Final project for the course of Cognitive Psychology
Stockholm University, DSV dept.
Academical year 2017/18

The influence of postevent information on eyewitness' memory

Presented by:

- Dimosthenis Ioannou
- Giorgos Ntymenos
- Giacomo Bartoli

Abstract

The aim of this research paper is to find relevant elements that prove how different terms, specifically verbs, can influence the accuracy of eyewitness testimony. In this case, the distortion could be the result of required informations that can be lead to a different interpretation depending on what verbs we used to formulate questions.
In order to achieve this goal, we selected a sample of people showing them the same video about a car accident. Then, the same people were asked to guess the speed of the accident.

1.Introduction

1. 1 Theory

How sure can humans be about the details of an event that they witnessed? How can they be sure that the details they remember are the precise details of the actual event that happened in front of their eyes and not just the representation of the event described “loosely” by the passing of the time in their brain? And can we be sure that what we remember doesn’t deviate from the reality? For example, how good are we in estimating some numerical quantity such as how fast the cars were traveling in case of an accident?
Loftus and Palmer (1974) suggest that memory is not like a video recorder, but instead our memory reconstructs events when we try to remember. This means that our memories can be affected by several factors, leading us to remember incorrectly.
Aiming to test the effect of different terms that lead to different results, Loftus and Palmer conducted an experiment in which they showed participants clips of car accidents and asked them to answer questions about it. All questions were irrelevant except one: how fast were the cars going when they hit each other? The same question was reported using also the verb ‘to smash’.
The results of this experiment indicate that the form of a question can affect the witness's answer. Considering a subject that is undecided whether to say 40 or 50 km/h, the verb smashed biases response towards the higher option.
Another way to interpret this experiment is that the question form may influence the subject’s memory representation of the accident, meaning that not only the memories can be influenced toward a worse scenario but the subject will tend to remember details that did not actually occur.
If we can easily affect a subject’s memory of an incident that happened just a few minutes ago, then how far can an experienced lawyer go who is pretty familiar with manipulating the opinion of the jury in a court? Especially if the incident in question happened months or years ago. Can we be sure the eye-witnesses are trustworthy and their testimony is what actually

took place? Can we base the result of a whole trial on the credibility of an eye-witness' memory?

1.2 Research Questions and hypothesis

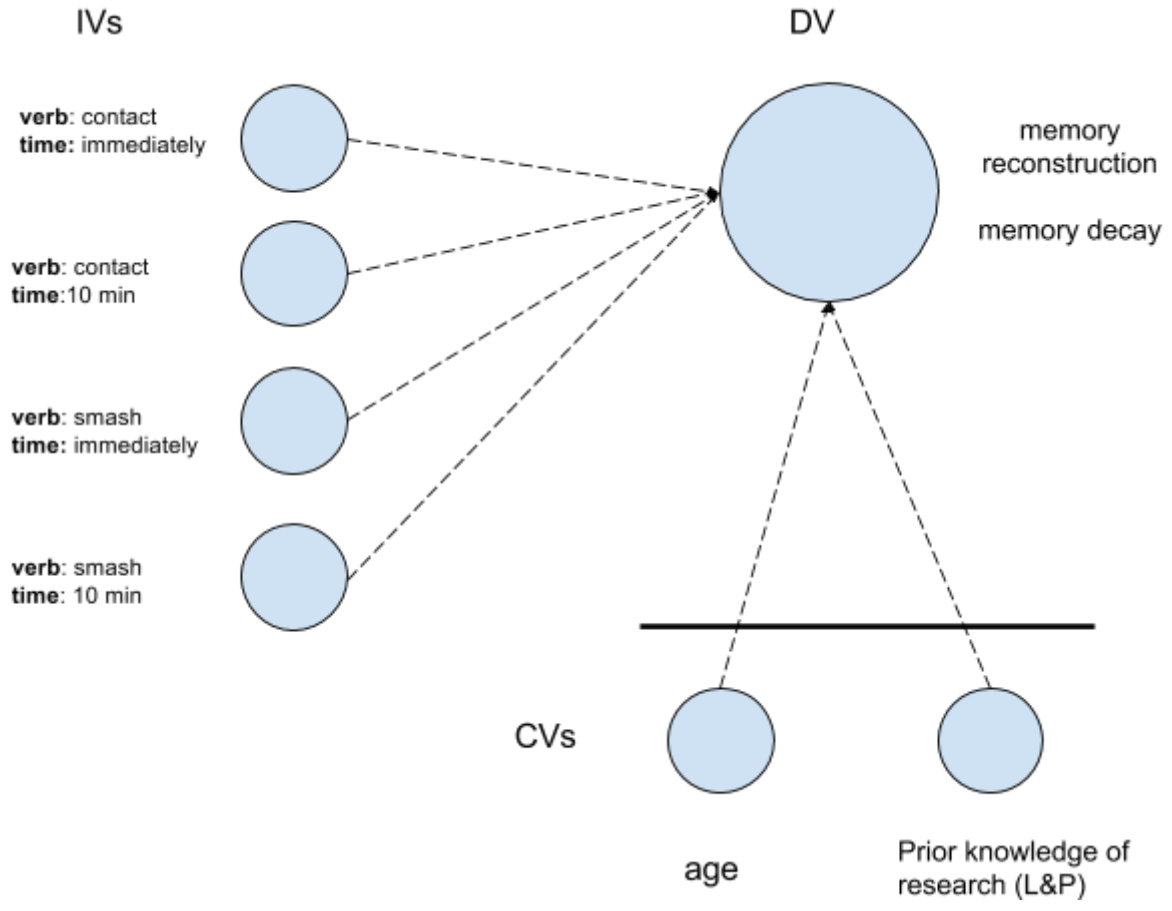
The purpose of this experiment is to reproduce the original Loftus and Palmer test as closely as possible and see how results differ by using verbs as smash/contact in the critical question. Our hypothesis is that, while memory reconstruct eyewitness' events, the reconstruction can be affected by the way we express words. In fact, verbs like smash/crush tend to emphasize the speed of the car, while others like hit/contact give an idea of an accident that was not particularly dangerous, so participants will guess a lower speed than what they really have in mind.

Moreover, we want to find out if subjects who wait a certain amount of time before answering questions can remember details more accurately than subjects who take the test immediately after.

2. Methodology

2.1 Subjects

Even though we could have involved people from different ages, due to our convenience we will use subjects aged between 20-30 years old.



2.2 Instruments

Video #1: https://www.youtube.com/watch?v=Rg5bBJQOL74
Video #2: https://www.youtube.com/watch?v=ybpXPfvZG1Y

Questions:

- What were the colors of the cars from the first video?
- Did the accident happen during the day or during the night?
- Where did the accident in the first video take place? Do you remember the surroundings?
- Where did the accident in the second video take place?
- Was the traffic light in the second video green,red or yellow?
- Were there any road signs in the second video? If yes, then which one?
- In the first video, about how fast was the car from the right side going,when it smashed/made contact the other car?
- In the second video, about how fast was the car from the left side going,when it smashed/made contact the other car?
- Did you see any broken glass in either of the videos?
- Did you see any broken glass in the accidents?
- In the second video do you remember the date written on the top of the screen?

2.3 Variables

Independent variables:

- Considering that our participants will mostly be from different countries thus their native language is not english, we have to choose verbs that can't have different interpretation. In order to achieve this goal we are going to use 'smash' and 'contact' as verbs.
- Plus, we ask part of the subject to wait 10 minutes before taking the test. The reason why we choose 10 minutes is based on previous researches [see ref.2] where participants were shown a number of pictures. For each picture they were shown a pair of similar pictures and they had to decide which one of the two was the correct one. The participants that were asked immediately after seeing the picture answered correctly 79% of the time, while the other, answering 10 minutes later, scored 59%. Moreover, the impact of the verbs will be more meaningful when waiting an amount of time before answer. This is due to time that makes memory "blurry".

Control variables:

- Subjects must not know about the experiment (the original one designed by Lotus and Palmer).
- Subjects must see the video on a big screen in a quiet place where they can focus on the content. No smartphones are allowed.
- In order to be sure that the test will be taken as we planned, we will be physically present.

- For those who have to wait 20 minutes before answering questions, they are not allowed to use their mobile phone in the meanwhile. In this way we can be sure they will not looking for information on the web. In the mid time, we are going to talk with them about random topics, the goal is to take their mind off of the experiment.

Dependent Variable:

- Memory reconstruction is measured in terms of answers that users provide to the critical question about the speed (estimated in km/h).
- Memory decay is measured in terms of percentage of right answers.

2.4 Procedures

We will split the subjects in two groups and then 50% of them will be asked question about the speed using the 'smash' verb. 50% of them will have to answer questions immediately and the rest will have to wait 20 minutes before taking the test.
This procedure will be repeated again using the other half of the subjects and the verb 'contact'.
The test can be taken at one of the following link:

- https://goo.gl/Lg2Qqf (contact version)
- https://goo.gl/YbfpQf (smash version)
- https://goo.gl/dxntDZ (contact version timed)
- https://goo.gl/u9dY3D (smash version timed)

2.5 Research ethics

Concerning research ethics, we handle it by adding a recap at the beginning of the form and read it in front of them.
Essentially, the participant must be aware that:

- Data are collected just for statistical purpose and there is no way to link data to its identity
- The participant can withdraw at any point of the test without consequences.
- The data collected about each will not be loaned or used commercially or in any other non-specific purpose.
- The participant must know that they are taking part of an experiment from the course of Cognitive Psychology at Stockholm University.

The introduction, which is mandatory for every participant, is the following:

" We are conducting a study that is part of the course Cognitive Psychology, held at Stockholm University by Robert Ramberg. We have to inform you that your participation in the study is absolutely voluntary. You are able to withdraw from the study at any point you want. If you decide that you no longer want to be part of the study there will not be any repercussions in any way, shape or form. We have to inform you that your answers will be used only for statistical purposes. We can assure you that there is no way your answers be linked to you.In addition, the data collected about each will not be loaned or used commercially or

in any other non-specific purpose. You will be asked to accept the terms and conditions and all personnel involved in the study will also have to sign an obligation to observe silence regarding such data. “

3. Results

3.1 Results

In the following part it is possible to visualize all the average results:

No timed tests

Smash

Colors	Time	Place (1st video)	Place (2nd video)	Traffic light	Road Sign	Speed (1st video)	Speed (2nd video)	Broken glass	Date
Orange, White	Day	highway	crossroad	Green	No	30	40	NO	No
Orange, White	Day	countryside	crossroad	Red	No	80	30	YES	No
Orange, White	Day	countryside	city center	Green	No	60	40	NO	No
Orange, White	Day	countryside	crossroad	Red	No	50	30	NO	No
Orange, White	Day	Course track	crossroad	Red	No	30	60	YES	No
Orange, White	Day	open road	intersection	Red	No	60	35	NO	2006
Orange, White	Day	countryside	crossroad	Red	No	30	30	NO	No
Orange, White	Day	highway	crossroad	Green	No	30	90	YES	No
Orange, White	Day	highway	crossroad	Red	No	30	40	NO	No
9/9	**9/9**	**7/9**	**9/9**	**6/9**	**0**	**44,444**	**43,889**	**6/9**	**0**
5,750						**44,167**			

Contact

Colors	Time	Place (1st video)	Place (2nd video)	Traffic light	Road Sign	Speed (1st video)	Speed (2nd video)	Broken glass	Date
Orange, White	Day	Countryside	Crossroad	Red	No	50	30	YES	No
Orange, Blue	Day	Countryside	City center	Green	No	40	40	NO	2013
White	Day	Highway	Crossroad	Green	No	60	60	YES	No
Orange, White	Day	City center	City center	Red	No	20	30	YES	No
Orange, White	Day	Highway	Crossroad	Yellow	No	50	50	NO	No
Orange, White	Day	Straight road	Crossroad	Red	No	10	50	NO	2015
Orange, White	Day	Highway	City center	Red	No	50	20	NO	No
White, Blue	Day	Highway	Intersection	Red	No	50	40	NO	2006
5/8	**8/8**	**7/8**	**8/8**	**5/8**	**0**	**41,25**	**40**	**5/8**	**1/8**
4,875						**40,625**			

Average between correct answers: 53,1%

Timed tests

Smash

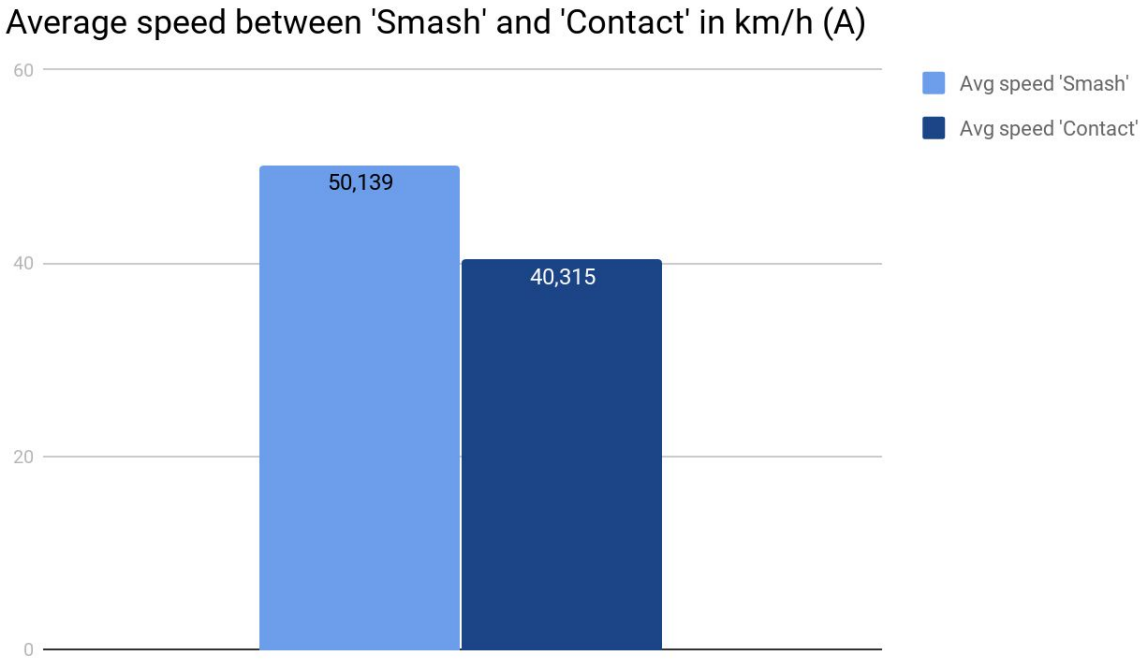
Colors	Time	Place (1st video)	Place (2nd video)	Traffic light	Road Sign	Speed (1st video)	Speed (2nd video)	Broken glass	Date
Orange, Blue	Day	countryside	crossroad	Yellow	no	50	50	NO	1998
Orange, White	Day	highway	crossroad	Green	no	100	60	NO	no
Orange, Blue	Night	countryside	crossroad	Green	no	40	60	YES	no
White, Blue	Day	highway	crossroad	Yellow	no	60	50	YES	no
Orange, Pink	Day	highway	city center	Green	no	50	30	YES	no
Orange, Blue	Day	highway	city center	Yellow	no	70	60	YES	no
White, Blue	Day	outside the city	crossroad	Yellow	no	70	40	NO	no
Orange, Blue	Day	highway	crossroad	Green	no	60	30	YES	no
Orange, White	Day	countryside	city center	Red	no	80	50	NO	2002
2/9	**8/9**	**9/9**	**9/9**	**1/9**	**0**	**64,444**	**47,778**	**4/9**	**0**
4,125						**56,111**			

Contact

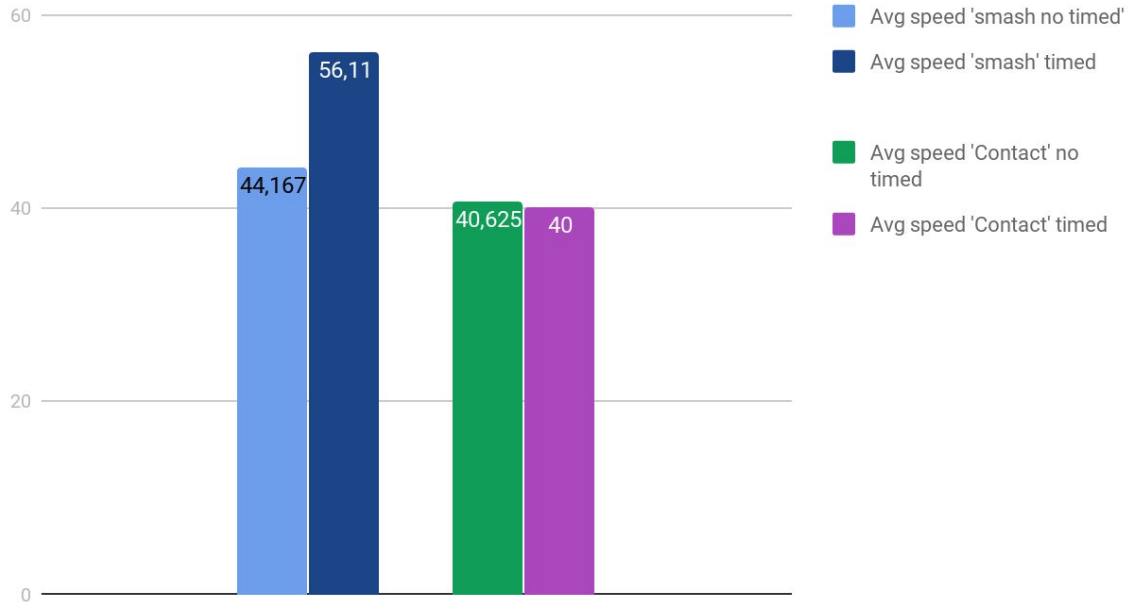
Colors	Time	Place (1st video)	Place (2nd video)	Traffic light	Road Sign	Speed (1st video)	Speed (2nd video)	Broken glass	Date
Orange, White	Day	countryside	crossroad	Red	No	40	50	NO	No
White, Blue	Day	countryside	crossroad	Red	No	50	30	YES	No
White, Blue	Day	highway	crossroad	Yellow	No	30	40	NO	2010
White, Blue	Night	city center	countryside	Green	No	20	30	NO	2016
Orange, Blue	Day	countryside	crossroad	Red	No	40	30	YES	No

Orange, White	Day	crossroad	city center	Green	No	60	40	YES	2000
White	Day	countryside	city center	Red	No	30	70	NO	No
2/7	**6/7**	**5/7**	**6/7**	**4/7**	**0**	**38,571**	**41,429**	**4/7**	**0**
3,375						**40**			

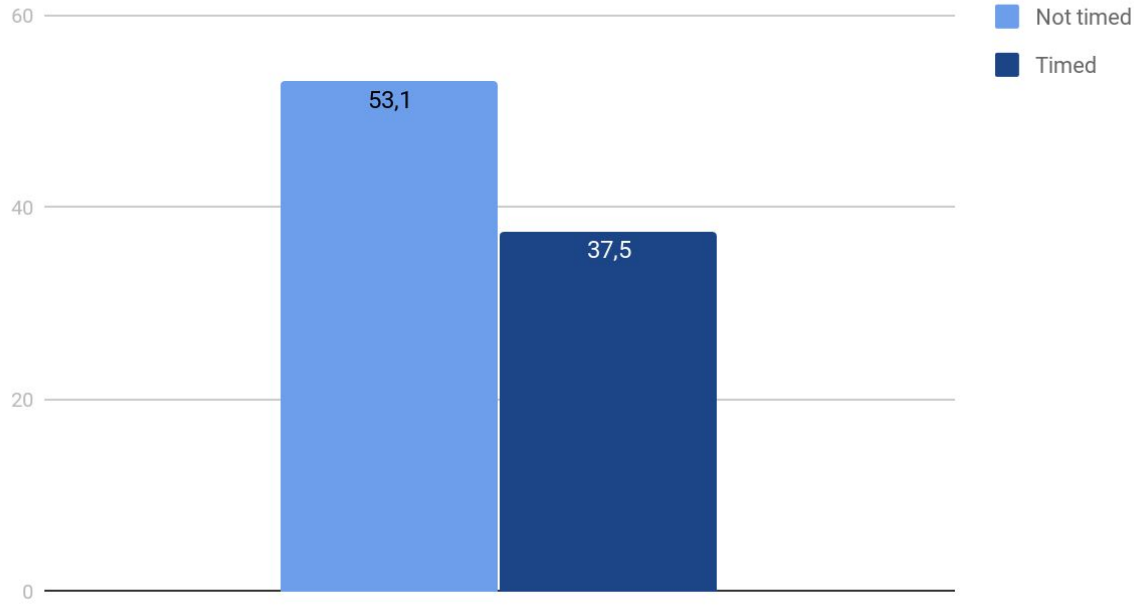
Average between correct answers: 37,5%



Avg speed difference between timed and not timed tests (B)



Avg correct answers between timed/not timed questions (C)



3.2 Notes

Table results:
Each table reports the results for each kind of test: smash/contact, timed/no timed.
At the end of each column we reported the total of correct answer for that specific question and then we calculate the average percentage of correct question.
Concerning the speed it was treated separately, in this way we are able to answer to our initial questions:

- How terms can influence the memory reconstruction?
- How time influence the memory's decay?

Barcharts:

A.
The barchart A clearly shows that people who were asked using the 'Smash' verb tend to say a greater speed rather than the other participants. To be more specific, the average of the 'smash' test is 50,13 km/h, while subjects that took the 'Contact' test have an average of 40,31 km/h. The difference is approximately 10 km/h.

B.
The barchart B represents the effect of the time. In fact, here people were asked to wait 10 minutes before answer questions. Time emphasizes the meaning of the words and, consequently, speed estimation were affected by the interval between watching the video and answering questions.

C.
The barchart C is interesting concerning the analysis of memory's decay. It is possible to see that participants that answered immediately tended to remember more details correctly than those who waited 10 minutes.

4. Conclusion

As we mentioned in the introduction, the way a question is formed can alter the memory representation of an incident in a subject's mind and as we can see in barchart A the results support this statement. It is visible that the use of each verb can produce a biased opinion towards a certain direction. What we mean by that is that the verb smash tends to lead subjects to a greater estimation of the speed of the moving cars. In the opposite direction, the phrase "make contact with" leads the subjects to a more conservative response.

We also intended to measure the memory decay that can occur when a participant has to wait a certain amount of time before answering questions about the videos that they watched previously. In our case the aforementioned time was 10 minutes. As the results show there was a considerate decrease in the percentage of correct answers collected after the interval. This proves that people are capable of retaining the general context of what they saw (in this case a video) but they tend to discard most of the details.

Finally, in the last barchart (C) we can see that there was an increase in the estimations that the subjects provided us with, when they heard the verb ‘smash’ after waiting 10 minutes in comparison to the subjects that completed the questionnaire immediately. Hence, as time passed and memories about the videos started fading the meaning of the verbs had a stronger impact.

5. References

[1].Loftus and Palmer (1974). Reconstruction of automobile destruction: An example of the interaction between language and memory. *J Verb Learn Verb Be* 13(5):58589

[2].Anderson, p.120-121, Gernsbacher - 1985