

Investigation of the effect of disfluency upon memory



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Investigation upon the Effect of Disfluency upon Encoding and Retrieval Performance and Accuracy

Abstract

This paper and subsequent study aimed to replicate the experiment conducted by Oppenheimer (2010), and was found to have major discrepancies with the original study. It used disfluency/fluency typeface as the independent variable, and the encoding and retrieval performance as the dependent variable, tested by a memory quiz after 15 minutes of distraction. The participants were all Year 11 Students attending the Queensland Academy of Health Sciences, who all had a particular class in common, where the experiment was conducted. The results gathered, greatly differed from the original experiment, in that a 26% difference was observed between the two groups, compared to the original 14% difference between the groups. It can be concluded that the evidence gained by the replication of the study was acted upon by uncontrolled variables, and thus gave opposite findings to the original.

Introduction

The aim of the conducted psychology experiment was to replicate the key study of Oppenheimer (2010) in a controlled environment, using a sample of high school students. The study investigated the impact of study and the subsequent use of fonts, in fluency and memory recall, after a distraction. It had been earlier hypothesised that students tend to gauge their learning success upon the ease of encoding information, and not necessarily upon the subsequent performance. Consequently, educators believed that placing more stress upon the learning faculties would impede the flow and retention

of information. Oppenheimer used the study to provide evidence that the prior notion was incorrect, and that the contrary was supported more, than the principle. Put simply, if the student learns the material easily, both student and instructor will label the session as successful, even if the student cannot recall the information at a later date, especially if the information was only provided once. Oppenheimer used pre-theorised information from Bjork (1994) that making material harder to learn would increase the long-term learning, retention and understanding of a concept, and therefore led Oppenheimer to believe that the more stress and cognitive engagement, the deeper the processing and encoding, facilitating later retrieval from memory. Oppenheimer's earlier studies in 2008 and 2009 helped shape the study, using the disfluency technique, building upon his previously acquired information. In this, he limited the independent variable to the disfluency, and the dependent variable to the encoding of the students, unlike his predecessors, who continuously had trouble in limiting to only one independent variable, which consisted of both objective and subjective difficulty levels.

Method

Design

The replicated study attempted to duplicate Oppenheimer's study, by using a similar sample of High School Students, and used the same independent and dependent variables. In both original and replicated study, the independent variable was the relative fluency or disfluency of the typeface, and the dependent variable was the encoding performance and retrieval of the information stored in semantic memory. As proffered by the original <https://assignbuster.com/investigation-of-the-effect-of-disfluency-upon-memory/>

research, the design stayed the same, as an experiment, rather than a case study. The design included no trial for the replication, and therefore no pilot study, to possibly improve upon some discrepancies and/or changes to the original study. Independent measures were used in this study, as to give a control group, and to base the disfluency results off, and in doing so, limited the participant to be in one group, which was chosen at random.

Participants

Participants were asked to learn about three species of aliens, each of which had seven features, for a total of 21 features that needed to be learned, in the original experiment. Our replication somewhat modified the experiment to on 10 features to learn. The participants were picked by random class, e. g., they had a common class at a common time. This made the sample size more effective, as the students had a wide range of knowledge, thus the use of an alien as the source of information. This nullified the range of knowledge, as by giving an unknown quantity to study, made the student body actually study the given information, and not to rely upon prior knowledge. This was also incorporated into the original study, where all students were biologists, and therefore were tested upon anatomy of an alien species (which was fictitious).

Materials

- Participant Consent Form
- Briefing
- Instructions for participants

- Stimuli – Alien Anatomy/Features written in fluent and disfluent typeface – 10 of each type
- Participants – 20
- 15 Minute distraction/activity other than memory test
- Memory Test
- Debriefing

Procedure

In the original study, the disfluent condition material was presented in 12-point 60% grayscale font or 12-point 60% grayscale, and the fluent condition material was presented in 16-point Arial pure black font. The replicated study used black font only, to limit the amount of variables in the experiment.

While there is no question that the disfluent text feels harder to read than the fluent text when they are presented side by side, in the absence of a fluent sample to contrast against, it is unlikely that a reader would even be consciously aware of the added difficulty that the disfluent text engenders. Participants were given 90 s to memorize the information in the lists (Appendix 6). They were then distracted for approximately 15 minutes with unrelated tasks. Finally, participants' memory for the material was tested, using formulated questions as to test the accuracy of recall (Appendix 6).

Results

The raw data collected can be perused in Appendix 2. The data was tabulated in such a way that the disfluent and fluent typefaces could be compared as a right/wrong answer. Comparing number of correct and incorrect answers was aided by changing the Y and N to 1 and 0,

respectively. Thus, the total figures could be added up, and a percentage
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average could be found and compared to the original study. It is also interesting to note, that some participants went out of their way to deliberately not answer or provide wild guesses that had little to do with the test itself. In the original study, the results that were found, indicated that there was a 72.8% correct answer average given by the fluent typeface, and an 86.5% success rate on behalf of the disfluent students. The results that were found by the replicated study show a disparity between the studies. In the replicated study, 76.2% of answers were correct for the fluent group, and 50% of answers were correct for the disfluent group. Not only is there a significant drop in the respective amounts, but the actual ratings have reversed, e. g. The fluent group shows more recollection than the disfluent group in replicated study, whereas, in the original, the roles are reversed.

Discussion

The results gathered seem to refute the results that were found in the original study, and by a large margin. The original study stated that the disfluency had a 13.7% increase in performance over the fluent factor, whereas the replicated study showed that there was a 38% decrease in performance. Even so, this can be mostly attributed to several factors, when combined, could have a similar effect.

Participant effects – the participants all knew they were being analysed, and possibly may have studied harder than normal, and/or used different studying techniques. This in turn may have either influenced the person to increase their encoding and subsequent retrieval performance, or it may have detracted from the performance.

Modified design – In carrying out the experiment, it was noted afterward, that the full extent of the 15 minute distraction was not applied, and thus, the attention of the participants was not directed fully away from the task.

Sample bias – the sample was taken from a class that had the particular class at that day. Compared the original study, these students were selected because they were in that class, rather than being offered money, in the case of the original. Of course, this created some people to dislike being part of the experiment, and they may have felt pressured to do this, thus increasing participant effects, and in other cases, refusing to partake in the test sensibly.

References

Diemand-Yauman, C., Oppenheimer, D. and Vaughan, E. (2010). Fortune favours the Bold and the Italicized: Effects of disfluency on educational outcomes. *Cognition*.

Appendix 1: Consent Form.

PARTICIPANT CONSENT FORM

This form grants consent by the signatory below for participation in the Oppenheimer Study Replication, conducted by Julie Goh, Josie Haggerty, Frazer Hearps, Morgan Li and Jonathan Manifold. The study will run for 30 minutes and is being conducted for IB Psychological Assessment Requirements.

During this study, you will be asked to complete a cognitive tasks. There will be no risks.

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The information that you provide will be kept secure and will remain confidential. You may withdraw from this study at any time without prejudice, as your participation is voluntary. You will receive no benefit from participating in this study. If you have any further questions about this study, please contact Josie via email:

Informed consent statement:

This study has been approved by Queensland Academy for Health Sciences and adheres to the Academy's Guidelines of the ethical conduct of experiments using human participants. You are free to discuss your participation in this study with the student's supervisor, (contactable via email:). If you would like to speak to the Principal of the Academy, who is not involved in the study, you may contact Ms Jane Sleeman on 5510 1100.

I (Participant's name) voluntarily consent to taking part in Oppenheimer Study Replication conducted by:

- I have read and understand the purpose, extent and possible effects of my involvement in this investigation.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I understand that this investigation has been approved by Queensland Academy for Health Sciences and will be carried out in line with the National Statement on Ethical Conduct in Human Research (2007).
- Any information that is collected and any individual data created about or on me will remain confidential.

- This investigation will be carried out in a way which will not demean me or harm me physically or mentally in any way.
- I understand that I have the right to withdraw from this investigation at any time.

Participant's Signature: Date:

If participant is under 18 years of age:

I have explained the investigation to my child who has signed above, and have no objections to his/her involvement in this investigation.

Parent's/Guardian's Name: Signature:

Date: / /

Appendix 2: Brief

In this cognitive task, you are duly reminded that at any time you are uncomfortable with our methods, you are welcome to leave and to ask to remove your personal data from the research. All records taken during this research are numbered, please remember your number that you are instructed to write on your paper. This will help you identify which results are yours should you wish to withdraw at any stage. This is to ensure that you remain anonymous both to the researchers and the wider public. If at any time that you feel extremely uncomfortable and are deeply troubled by this, you are welcome to find solstice with either supervisor. If you have later questions please feel free to see the supervisor.

Appendix 3: Instructions to Participants

You will now be given a sheet of paper. Please do not turn over this sheet of paper, until instructed.

You will have 90 seconds to memorise the information on the sheet Now.

At end of 90 seconds Thank you, please turn the sheets back over. Your lesson will now continue.

15 minutes pass We will now pass out questionnaires. Please do not turn over the paper until told to do so. Please try to the best of your ability to answer the questions accurately and truthfully.

You may undertake take the questions now.

At completion of the questionnaire Thank you for your participation.

Continue to debrief

Appendix 4: Debrief

Thank you for your time and participation in our study today.

This study was an investigation into the effect of varying texts, both fluid and disjointed texts on memory, and the recall of it. For example, some of you received Calibri body size 12 and the other half received Gigi sized 16. This was a recreation of Oppenheimer's experiment in 2010, and we were to replicate it for a category of our IB Psychology course.

We anticipated that like the study showed, those of you who received a disjointed, or harder to read text, would perform better if the study was true,

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so that there was the possibility for this system of disjointed fonts to be moved into a school scenario. If this is true, then it is likely caused by the brain using more effort into remembering and reading the text due to the unfamiliar nature of it.

If you feel that you no longer want your results recorded, please raise your hand and you may leave the room, and your results will be discarded. If you have suffered any kind of discomfort, please contact us at the following email address: . If you have any more questions about this study, you may feel free to contact us at any time on:.

THANK YOU FOR YOUR COOPERATION

Appendix 5: Stimuli Samples

Fluent Font Type: Comic Sans MS

Gognofian	Fequilian	Lisquishan
Eats Algae	Eats meat	Eats rocks
Lives in Fresh water	Lives in nests	Lives in desert
Scaly Skin	Feathered skin	Rough, prickly skin
One large eye	Four eyes	A curved beak
Six arms	Two wings	8 legs

One large tail 10m tall Weighs 3 tonnes

Green ears Black Orange horn on
coloured back

Disfluent Font Type: Bodoni MT

Gognofian Fequilian Lisquishan

Eats Algae Eats meat Eats rocks

*Lives in Fresh Lives in Lives in desert
water nests*

*Scaly Skin Feathered Rough, prickly
skin skin*

One large eye Four eyes A curved beak

Six arms Two wings 8 legs

One large tail 10m tall Weighs 3 tonnes

*Green ears Black Orange horn on
coloured back*

Questions:

1. What species eats meat?

2. How many legs does the Lisquishan have?
3. What type of skin does the Gognofian have?
4. Which species has four eyes
5. Where does the Lisquishan live?
6. Which species is 10 metres tall?
7. What type of skin does the Fequilian have?

1. *What species eats meat?*
2. *How many legs does the Lisquishan have?*
3. *What type of skin does the Gognofian have?*
4. *Which species has four eyes*
5. *Where does the Lisquishan live?*
6. *Which species is 10 metres tall?*
7. *What type of skin does the Fequilian have?*

Answers:

1. Fequilian
2. 8
3. Scaly Skin
4. Fequilian
5. In the desert
6. Fequilian
7. Feathered