



Cases of Academic Misconduct

May 2015
Examination Session

Subject Group 3

Psychology HL
Internal Assessment
Infringement: Collusion

Candidate 1

Introduction

I will be replicating Loftus and Palmer (1974) and their experiment hypothesizing that language can alter memory. It makes up part of the cognitive level of analysis. The Cognitive Level of Analysis is an area of psychological research which looks at mental processes, investigating how we think, perceive, learn, process information and our memory.

Loftus has shown how a leading question after a witness event can have a retroactive interference effect on the memory of that event. Loftus and Palmer's experiment was especially effected by schema theory and Bartlett (1932). Bartlett (1932), found that people change the material as they try to recall it. This could occur over a series of recollections, rather like the game known as Chinese Whispers¹. His most recognised memory task involved a Native American folk story called 'War of the Ghosts'. After reading the story to the students he asked them to recall the story taking note of the key plot lines. He found that the stories became more basic and things were changed to make them seem more familiar². For example changing the word 'canoe' to 'boat' as it seemed more familiar and likely in their culture. They made an effort to make sense of the story but due to participants' schemas they struggled as it came from a different culture.

Rumelhart & Norman (1983) did a study on what is now called "Schema Theory", and this is linked to the thought that "schemas operate as active recognition devices"³. For example when a professional footballer scores a penalty directly into the goal, they must take lots of other things into account, such as the position of the goalkeeper and predict possible reactions. This is done from prior experience learned as knowledge. These players have learned this to perfection and would have stored it as a sort of 'how-to-score' knowledge. Cognitive psychologists would call this knowledge a schema and schema theory is a cognitive theory about information processing⁴. The human mind uses 'Schemata' - preexisting patterns, mental models or representations of the world - to make sense of information. This helps us to remember as it makes things more logical, essentially it is a filing system used by our brains to build pictures from memories.

This experiment is a reconstruction of Loftus and Palmer (1974) who studied the human reconstructive mind, the aim of the experiment was to see if changing *one* word in certain critical questions would influence speed estimates. They showed forty five students chosen through opportunity sampling and split up in five groups a video of the same car crash. The students were then asked to estimate the speed of the cars, each group with one of the following leading verbs in their question: "hit", "smashed", "collided", "bumped" and "contacted". Their results showed that in the "smashed" condition, the estimates were the highest, decreasing from "collided", "bumped", "hit" to "contacted" which was concluded to be caused by the leading and suggestive effect of the verbs⁵.

Loftus and Palmer (1974) is worth replicating due to its relevance in real life situations, such as in the legal system, with special reference to giving eyewitness testimonies.

¹ Bartlett, F.C. (1932). *Remembering: A Study in Experimental and Social Psychology*. Cambridge: Cambridge University Press.

² Firth, J. (2011). *Bartlett (1932) and the War of the Ghosts*. Available: <http://mindsandmodels.blogspot.co.uk/2011/11/bartlett-1932-and-war-of-ghosts.html>. Last accessed 4th Jan 2014.

³ Hill, G. "AS Level Psychology through diagrams", 2001, Oxford University Press, p.13.

⁴ Crane, J., Hannibal, J. "Psychology: Course Companion", 2009, Oxford University Press, p.71

⁵ Crane, J., Hannibal, J. "Psychology: Course Companion", 2009, Oxford University Press, p.84

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Comments

These two candidates have submitted near-identical work. Although the introductions are largely unique, and the conclusions entirely unique, the remainder of the candidate's works are near-dentical, and are therefore seen as a breach of regulations in the form of collusion.

Words that appear in both works have been highlighted in yellow, and words that appear to have been paraphrased have been underlined in red.

The highlighted extracts continue on the following five pages.

Introduction:

The cognitive level of analysis is an area of psychology that deals with mental processes, aiming to investigate how we think, perceive, learn, process information and remember. Especially interesting for this experiment, research on latter has shown how various the implications are that arise from studying the human memory.

Applied to memory and in line with Rumelhart & Norman (1983), what is now referred to as "schema theory" is linked to the assumption that "schemas operate as active recognition devices"¹. The human mind uses preexisting patterns, mental models or representations of the world, so called "schemata", to make sense of information. When we try to remember, we try to make things more logical, fitting memory into "schemata".

This experiment is a replication of Loftus & Palmers (1974) who studied the human reconstructive mind by trying to alter what their participants remembered. They showed forty five students chosen through opportunity sampling and split up in five groups videos of car-crashes. The students were then asked "At what speed did the cars [...] each other"², each group with one of the following verbs in their question: "hit", "smashed", "collided", "bumped" and "contacted". Their results showed that in the "smashed" condition, the estimates were the highest, decreasing from "collided", "bumped", "hit" to "contacted" which was concluded to be caused by suggestive effect of the verbs caused through schemas.³

However, as Yuille & Cutshall (1986) indicate, does the conclusion by Loftus & Palmers (1974) bear some weaknesses because it is a lab experiment. Yuille & Cutshall (1986) found using leading questions that recall in a real-life robbery situation was very accurate⁴, which stands in contrast to Loftus & Palmers (1974).⁵

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The shooting of Jean Charles de Menezes in Stockwell tube station is an example of this, where witness testimonies have been challenged and been found to have differences to his real appearance. For example the colour of his shirt. Researchers have found that eyewitness statements have been distorted due to stress, leading questions and media coverage among other factors⁶. This brings up the significance of research such as Loftus and Palmer (1974) and how their experiments on human memory as a part of eye witness testimonies may prevent wrongful convictions.

The aim of this study is to investigate the affect of changing a critical verb in a sentence, in essence how a leading question can affect the reconstruction of memory.

The experiment hypothesis of this study is one tailed. It assumes that participants who are given the critical verb "contacted" in the leading question will make a lower speed estimate than those participants who were given the critical verb "smashed" in the leading question. This is linked to schema theory because associations with different words will have a different suggestive effect.

The null hypothesis is that speed estimates in the "contacted" condition won't be significantly different from the speed estimates given in the "smashed" condition, any differences are due to chance.

⁶ Rohrer, F. (2005). *The problem with eyewitnesses*. Available: <http://news.bbc.co.uk/1/hi/uk/4177082.stm>. Last accessed 4th Jan 2014.

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"active attempt to understand"⁷ rather than "output matching the input"⁸. Bartlett (1932) studied the recall ability of British subjects who heard a Native American legend. After they were heard the story twice, they were asked to repeatedly, over the course of weeks, months and years, come back to the lab and recall the story. All subjects were prone to similar errors, they would assimilate unfamiliar content to their culture so it would fit their cultural "schemata". Cohen (1993) states: "New experiences are not just passively "copied" [...]; rather, [...] memory [...] is actively constructed by processes that are strongly influenced by schemas"⁹ which also includes the predictions made by the participants in this experiment.

Loftus & Palmers (1974) study is worth replicating for example because of its real life implications in the legal system. As the wrongful conviction based on EWT of Francisco Carillo in 1991¹⁰ shows, the significance of such studies is, that the extend of knowledge on the human memory as a crucial part of EWT is increased. This could lead to better understanding and might prevent wrongful conviction.

The aim of this study is to investigate the affect of language on memory, how a question can affect the reconstruction of memory.

The hypothesis of this study is one tailed. It assumes participants given the critical verb "contacted" will give a smaller speed estimate in mph than participants given the verb "smashed".

This is linked to schema theory because associations with different words will have a different suggestive effect. They will alter memory as they make the participant "draw[...] inferences [...] about what might or should have happened"¹¹ justified through research by Bartlett (1932).

The null hypothesis is that speed estimates in the "contacted" condition won't be significantly different from the speed estimates given in the "smashed" condition, any differences are due to chance.

⁷ Ibid.

⁸ Ibid.

⁹ Ibid.

¹⁰ Brown, K. "Making a new life after 20 years of false imprisonment", 2013, *BBC News Magazine*, Retrieved 25. November 2013 (<http://www.bbc.co.uk/news/magazine-21972058>)

Fraser, S. "The problem with eyewitness testimony". TED talk. Retrieved 25. November 2013 <http://www.youtube.com/watch?v=buhMdC7MO0U>.

¹¹ Loftus, E. F., Palmer, J. C. "Reconstruction of automobile destruction: An example of the interaction between language and memory", 1974, *Journal of Verbal Learning & Verbal Behaviour*, Ed.13, pp. 585-589.

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Method

Design

The experiment will use an independent measures design. Which means that the experiment will make use of two different groups of participants. This is because the experiment uses two independent treatment groups to investigate the effect of wording on recall. The design is to help avoid participants trying to guess the aim of the experiment by means of the order effect, which occurs in repeated measures design when using the same group of participants whereby they learn what to remember in the first trial so this then effects the second trial. This could influence them to alter how they answer a question, which would make the experiment insignificant. Demand characteristics occur when the participants guess the aim of the study and therefore it defaults the aim of the experiment.

The participants chose where they wanted to sit, which made the allocation into a treatment group random. As we had no say into where they should sit, we just laid the questionnaires and briefings face down so this did not influence their decision either. To avoid external influences a written and standardised briefing was given to all participants. Also participants were told not to speak to each other to avoid demand characteristics such as mentioned before. On the questionnaire we included questions which were not linked to the aim to avoid demand characteristics. We did not take into account experience on the road, which may have given participants an advantage at guessing the correct speed.

The Independent Variable (IV) for both treatment groups was the critical verb inserted in the gap in the following leading sentence: 'At what speed did the cars ___ into each other?'. The critical verb changed for the both group 1 and group 2, group 1 had 'contacted' and group 2 had 'smashed'. The dependent variable (DV) is the speed estimate of the cars at the time of the crash in Miles Per Hour (MPH), this was applied to both group 1 and group 2.

We gave out a consent form for the participants to fill in, they were also briefed⁷ and debriefed⁸ in order to follow ethical guidelines. They were told that the experiment would remain anonymous and they had the right to withdraw at anytime. They were also assured that they would not be mentally or physically harmed.

Participants

We opportunity sampled from a TOK class as it was easiest. We attracted 21 participants, IBDP students between 17 and 18 years old from Greshams School. The target population was, IBDP students in a boarding school. We excluded students studying psychology, and chose the rest of the students from two different TOK classes. There was no specific allocation of students into the two experimental groups, we allowed them to sit where they wanted to. All students are fluent in, and study, english but for 14 it was not their 1st language. There were 8 girls and 13 boys. The participants were allocated to the conditions by being allowed to choose 1 of 21 seats with a covered and numbered questionnaire on it. The numbering best provided anonymity.

⁷ See Appendix 2

⁸ See Appendix 3

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Method:

Design

The experiment will use an independent measures design. This is due to the aim of the experiment, two independent treatment groups are needed to investigate the effect of a variation of the wording on recall. This is to avoid demand characteristics such as the order effect, participants trying to guess the aim of the experiment, which could influence them to answer how they think they "should" answer which could influence validity of the results.

Participants were randomly assigned to a treatment group by asking them to sit where they want, questionnaires were assigned to seats in alternate order before. The undertaken control variables for this experiment to avoid external influences included a precise written and standardised briefing which was read out to every participant. Secondly participants were asked not to talk to each other to avoid demand characteristics as described before. Also more questions on the questionnaire not linked to the aim tried to avoid demand characteristics by distracting. Another extraneous variable could be driving experience, making it easier for participants to give speed estimates, which was not taken into consideration.

The independent variable (IV) for the two treatment groups was the wording of the generic question 'At what speed did the cars ___ into each other?'. One group had 'contacted' and the second group 'smashed' as the critical verb. The dependent variable (DV) for both groups is their speed

Method:

Participants

The number of participants was 21 (N=21) international IB students between 17 and 18 years from Gresham's School therefore any results can only be generalised to the target population, IB students in a boarding school. Pupils studying Psychology were excluded, the remaining students were obtained from two different TOK sets because they added up to 21, there was no specific allocation of students into these TOK sets. All students study English, but for 14 it is not their mother tongue. There was an unequal gender distribution, 8 girls and 13 boys, 7 girls and 11 boys would answer the critical question later. Participants were allocated to the conditions by asking them to individually choose one of 21 prepared seats with a covered and numbered questionnaire. This provided random allocation, the numbering provided best anonymity for the later evaluation. This form of

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Materials

1x projector
1x computer
1x video of the car crash⁹
21x numbered questionnaires¹⁰
21x printed briefings¹¹
21x printed consent forms¹²
1x printed debriefing (to be read out)¹³

Procedure

- Consent form¹⁴, briefing¹⁵ as well as questionnaires¹⁶ were, with their blank side turned up, put on each table for each participant
- Participants were asked to randomly choose a table
- Participants were asked to read the standardised briefing instructions and the consent form, furthermore they were asked not to talk to each other anymore
- Consent forms and briefing instructions were collected
- Participants were shown the video of the car crash
- Participants were asked to turn over the questionnaire and answer the questions
- After everyone had finished their questionnaire, participants were read out the standardised debriefing¹⁷
- Participants were given time for additional questions

This procedure lasted for about 25 minutes

⁹ See Appendix 5

¹⁰ See Appendix 6

¹¹ See Appendix 2

¹² See Appendix 1

¹³ See Appendix 3

¹⁴ See Appendix 1

¹⁵ See Appendix 2

¹⁶ See Appendix 6

¹⁷ See Appendix 3

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Method:

Materials

1x projector
1x computer
1x video of the car crash¹⁵
21x numbered questionnaires¹⁶
21x printed briefings¹⁷
21x printed consent forms¹⁸
1x printed debriefing¹⁹ (to be read out)

Method:

Procedure

- Consent form, briefing as well as questionnaires were, with their blank side turned up, put on each table for each participant
- Participants were asked to randomly choose a table
- Participants were asked to read the standardised briefing and sign the consent form, furthermore they were asked not to talk to each other
- Participants were shown the video of the car crash
- Participants were asked to turn over the questionnaire and answer the questions
- After everyone had finished their questionnaire, participants were read out the standardised debriefing to avoid deception
- Participants were given time for additional questions

This procedure lasted for about 25 minutes

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Results

Descriptive statistics:

Questionnaires were categorised into two groups according to their experimental condition. The raw data of this is assembled in two tables according to their respective condition. The mean of the speed estimates was 29.2 mph for the experimental condition 'smashed' and 23.3 mph for 'contacted'. The standard deviation for the condition 'smashed' was 14.1 mph and for 'contacted' 6.7 mph.

The mean was used as a measurement of central tendency because there were no abnormal results that could affect the mean's representation of central tendency. The standard deviation was used in order to find out the dispersion of results around the mean.

Table 1. Mean¹⁸ and Standard Deviation¹⁹ of the speed estimates from the two experimental conditions 'smashed' and 'contacted'

N=18*	Mean (mph)	Standard Deviation (mph)
Experimental condition : Smashed	29.2	14.1
Experimental condition : Contacted	23.3	6.7

*only 18 estimates available

The mean percentage difference²⁰ between condition 1 and 2 is 25.3%.

¹⁸ See Appendix 7

¹⁹ See Appendix 8

²⁰ See Appendix 11

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Results:

Descriptive statistics:

Questionnaires were categorised into two groups according to their experimental condition. The raw data of this is assembled in two tables according to their respective condition²⁰. The mean of the speed estimates was 29.2 mph for the experimental condition "smashed" and 23.3 mph for "contacted". The standard deviation for the condition "smashed" was 14.1 mph and for "contacted" 6.7 mph.

The mean was used as a measurement of central tendency because there were no extreme results which could negatively affect the mean's representation of central tendency. The standard deviation was used as a measurement of dispersion around the mean because unlike the range it takes all results into account and is not affected by outliers.

Table 1. Mean²¹ and standard deviation²² of the speed estimates from the two experimental conditions "smashed" and "contacted".

N=18*	Mean (mph)	Standard deviation (mph)
Experimental condition: "smashed"	29.2	14.1
Experimental condition: "contacted"	23.3	6.7

*only 18 estimates applicable

The mean percentage difference between condition 1 and 2 is 25.3 %.²³

²⁰ see Appendix 4

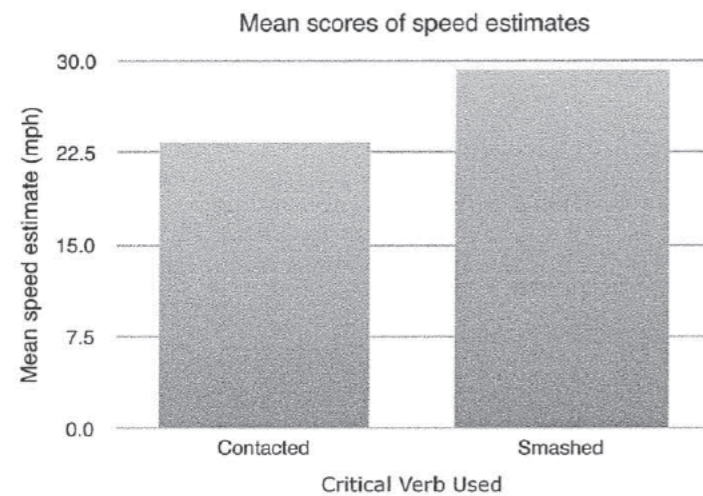
²¹ see Appendix 7

²² see Appendix 8

²³ see Appendix 7

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Graph 1. Mean scores of the speed estimates from the two experimental conditions 'smashed' and 'contacted'



Inferential statistics:

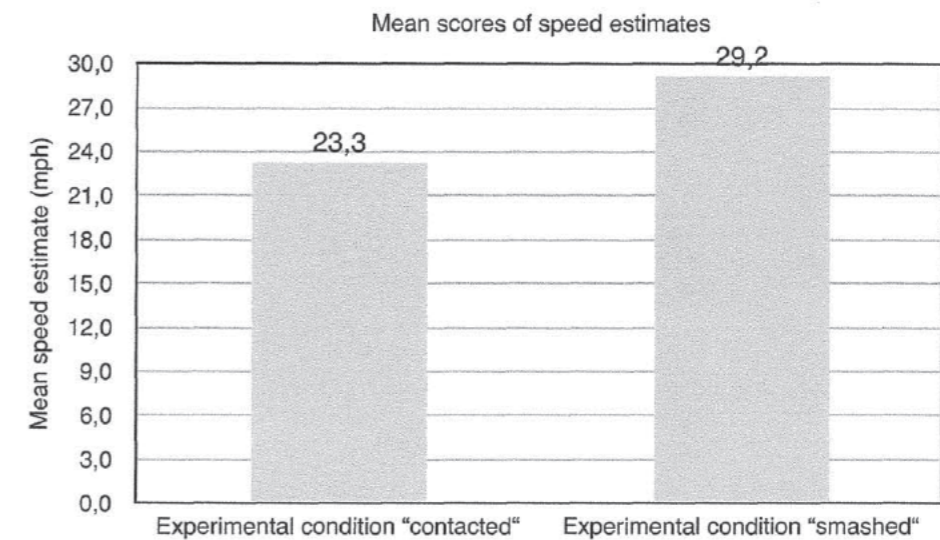
The Mann-Whitney U test²¹ was used as an indicator of significance of the results of this experiment because this experiment produced interval data from an independent measures design. The calculated value of U (31.5) was higher than the critical value of Table U (21) for a one tailed test at .05 with $n_1=9$; $n_2=9$.

The Mann Whitney U test calculates the significance of the results, meaning whether these results could only be due to chance. In this case the results show no significant statistical difference when 5% is used as parameter for significance. This means I can not reject my null hypothesis.

²¹ See Appendix 9

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Graph 1. Mean scores of the speed estimates from the two experimental conditions "smashed" and "contacted"



Results:

Inferential statistics:

The Mann-Whitney U test²⁴ was used as an indicator of significance of the results of this experiment because this experiment produced interval data from an independent measures design.

The calculated value of U (31.5) was higher than the critical value of Table U (21) for a one tailed test at .05 with $n_1=9$; $n_2=9$.

The Mann Whitney U test calculates the significance of the results, meaning whether these results could only be due to chance. In this case the results show no significant statistical difference when 5% is used as parameter for significance. This means I can not reject my null hypothesis.

²⁴ see Appendix 9

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Discussion

As my results above show, the mean results (calculations of central tendency) show a correlation with Loftus and Palmers (1974) results as our condition 'smashed' achieved a higher mean score (29.2 mph) than our other condition 'contacted' (23.3 mph). This shows how the leading question influences memory reconstruction and therefore how events are recalled afterwards. This is in line with Rumelhart & Norman (1983) framework on Schema Theory and that the knowledge for answering the questions are affected by the critical verb in the leading question.

However, I cannot rule out the null hypothesis for this experiment as the Mann-Whitney U test results show no real statistical difference between the two experimental groups. This is furthermore shown by the dispersion of the standard deviation for the two groups hence meaning that the results are too spread from the mean to reject the null hypothesis.

This experiment benefitted from a clear IV and a very measurable DV which provides quantifiable data which can be operationalised in my results. However, the sample of IB students means that I cannot generalise my findings to a broader sample as it is such a specific target group. If I were to repeat the experiment again I would look to finding a much broader sample of participants so that my results have more real world relevance.

As mentioned before the students were not all English mother tongue speakers so complete meaning and understanding of a word may not have been received and this could have effected my results. As could the fact that I did not take into account the sample's driving experience which may have given them an advantage into vehicle speed perception. If the experiment would be repeated then I would choose all native speaking English participants and those with evenly matched driving experience. However this could then make the results culturally specific.

The video that I used in my experiment was not the same one as Loftus and Palmers (1974) so this could have been a reason for slightly differing results. Also the emotional response of not actually witnessing the crash could have faltered my results further.

Real world implications of this study show the significance in having consistent question wording when trying to obtain an eye-witness testimony as ones recollection of events may be altered by specific critical wording.

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Discussion:

As shown in the results section, the calculations of central tendency seem to indicate a similar relationship as results gained by Loftus & Palmers (1974) because the condition "smashed" scored a higher mean (29.2 mph) on average than condition "contacted" (23.3 mph). This would also stand in line with the theoretical framework of Rumelhart & Norman (1983) and Cohen (1993) because it shows how schemata, in this case the leading question, influence the process of reconstruction of memory.

Loftus & Palmers (1974) specified this by saying that schemata either affect the mental representation of the accident or cause a response-bias, an influence towards the speed the car is going.

However, condition "smashed" the first standard deviation (SD) showed a 14.1mph spread around the mean whilst for "contacted" SD showed a 6.7mph spread. This creates an overlap between both sets of data which makes it difficult to establish a clear, distinguishable, cause-effect relationship when IV was changed.

This was supported by the use of inferential statistics because the Mann-Whitney U test supported the insignificance of the difference in-between these two sets of data meaning I can not reject my null hypothesis.

Strengths of this experiment are a clear IV and well operationalised DV because speed estimates offer themselves for statistical analysis.

Limitations are for example the sample. Because only IB students were asked to participate, the results can only be generalised to IB students.

As mentioned earlier, driving experience could also have influenced the ability to estimate speed but was not taken into account, if this experiment was to be done again, this needs to be taken into consideration.

Because English was not first language of every participant and because this experiment is about the influence of language, one has to consider that learning English as a second language could have influenced the participants perception of a word, especially connotations a native speaker is naturally aware of. This might influence the response-bias because it might alter the speed the critical verbs suggests.

Furthermore another limitation was that the crash was not a real environment and the emotional response in a real accident might trigger a more precise ability to recall.

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Bibliography

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6. Rohrer, F. (2005). *The problem with eyewitnesses*. Available: <http://news.bbc.co.uk/1/hi/uk/4177082.stm>. Last accessed 4th Jan 2014.

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The video used could also have influenced significance of this experiment because it differs from the video Loftus & Palmers (1974) used.

If this experiment was to be done again, both groups should sit in different rooms to avoid them finding out the nature of this experiment as well as the questionnaire should state both, mph and km/h for the participant to choose what they are more familiar with.

Implications of this study are various but first and foremost this experiment shows a vital link to EWT and possibilities to distort testimonies through use of language.

A possibility for further research could be the sociological influence of authority on leading questions. Social differences of the person asking the leading question could trigger or/and reinforce schemata therefore increase effect described in the conclusion of Loftus & Palmers (1974).

Concluding this experiment shows the variability of factors affecting the reconstructive memory and a mean percentage difference of 25.3 % between the conditions, supporting Loftus & Palmers (1974) conclusion. The insignificance of my results as well as the possible factors discussed in my conclusion show how much more research can be done in this specific area of cognitive psychology.

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