a dumb-bell or a pair of glasses. They had been asked to recall the actual image shown. They had changed the original image in their mind, to fit their idea of what the label described. The 'car accident' scene in the present experiment is rather like Carmichael's image. The speed is unclear, rather as Carmichael's image is unclear. The verb in the question acts rather like Carmichael's label; It allows a tangible (or clearer) image to be held in memory.

EVALUATION OF LOFTUS' STUDY ON EYE-WITNESS TESTIMONY.

It is also possible to interpret the results of her study in terms of Bartlett's theory. Bartlett described memory as an 'elaborative reconstruction of experience' i.e. when remembering the details of an event we tend to alter (reconstruct) them. This has happened in the Loftus study. The original memory trace has been altered to incorporate the new information about speed of the vehicle. Subjects have used their past knowledge (schema) of serious car accidents to help them to decide whether or not there was any broken glass.

Loftus' work has important implications. If eye witnesses are so inaccurate then we must not allow a person to be convicted just on the basis of an eye witness report. Leading questions in court should also be avoided.

However, the study lacks ecological validity in a number of ways, which may mean that the results cannot be generalized to real life. Some of the ways in which the study lacks ecological validity are discussed below.

1. Choice of participants. Who were the participants? Why might their memories be different from the rest of the population?

2. Participants knew that they were being studied and this may have led to *demand characteristics*. Define this term.
 3. Participant's memory traces may not have been altered at all. They may simply have been using the information provided by the experimenter (smashed, hit etc.) to take a guess as to the speed of the vehicle. They may even be trying to please the experimenter by giving the answer that she seems to want.
 4. There are numerous ways in which taking part in this study is different from witnessing a real life car accident. The accident is seen on film, the person is looking directly at the film and has been told to watch, the person is unlikely to find the film stressful, it is not important if the estimate of speed is not accurate. Perhaps witnessing a real life event is different. You may only see part of it, it may frighten you and it is obviously vital that you report it accurately.
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