SASTA OLIPHANT SCIENCE AWARDS

SOUTH AUSTRALIAN SCIENCE TEACHERS ASSOCIATION

Prize Winner

Science Investigation

Year 7 - 8

Quinn Hansen

Glenunga International High School

ROWE SCIENTIFIC PTY. LTD. www.rowe.com.au

SOUTH AUSTRALIA

Government of South Australia

Department for Education

SASTA South Australian Science Teachers Association

Report

Do people who read books for pleasure have a better short-term memory?

Quinn Hansen

Word count (excluding reference list): 1356

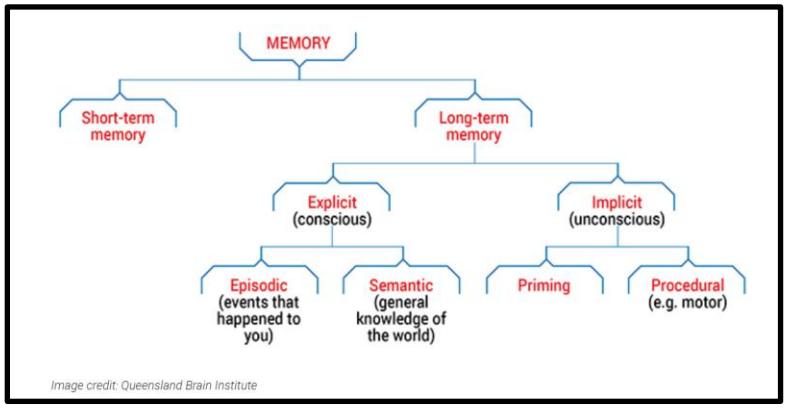
Introduction and background:

Have you ever wondered why you struggle to remember things, or remember more than your family or friends? In this report I will be researching whether reading books for pleasure affects your memory. Here is some research I have found on the matter.

Memory is the ability to retain and recall information. Memory is not stored in one part of the brain, but in multiple. Memories have different sensory aspects about them, so each sensory aspect is stored in a different part of the brain. The act of remembering is piecing together these aspects to make a memory. (Harvard Medical School, 2022)

Memory loss is common over time. This means that when you get older, your memory capacity slowly decreases. This is because the neurons in your brain lose some of their structure, and this makes it harder to recall information from your long term memory, and bring it to your working memory. Being mentally active helps improve your memory, and reading is a form of this. (National Institute of Aging, 2023)

Short term memory usually lasts for 15 to 30 seconds, and can hold 5-9 items. But what is the difference between short term and working memory? Working memory is the shortest type of memory that you can use subconsciously. This type of memory lasts for seconds. (Cherry K, 2026)



Research shows (Artushin, 2024) that physical books can help people absorb and recall information more successfully. Due to distractions online,such as social media or notifications, it is much more difficult to retain information. Audiobooks are also not the same as reading a physical book, because they do not offer the same engagement level as physical books.

Digital reading is endangering our ability to actually read deeply. Skim reading is becoming a huge issue, as we are now only reading text in short bursts. Famous neurologist, Maryanne Wolf, is concerned that skim reading becoming a habit could raise attentional disorders and decrease empathetic abilities specifically for young people. (Wolf.M, 2018)

Aim:

My aim is to determine if reading physical books for pleasure improves your short term memory.

Hypothesis:

My hypothesis is that people who read books for pleasure have a better short term memory, because it has been found that mental stimulation expands the brain's capacity to retain and recall information.

Variables:

Independent variable- The independent variable will be whether people read for pleasure or not. The participants' age is also an independent variable, as they can affect the experiment through state of memory.

Dependent variable- The dependent variable is how many words they can accurately recall from the list shown to them.

Controlled variables- The controlled variables are-

1. The test the participants are given- this is important so the participants have the same level of test.
2. The time the participants are given to remember and recall the words- this means no one has an advantage in time.
3. The environment the test is taken in - it will be a low distractions environment, so no-one is distracted and this doesn't affect the results.

Materials:

1. x45 test sheets

2. x1 information sheet
3. x4 word lists
4. x3 Pens

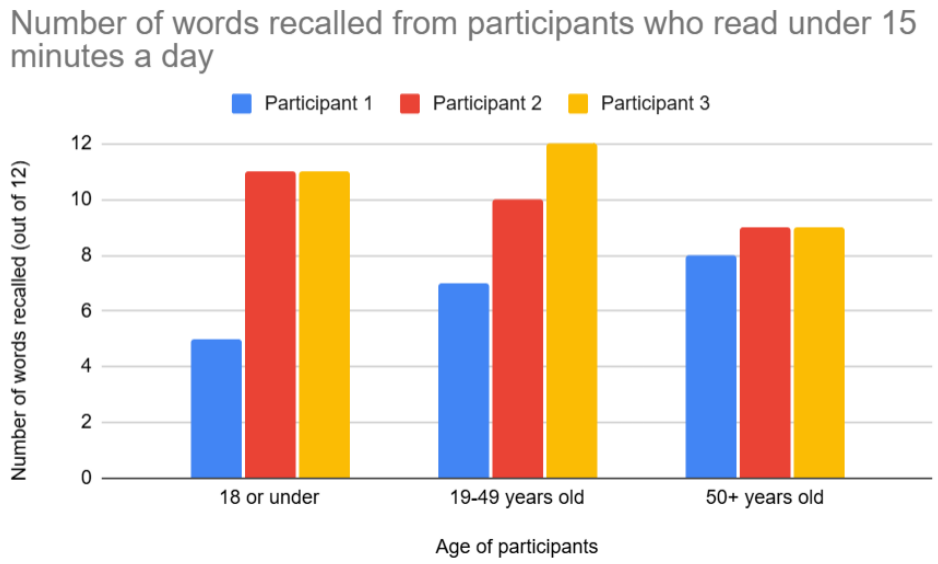
Method:

1. Create the test forms on Canva by adding the following demographics- Age, Minutes read per day and gender.
2. Find a test subject.
3. Explain the test to them.
4. Get them to sign the consent form and fill out the demographics.
5. Give them the test and set a 1-minute timer for them to memorize the words.
6. Set another 1-minute timer and ask them to recall as many words as possible that they remember in no specific order.
7. Repeat steps 2-6 until enough people have been tested.

Raw data:

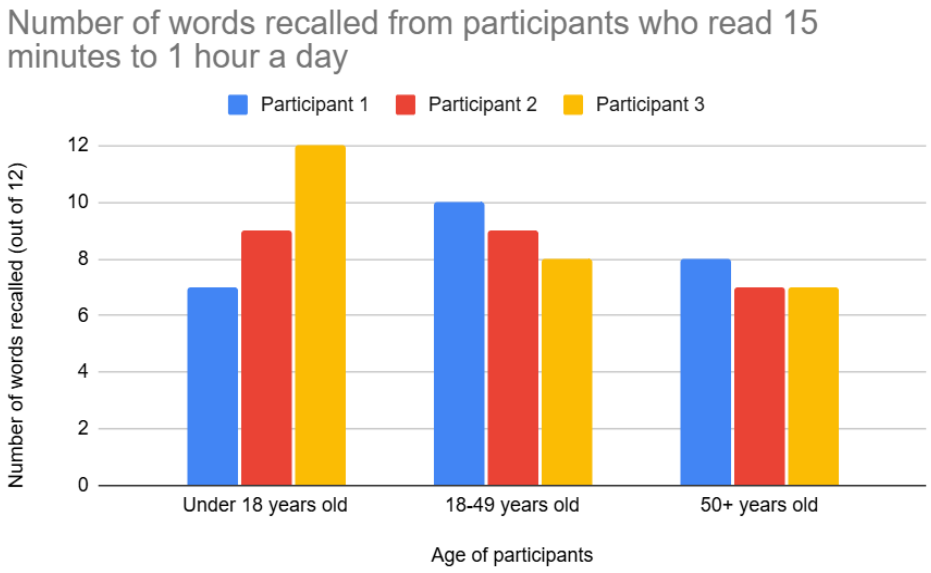
Participants who read under 15 minutes a day (number of words recalled out of 12)

	Participant 1	Participant 2	Participant 3
18 or under	5	11	11
19-49 years old	7	10	12
50+ years old	8	9	9



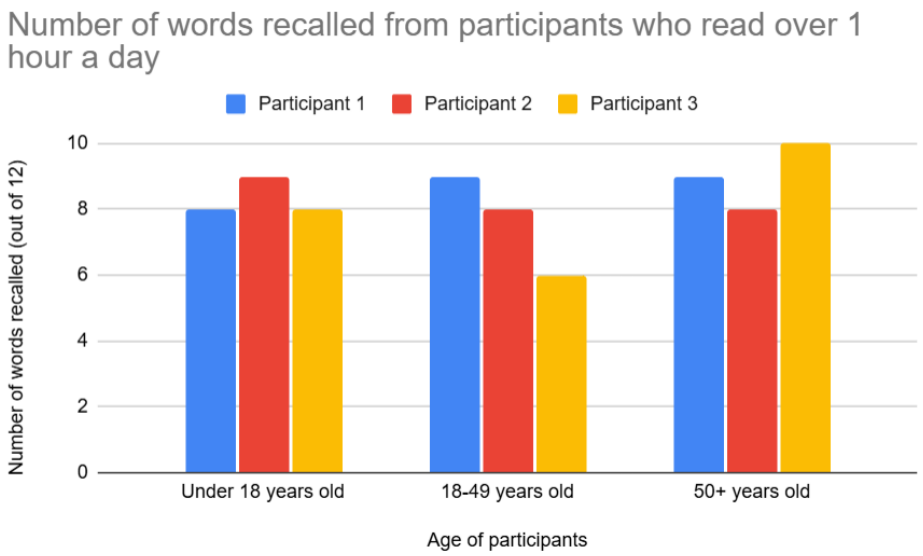
Participants who read 15 minutes to 1 hour a day (number of words recalled out of 12)

	Participant 1	Participant 2	Participant 3
Under 18 years old	7	9	12
18-49 years old	10	9	8
50+ years old	8	7	7



Participants who read over 1 hour a day (number of words recalled out of 12)

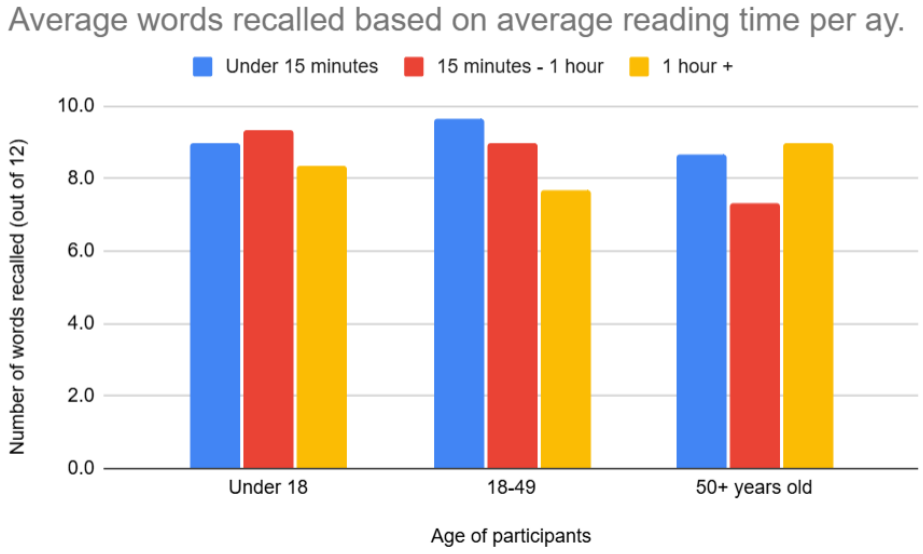
	Participant 1	Participant 2	Participant 3
Under 18 years old	8	9	8
18-49 years old	9	8	6
50+ years old	9	8	10



Processed data:

Average words recalled based off average reading time per day

	Under 15 minutes	15 minutes - 1 hour	1 hour +
Under 18	9.0	9.3	8.3
19-49	9.7	9.0	7.7
50+ years old	8.7	7.3	9



Discussion

1. **Analysis**

This graph shows the relationship between minutes read a day and average words recalled out of 12 on a memory test. This graph did not show statistically significant differences between minutes read a day in correlation with words recalled out of 12, however it did show that reading for pleasure improves your memory as you age.

The lowest point in the trend was an average of 7.3 words recalled, at 15 minutes - 1 hour read a day from the age category of 18-49. The highest point in the trend was an average of 9.7 words recalled, at under 15 minutes read a day from the age category 18-49.

No anomalies or outliers were identified within the data set, but this may have been masked due to the broad spread of the results.

The results did not support the hypothesis that people who read books for pleasure have a more accurate short term memory. The wide variety of the data showed no significant link between reading for pleasure and short term memory.

This trend may have existed due to a small sample size, having collected not enough data to draw conclusions. Another reason this trend may have occurred could be that reading for pleasure often develops task specific muscles, such as remembering a plot or characters, rather than remembering a list or paragraph. This could have affected the results as memorising a list of words is highly different to the memory skills developed by reading a book.

Unexpectedly, this experiment proved that reading for pleasure has no immediate effect on your memory in early years, the trend shows that as you age reading for pleasure does improve your short term memory. This is because as you age your memory slowly degrades, but mental stimulation has been shown to slow or even prevent that process from occurring.

2. Errors and improvements

Systematic errors are usually constant or predictable (Helmenstine, 2023). These are usually due to uncalibrated equipment or consistent human measurement errors. Systematic errors mostly affect a measurement’s accuracy (Helmenstine, 2023). A possible systematic error in this experiment could include the small time bracket it took the participants to flip their word sheets, meaning the time spent memorising the words would’ve been a little under 1 minute. A possible improvement to this error could be

allowing the participants to flip their word sheets before starting the timer, so they had exactly 1 minute to memorise their words.

Random errors are mainly caused by limitations of instruments and environmental factors, or variations in the process (Helmstine, 2023). Random errors usually affect the precision of measurements, usually the last digits (Helmstine, 2023).A possible random error that could've occurred are any underlying medical conditions that could've affected a participant's memory. An improvement for this would be to ask them if they had any medical conditions that could affect their memory on the demographic sheet, to enable identification of this.

Overall this was a fair test, with all errors made affecting the results in a minor way.

3. **Further investigations**
   To extend on the results of this experiment, some further investigations could be:
   a. Test if reading books for pleasure affects the long term memory to determine if reading helps memory at all
   b. Test if there is a perfect amount of reading time that affects the memory
   c. Test whether other cognitive developing activities (e.g sudoku, because it uses numbers instead of letters/words) improve memory.

4. **Use of report**
   These results may be of use to:
   a. Older people wishing to retain their memory function over time
   b. Scientists wishing to further investigate the human memory

---

Conclusion:

The results of the experiment did not support the hypothesis that people who read books for pleasure have a more accurate short term memory. Out of the age groups the participants under 18 had the highest average of 8.9 words recalled. These findings suggest that reading books for pleasure has no apparent effect on short term memory. This experiment shows that reading for pleasure has no immediate effect on short term memory, however reading for pleasure does improve your short term memory as you age.

Reference list:

Artushin, H.R. (2024). *The Case for Paper: Books vs. E-Readers*. [online] Psychology Today. Available at: https://www.psychologytoday.com/au/blog/well-read/202402/the-case-for-paper-books-vs-e-readers.

Cherry, K. (2024). *What Is Memory?* [online] Verywell Mind. Available at: https://www.verywellmind.com/what-is-memory-2795006.

Cherry, K. (2025). *Short-Term Memory Duration and Capacity*. [online] Verywell Mind. Available at: https://www.verywellmind.com/what-is-short-term-memory-2795348.

Chudler, Eric.H. (n.d.). *Short Term Memory*. [online] faculty.washington.edu. Available at: https://faculty.washington.edu/chudler/stm0.html.

Cleveland Clinic. (2024). *Short-Term Memory: What It Is, How It Works & Duration*. [online] Available at: https://my.clevelandclinic.org/health/articles/short-term-memory.

Gotlieb, R. (2026). *Reader, Come Home: The Reading Brain in a Digital World by Maryanne Wolf – Education & Teacher Conferences*. [online] Learningandthebrain.com. Available at: https://www.learningandthebrain.com/blog/reader-come-home-the-reading-brain-in-a-digital-world-by-maryanne-wolf/.

Harrison, S. (2021). *What Makes Some Words More Memorable Than Others?* [online] Stanford Graduate School of Business. Available at: https://www.gsb.stanford.edu/insights/what-makes-some-words-more-memorable-others.

Harvard Medical School (2022). *Memory*. [online] www.health.harvard.edu. Available at: https://www.health.harvard.edu/topics/memory.

Helmenstine, A.M. (2020). *What's the Difference Between Random and Systematic Error?* [online] ThoughtCo. Available at: https://www.thoughtco.com/random-vs-systematic-error-4175358.

Human Benchmark (2019). *Verbal Memory Test*. [online] Human Benchmark. Available at: https://humanbenchmark.com/tests/verbal-memory.

Lai, M. (2025). *Reading for pleasure can strengthen memory in older adults, Beckman researchers find*. [online] Default. Available at: https://beckman.illinois.edu/news/article/2022/12/05/reading-for-pleasure-can-strengthen-memory-in-older-adults-beckman-researchers-find.

Mayo Clinic (2024). *Memory loss: 7 Tips to Improve Your Memory*. [online] Mayo Clinic. Available at: https://www.mayoclinic.org/healthy-lifestyle/healthy-aging/in-depth/memory-loss/art-20046518.

National Institute of Aging (2023). *How the Aging Brain Affects Thinking*. [online] National Institute on Aging. Available at: https://www.nia.nih.gov/health/brain-health/how-aging-brain-affects-thinking.

Queensland Brain Institute (2016). *Types of memory*. [online] Uq.edu.au. Available at: https://qbi.uq.edu.au/memory/types-memory.

Tan, L., Ward, G., Paulauskaite, L. and Markou, M. (2025). *APA PsycNet*. [online] Apa.org. Available at: https://psycnet.apa.org/record/2016-05572-001 [Accessed 27 Feb. 2025].

Logbook

13/4/2026

Introduction

In the world today, we are so surrounded by technology that we forget about books. Most people just read on their devices, rather than picking up an actual book. According to Artishun (2024) reading physical books helps readers absorb and recall content more effectively. In a previous English class I have explored this concept, but in minimal depth. Inspired by this research, I would find it fascinating to explore how reading physical books improves your short-term memory.

What is short term memory?

According to Cherry (2025) short term memory allows us to store small pieces of information temporarily. Short term memory generally has a capacity of 20-30 seconds, and is suggested to hold up to 7 items at once.

Thoughts:

If short term memory has a limited capacity for most, is this improved by reading? How can I test this so it really stretches the limits of short-term memory, to observe whether reading actually improves short term memory?

14/4/26

Today I researched on how cognitive activities improve short term memory.

How can you improve your memory?

Research shows (Mayo Clinic, 2024) that cognitive stimulation improves memory, and that reading is a form of it. Your brain is a muscle, and you have to use it or it grows weak. This research is further backed up by researcher Liz Stine-Morrow, who stated ‘Leisure reading, the kind that really sucks you in, is good for you, and it helps build the mental abilities on which reading depends’.

Why read physical books?

Research shows that reading physical books means you have comprehension 6 to 8 times better, and help you absorb and recall content more effectively (Cherry, 2025). Reading physical books help make an ‘index’ in your brain, remembering what we read visually to a particular page.

Thoughts:

I have found that reading is a form of cognitive stimulation that is proven to support your memory. I wonder if reading lots would result in even better memory?

I have decided that a memory test would be most effective to test if reading impacts memory. I will have to research memory tests to decide which method would be the most accurate to collect results.

After researching memory, I have formed the hypothesis that people who read books for pleasure have a better short term memory, because it has been found that mental stimulation expands the brain's capacity to retain and recall information.

15/4/26

Today I have been testing memory tests, to see which one would work the most accurately. I want to do a visual test, as a visual test will be most effective as reading physical books creates an index in your brain, so reading a visual list of words would apply the same skill that reading physical books may have developed.

Here are multiple I have tried, and had family members test.

Memory test #1- https://faculty.washington.edu/chudler/stm0.html
Positives:
This memory test increases in difficulty over time, and has a set time limit.
Negatives:
Doesn't use actual words, so therefore is not applying the same skill developed when reading books.

Memory test #2- https://www.psychologistworld.com/memory/test-2
Positives:
Uses actual words, so applies the same skill as reading.
Negatives
Has no set time limit.

Memory test #3- https://humanbenchmark.comc/tests/verbal-memory
Positives
Uses actual words, so applies the same skill as reading.
Negatives
Has infinite turns until you get out.

I found that the list of words (#2) would be the most effective because it seems to test short term memory quite well. I am able to apply a time limit, and even make a list of my own.

22/4/26

Does age affect your memory?

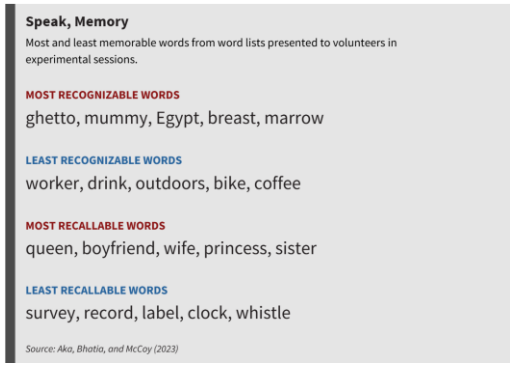
As you age your brain changes, impacting your memory. These changes may include decreased blood flow to the brain, or even parts of the brain shrinking. This makes it slower to recall things, as neuron connections also decrease.

Thoughts:
With this research I think I will need to have sub categories for age, to compensate for this, making the results as fair as possible.

30/4/26
General thoughts and questions:
The capacity of the short term memory is usually 5-9 items, and I want to see if this is improved by reading books. I think on the test it will contain 12 words, so there might be more of a variety of words correctly recalled.

Should I keep all the words at the same scoring level? Or should harder words score more when recalled? I think it would be easier if they all scored the same, and make it fairer, because people's minds recall different things more easily.

2/05/26
What makes words more memorable?
Researcher Ada Aka has found that negative words seem to be more memorable than positive words through a memory test. Here is a list of the least and most memorable words from her test.



24/05/26
Update on experiment:
I have been working on my templates for the experiment, and now am ready to generate the words. I wonder if there is a website that can generate random words with not much relation.

I have found a website that generates random words for a memory test, but only has options for 10 or 16. I think I will generate 16 words then take off the bottom 4. I have generated the words, and will print them at school, so I can begin testing people.

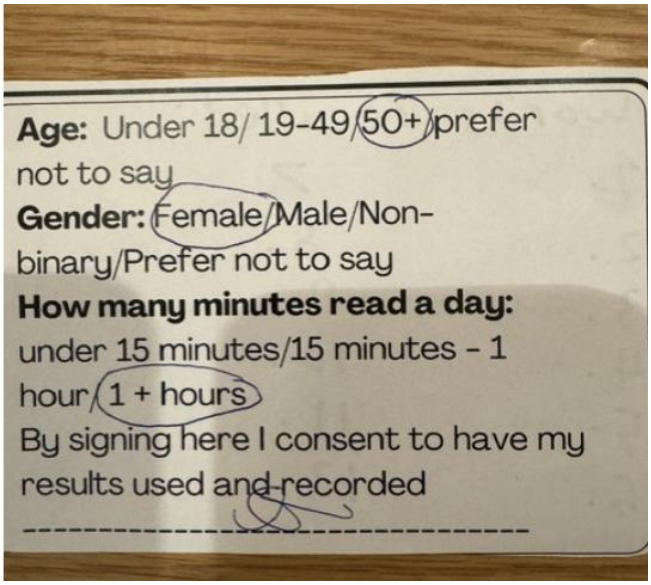
My list of words is:
1. Sea

2. Scoop
3. Red
4. Snow
5. Detour
6. Millionaire
7. Sign
8. Pioneer
9. Hyena
10. Filter
11. Scissors
12. Mouse

25/05/26

As I am going to start testing people soon I will need to create some strategies to help keep it as controlled as possible. I will try to do tests in a low to no distractions environment. This will help them have equal chances to complete the tests. They will all have the same test and time to complete it, so they all have equal chances. The results and demographics are being kept completely anonymous, and consent is being gained from all participants of the experiment.

Example of consent form:



27/05/2026-27/06/26

Observations:

Some things I have observed is that 88% of the participants got the first word in the right spot, and 86% of those people got the second word in the right spot. This may be because of the way people memorise things, as they likely memorised the list from top to bottom, so these words stuck in their memory the most.

Raw data:

Participants who read under 15 minutes a day (number of words recalled out of 12)

	Participant 1	Participant 2	Participant 3
18 or under	5	11	11
19-49 years old	7	10	12
50+ years old	8	9	9

Participants who read 15 minutes to 1 hour a day (number of words recalled out of 12)

	Participant 1	Participant 2	Participant 3
Under 18 years old	7	9	12
18-49 years old	10	9	8
50+ years old	8	7	7

Participants who read over 1 hour a day (number of words recalled out of 12)

	Participant 1	Participant 2	Participant 3
Under 18 years old	8	9	8
18-49 years old	9	8	6
50+ years old	9	8	10

28/06/2026

Summary:

The human brain is still a mystery to many scientists, with many parts of it still unknown, including memory storage and recall. Scientists are still researching how the brain seems to recall millions of memories across a lifetime. This experiment helps us understand the process of the human memory, and how cognitive stimulation such as reading can benefit this.

OSA RISK ASSESSMENT FORM

for all entries in (P) Models & Inventions and ☒ Scientific Inquiry

This must be included with your report, log book or entry. One form per entry.

STUDENT(S) NAME: Quinn Hansen ID: 260537

SCHOOL: Glenunga International High School

Activity: Give a brief outline of what you are planning to do.

I want to give some people a memory test and see how many words they can recall. My aim is to determine if people who read for pleasure have a more accurate short term memory.

Are there possible risks? Consider the following:

- Chemical risks: Are you using chemicals? If so, check with your teacher that any chemicals to be used are on the approved list for schools. Check the safety requirements for their use, such as eye protection and eyewash facilities, availability of running water, use of gloves, a well-ventilated area or fume cupboard.
- Thermal risks: Are you heating things? Could you be burnt?
- Biological risks: Are you working with micro-organisms such as mould and bacteria?
- Sharps risks: Are you cutting things, and is there a risk of injury from sharp objects?
- Electrical risks: Are you using mains (240 volt) electricity? How will you make sure that this is safe? Could you use a battery instead?
- Radiation risks: Does your entry use potentially harmful radiation such as UV or lasers?
- Other hazards.

Also, if you are using other people as subjects in an investigation you must get them to sign a note consenting to be part of your experiment.

Risks	*How I will control/manage the risk*
That the writing on the tests could be too small and damage people's eyesight.	By making the writing a good size.

(Attach another sheet if needed.)

Risk Assessment indicates that this activity can be safely carried out

RISK ASSESSMENT COMPLETED BY (student name(s)): Quinn Hansen

SIGNATURE(S): Quinn

☑ By ticking this box, I/we state that my/our project adheres to the listed criteria for this Category.

TEACHER'S NAME: Shannon Pautz

SIGNATURE: _____ DATE: 7/05/2026