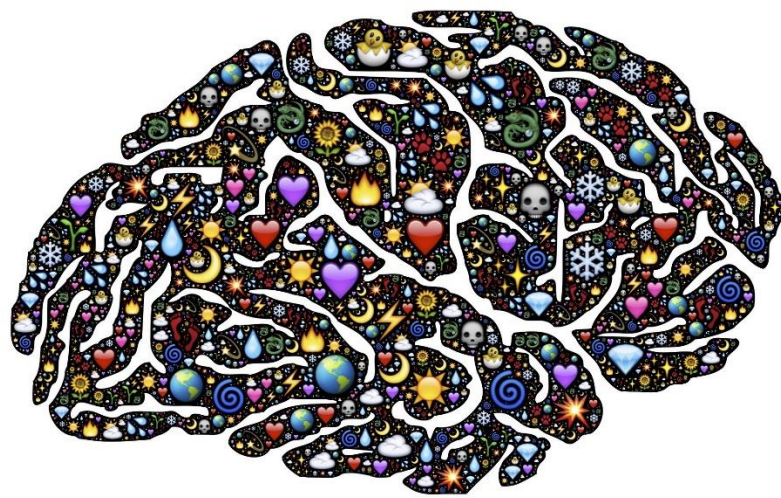


VCE PSYCHOLOGY

Units 3 & 4



Key Science Skills &
Area of Study 3

LOGBOOK

Student Name:  _____

Checklist and Due Dates

Section	What does this include?	Due Date	Teacher Signature
Introduction	✓ Identify research question	6 th June	
	✓ Conduct background search and find at least <u>one</u> relevant piece of previous research	13 th June	
	✓ Identify and explain any relevant terms and/or theories	13 th June	
Objectives	✓ Develop an aim	6 th June	
	✓ Formulate a hypothesis	6 th June	
	✓ Identify and operationalise the IV and DV	6 th June	
Methodology Participants	✓ Select appropriate sampling method ✓ List the details of your population	13 th June	
Methodology Materials	✓ Select and identify the necessary equipment ✓ Identify and design the necessary material		
Methodology Procedure	✓ Choose an appropriate experimental design: Independent groups, matched participants, repeated measures ✓ Provide a detailed outline of the steps involved so that the study can be replicated in the future		
Ethical Considerations	✓ Identify and explain how relevant ethical principles have been considered: Role of the experimenter and participants' rights (confidentiality, voluntary participation, withdrawal rights, informed consent, use of deception and debriefing).	13 th June	
Results	✓ Systematically collect, record and summarise data (qualitative and/or quantitative) ✓ Calculation of statistics, if necessary *Raw data must be attached to or included in your logbook.	19 th June	
Discussion	✓ Analyse and explain the data collated in the investigation. ✓ Evaluate procedures by identifying sources of error (e.g. EV/CVs) and discussing any limitations of the data, including practical suggestions for improvements to the experimental design and possible further investigations. ✓ Communicate a valid conclusion that relates data to the hypothesis and/or aim and that provides a justified response to the investigation question. ✓ Explain the link between investigation findings and relevant scientific concepts.	21 st June	

	<ul style="list-style-type: none"> ☞ Analyse the generalisability of the results to the population of interest ☞ Propose implications of the results for the population of interest. 		
References & Appendices	Relevant, correct and consistent use of referencing	13 th June	

How to present a scientific poster.

You are required to communicate the findings of your investigation in a scientific poster. The poster will be produced on the template provided and should not exceed 600-700 words. The production quality of the poster will not form part of the assessment.

Introduction

This section provides an explanation or reason for undertaking your investigation by outlining key **psychological concepts** and **theories** relevant to your research question. Make sure you cite the studies you refer to, by writing the author name and then the publishing year. For example: Foley (2017) investigated the effect of caffeine on juggling ability.

- ☞ It should be like a funnel: Start with a definition of the topic that you are studying. Then it gets more specific and leads into the past research that you are referring to.
- ☞ You should include at least 2 or 3 definitions in the introduction. They should be linked in a meaningful way so that the paragraph flows properly.
- ☞ A summary of past research outlining the aim, method, results and conclusion of an experiment (or two) on a similar topic.

Objectives

This section establishes what you are planning to investigate, how you are going to manipulate and measure your variables and what you predict the outcome of your investigation will be.

- ☞ **Aim:** A sentence that includes the effect of the simplified IV on the simplified DV.
- ☞ **Hypothesis:** You must include the population (NOT the sample!), the simple IV and DV and state the prediction/direction.
- ☞ **Operationalised IV:** Make sure you are very specific about the different conditions the control and experimental groups were exposed to.
- ☞ **Operationalised DV:** Be very specific about the data you recorded.

Methodology

This is a summary of the method in your investigation and will be authenticated by logbook entries.

- ☞ **Participants:** Provide as much detail as possible about the people you tested, e.g. total number, gender, age range etc. You should also state which sampling method was used.

- 👁️ **Materials:** Make sure you list everything you used. If you have any appendices you should mention them in this section. E.g. Word List (Appendix A). You submit a copy of the Appendix with your poster.
- 👁️ **Procedure:** You should refer to the experimental design that was used, what was involved in each condition and the specific results that were collected (raw data should be an appendix item). Like the rest of the poster, it should be written in past tense. It is helpful to number each step in the procedure.
- 👁️ You can use **dot points** in this section.

Ethical Considerations

- 👁️ Make sure you consider at least 2 or 3 ethical principles.
- 👁️ Do not just write definitions, you must explain how you applied the ethic in your study.

Results

- 👁️ Your graph should have a title and labels on the axes.
- 👁️ You must use descriptive statistics, rather than raw data. And write it out properly, i.e. participants recalled, on average, 3 words out of 20.
- 👁️ Don't interpret or analyse your results, i.e. do not say if a conclusion/generalisation can be made.

References, using the APA system (and appendices)

- 👁️ **Format:** Author, A., & Author, B. (year). Title. Place of Publishing: Publisher.

Example for textbook: Leary, T. (1997). Psychology for Beginners. London: Penguin Books.

Example for journal article: Ankers, L., & Gregory, C. (2011). How Alcohol Affects the Brain. Journal of Neuroscience, Vol. 78, 567-678.

Example for internet journal article: Radiological Society of North America. (2005). Coffee Jump-starts Short-term Memory. ScienceDaily. Retrieved from <https://www.sciencedaily.com/releases/2005/12/051212091544.htm>

- 👁️ You must also attach your **appendices** to your poster (as mentioned in the Methodology section). Appendices must be numbered and given a title. E.g. Appendix A: Word List 1

Presentation/Language

- 👁️ The report should be set out using the template provided, including a title and the appropriate sub-heading for each section.

🗨️ Formal language must be used. You are writing a scientific poster, so you should get straight to the point and **never** write in the first person. **You must use third person and past tense throughout the report.** I.e. Don't include 'I', 'We', 'They' etc. The language should be 'The experimenter asked..' or 'the participants were required to...' etc.

Step 1 - Introduction: Past research and key terms

What is your research question?

Highlighting information enhances memorisation of the information.

Conduct a background search and find at least one relevant piece of previous research.

In the box below you should write a summary of the past research and the referencing details for this research.

Books: Title, author(s), publication year, publisher and place of publication.

Websites/online articles: Website address (URL), date of access, author of the website and title of the website/article.

Past research:

In Europe, three psychologists conducted five experiments to explore colour's role in memory for natural scenes such as forests, rocks and flowers. In the basic experiment, participants looked at 48 photographs, half in colour and half in black and white. Then, they viewed the same 48 images randomly mixed with 48 new images, and indicated if they had seen (or not) each picture. Participants remembered the coloured natural scenes significantly better than they remembered black and white images, regardless of how long they saw the images.

<https://www.sciencedaily.com/releases/2002/05/020506073901.htm>

In 2013 study, Dunlosky et al. reviewed the effectiveness of some commonly used learning techniques, including highlighting. In investigating this, the experimenters divided the participants into 3 groups, the control group in which students only read the designated text, the active highlighters who were allowed to highlight as much text as they needed to and the passive highlighters who only read the sections that had been highlighted by the active highlighters. The participants then reviewed the material one week later for 10 minutes and were tested on the material. Even though the control condition produced the best results, the advantage that active highlighters had over the passive group was that highlighting required extra processing of the material, allowing active highlighters to have more enhanced memory than passive highlighters. Participants that used highlighting to enhance memory, answered particularly well on questions concerning text that was highlighted however, information not highlighted was neglected during evaluation.

<https://web.colby.edu/cogblog/2013/12/02/if-your-text-book-looks-like-the-offspring-of-a-rainbow-youre-doing-something-wrong/>

In the box below you are to identify and explain any relevant terms/theories.

Make sure you include the referencing details.

Key terms/theories:

- *Highlighting text draws attention to or allows participants to focus on the section, as it makes the information prominent* <http://www.dictionary.com/browse/highlighting>

- Recall involves reproducing information stored in memory. You bring the information into conscious awareness and doing so provides evidence that something previously learned was retained. Textbook
- Memorising is committing to memory or learning by heart, <http://www.thefreedictionary.com/memorizing>

Step 2 – Objectives: Aim, variables and research hypothesis

What will be the **aim** of your investigation?

To investigate the effect of colour on memorisation.

What is the **simple IV**?

Highlighting or not highlighting text

What is the **simple DV**?

Level of memorisation

You now need to **operationalise your variables** so they are testable.

The **operationalised independent variable** in this study will be

Students will either highlight words using a yellow highlighter during memorisation of words or memorise with no highlighter.

The **operationalised dependent variable** in this study will be

Memory as measured by average number of words recalled from a list.

Who will your target **population** be?

Pascoe Vale Girls College Students

And finally, you need to formulate a **research hypothesis**.

It is hypothesised that PVGC students who highlight the words they are studying during a memory test will recall more words compared to not highlighting words.

Step 3 – Methodology: Participants, materials and procedure

PARTICIPANTS

Identify your chosen **sampling** technique, including a justification of why you chose this method. Are there any potential problems that could arise as a result of this sampling technique?

Convenience sampling is used in selecting participants for this research as it is a quick and easy method, and involves selecting participants based on our accessibility to them and the participant's availability. However, whilst this method is quick as it requires no forward planning, this sampling technique can be highly biased as the participants may not necessarily be representative of the population. This is because members may be likely to possess similar characteristics such as age or knowledge level, predisposing them to have similar performance or skills.

List the **details of the sample** you intend to investigate. E.g. total number, number of males/females, age range, where they are from, how you will find them etc.

This research is intended to be conducted on 20, year 8 Pascoe Vale Girls College students. Ages range from 12-14 years if age and all participants are females.

MATERIALS

Identify the **equipment/materials** you will need to conduct your study and list them below (remember to include **appendices!**)

- 10 yellow highlighters
- 10 sheets of paper with 15, 5 letter words (such as jumps) labelled 'set 1'
- 10 sheets of paper with 15 different, 5 letter words labelled 'set 2'
- Stopwatch
- 20 sheets of blank lined paper
- 20 pens

PROCEDURE

Choose an appropriate **experimental design** and explain why you chose this method. Are there any potential problems that could arise due to this type of experimental design?

A repeated measures design can be used to conduct this experiment. The use of this method would eliminate the impact of participant differences as an extraneous variable, as the same participants would be used for both the

control and the experimental condition. However, this experimental design can cause an order effect, which is a change in results due to the sequence in which the participants complete the control and experimental condition. To minimise the influence of this impact on the results, counterbalancing will be applied by dividing the group of participants in half and ensuring that the order of each condition occurs equally as often in each position.

Write a **step-by-step description** of how you carried out your study so it can be replicated in the future.

1. Divide 20 participants into two groups of 10 participants each
2. Give a yellow highlighter to each of the 10 participants in group 2
3. Place the sheet of paper labelled 'set 1' in front of group 1, and the paper labelled 'set 2' in front of group 2. Ensure that the side with the list of words is facing the table for all participants.
4. Place a blank sheet of paper and a pen on each of the participants' tables
5. Ask participants in group 1 to start memorising information on their paper on the sound of 'go', and continue memorising for 7 minutes until told to 'stop'
6. Instruct participants in group 2 to start memorising information on their paper on the sound of 'go' by highlighting the information as they memorise it, and continue doing this for 7 minutes until told to 'stop'
7. Say 'Go' and start the stop watch
8. After 7 minutes, ask participants to turn over the page with the list of words, and collect the paper from each student
9. Once all pages with the words are collected, ask students to write down all the words they are able to recall on the blank piece of paper. Allow 3 minutes for students to recall
10. Now, show students the list of words and ask them how many they could correctly recall. Then, record this data.
11. Then, ask students to turn over the paper so they can no longer see the words that have been recalled
12. Repeat steps 1-11 however, this time place list of words labelled 'set 1' in front of group 2, and the list labelled 'set 2' and the yellow highlighters in front of group 1.
13. Collect pens, highlighters and papers from participants, and collate all data.

Step 4 - Ethical Considerations

Before you start collecting your data you must consider all **ethical guidelines and principles**. List any relevant ethical considerations below **and** state how you plan to adhere to each during your experiment.

- **Voluntary participation:** ensure that participants willingly take part in the experiment and are not pressured to participate. This will be done by giving students a choice of participating in this research without any pressure.
- **Informed consent:** must send letters home to participants' parents, informing them of their children's rights as well as, what their child will be expected to do and for what research this experiment is being conducted.
- **Debriefing:** Must occur at the end by informing participants of the study's true purpose. Participants must also be given an opportunity to gain access to information about the study such as procedures, results and conclusions. Finally, participants must be ensured that results do not suggest anything about their intellectual level to prevent participants from self-devaluation.

Step 5 - Potential Extraneous/Confounding Variables

It is important before you begin your investigation that you consider any factors that could become **extraneous or confounding variables**. It is essential to eliminate as many of these variables as possible so your results are reliable.

Identify two potential extraneous/confounding variables in your study, their potential effect on the operationalised DV and how you will try to prevent them from occurring (i.e. you may need to adjust your procedure if appropriate).

Extraneous/Confounding Variable 1:

Cheating during recall of the words may occur in this study as students may look at each other's page or ask one another. This will impact the results as students will score higher than their true capacity and hence may do better in either the experimental or control experiment due to words obtained through cheating. To prevent this, test dividers can be used, or participants can be spaced out so communication is not as easy.

Extraneous/Confounding Variable 2:

Some of the words in list 1 or 2 may be more meaningful for some participants compared to other words. This would affect the results as more meaningful words would be more likely to be remembered compared to words in the other list. Therefore, enhanced memory may occur due to factors other than the independent variable. Preventing this would be difficult however can be avoided by restraining from using names of celebrities or names of places, as these could have more meaning to one individual compared to another.

Step 6 – Results: Data collection

Now you are ready to collect your data. Remember to:

1. **Record** the age and gender of your participants: *Females, of age 12-15 years*
2. **Keep** all question sheets, handouts etc in order to submit them as **appendices** with your poster.
3. **Keep** all of your raw scores (you will need to submit it to your teacher to determine if your results were statistically significant).

Step 7 - Results: Organising the data

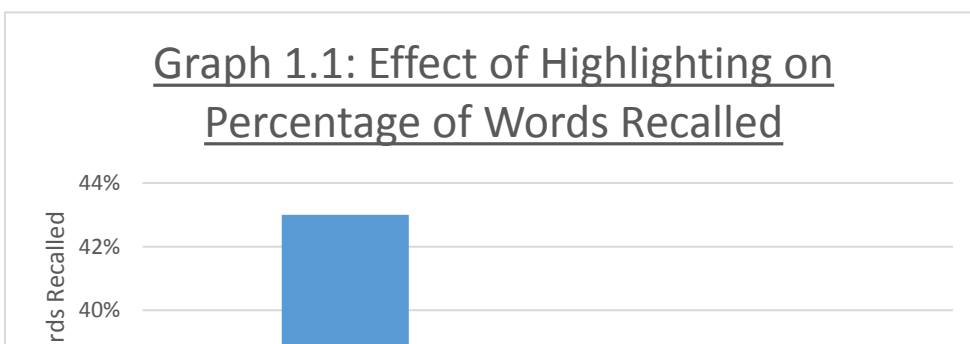
It is now time to use any appropriate **descriptive statistics** to summarise and organise your data. You could use percentages, means, medians or modes. You will need to sketch a graph and include a table of your results to use in your poster. Make sure you label them correctly.

Calculations:

Not highlighted: recalled an average of 6.4 words. $6.4/15=43\%$ → On average 43% of the words were recalled when participants did not highlight the words

Highlighted: recalled an average of 5.45 words. $5.45/15=36\%$ → On average, 36% of the words underlined in the text were memorised when students used a highlighter to assist memorisation

Graphs/Tables:



On average, participants recalled 6.4 out of 15 words without the use of highlighters and a mean of 5.45 of 15 words when yellow highlighters were used.

Step 8 - Discussion: Analysis and evaluation.

Interpret your results/findings by linking them back to the aim, hypothesis, previous research, and any relevant concepts you will address in your introduction.

Through conduction of the experiment, the aim was achieved as the effect of colour on memory abilities was investigated. This was done by asking participants to memorise underlined words in different texts, with and without the use of a highlighter. It was expected that the use of a highlighter would increase memory performance as the presence of colour would rise attention levels, and highlighting would result in more processing of the information. A rise in attention levels is expected to increase memory performance because when attention is paid to certain information, it involves selecting and focusing on information that is to be processed in the cognitive system, increasing the probability of the information to be stored in memory. However, unlike expected, therefore refuting the hypothesis, more than half the participants recalled more words when memorisation occurred without the use of a highlighter compared to when a highlighter was used. This can be seen in the results which show that when participants memorised the words without the aid of a highlighter, an average of 43% of the 15 words were memorised. Alternatively, when a highlighter was used for memorisation of underlined words, on average participants only recalled 36% of the underlined words. Therefore, results show that on average, the number of words recalled decreased by 7% when a highlighter was used. Such results do not support the previous research done by psychologists, such as Dunlosky et al, Felix A. Wichmann, Lindsay T. Sharpe and Karl R. Gegenfurtner.

Now communicate a conclusion that relates your findings to the hypothesis/aim. Has it been supported or rejected?

In conclusion, the aim was achieved as the research allowed investigation on the effect of colour on memory abilities. It was determined that; despite contradiction in the results, colour enhances memory performance, allowing information to be memorised more easily. The results obtained through the experiment, refute the hypothesis as results do not support the idea that memory ability is increased due to colour.

Now begin the evaluation process by identifying any sources of error. This could include:

- Any choices you made in relation to: Sampling technique, allocation methods, research design, use of standardised instructions/procedures.
- Be sure to identify and explain specific EVs/CVs and the effect they had on the operationalised DV.

There are many variables that may have affected the experiment causing the unexpected results. For example, the instructions provided to students were not clear causing confusion about whether the whole text was to be read or only the underlined words. This may have caused participant differences, hence affected the results. This is because some participants may have spent less time memorising the underlined words, due to time spent reading the whole text, whereas other participants may have spent the time only reading and memorising the underlined words. Also affecting the results may have been the level of difficulty of the words that were required to be memorised from each text. Although the texts for both the experimental and control condition were obtained from the same book, the underlined words in the text for the control condition (Appendix B: Word list 1) were believed to be more easily linked hence memorised than the words underlined in the text used for the experimental condition (Appendix C: Word list 2). Therefore, such factors may have caused an increase in the number of words recalled during the experimental condition. Order effects may have also occurred due to the experimental design, as participants may have been tired after the control condition, causing them to perform better without the highlighters compared to with. To minimise the influence of this impact on the results, in further research experiments, counterbalancing can be applied by dividing the group of participants in half and ensuring that the order of each condition occurs equally as often in each position.

More notes: Implications on society

Hence, despite contradiction in the results it can be concluded that colour enhances memory performance, allowing information to be memorised more easily. Therefore, to improve recall of information, students can highlight the information during memorisation. This would increase the level of attention, and processing of the information allowing the information to be stored in memory, and more easily recalled when required.

Can your results can be generalised to the population of interest:

- Consider sampling method and sample size to determine if your sample is representative of the population.

The selection of participants through convenience sampling, resulted in highly biased results as the participants were not representative of the population. This is because all participants were of a similar age group of 12 to 15 years, hence more likely to possess similar characteristics such as level of attention or reaction to colour, predisposing the participants to have similar recall results. Therefore, the results obtained from the experiment cannot be generalised to all Victorian students as the experiment was conducted on a small sample of similar characteristics.

Now make some practical suggestions for improvements and suggest any further investigations or replications that could be conducted.

Improvements can be made to future experiments by increasing the sample size and range, so research is conducted on a wider range of the society. This could be done by using a stratified sampling technique when selecting participants as it is a method that selects participants that are representative of the population. To make the instructions clearer, it must be specified whether the students are required to read the whole text or only the underlined words. Increased competition of the experiment may also increase the reliability of results obtained.

Any additional notes or analysis? **INTRODUCTION**

Memory is an important human cognitive process commonly associated with the mental processes of encoding, storing, retaining and retrieving information. In contemporary memory research psychologists are focusing on investigating ways to enhance memory performance. Many variables are believed to influence memory abilities, including colour. Colour is the most important visual experience to human beings, and has been found to play a significant role in enhancing memory performance. As suggested by the American Psychological Association, colour aids memorisation by increasing attentional levels. Increased attention improves recall as information becomes more likely to be transferred to permanent memory storage. This was suggested through the research conducted by Felix A. Wichmann, Lindsay T. Sharpe and Karl R. Gegenfurtner (2002) to explore colour's role in memory for natural scenes such as forests, rocks and flowers. In the basic experiment, participants looked at 48 photographs, half in colour and half in black and white. Then, the same 48 images were viewed randomly mixed with 48 new images, and it was indicated if the picture had been seen. Participants remembered the coloured natural scenes significantly better than they remembered black and white images. Psychologists concluded that colour caused an advantage by grabbing participants' attention better than black and white images [American Psychological Association]. The effect of colour on memory abilities can be investigated by highlighting required information. This idea was tested by Dunlosky's (2013) study, on three groups of participants including, the control group in which students only read the designated text, the active highlighters who were allowed to highlight as much text as they needed to and the passive highlighters who only read the sections that had been highlighted by the active highlighters. The participants then reviewed the material one week later for 10 minutes and were tested on the material. It was concluded that active highlighters had an advantage over the passive highlighters, as highlighting the information involved extra processing of the material.



References

American Psychological Association (2002). In Living Colour: We Remember Scenes Better When They're in Colour Than In Black And White. ScienceDaily. Retrieved from <https://www.sciencedaily.com/releases/2002/05/020506073901.htm>

A Cognitintve Psychology Blog (2013). Does your text book look like the offspring of a rainbow? CogBlog. Retrieved from <https://web.colby.edu/cogblog/2013/12/02/if-your-text-book-looks-like-the-offspring-of-a-rainbow-youre-doing-something-wrong/>

