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Queensland Curriculum and Assessment Authority

Psychology 2025 v1.2

IA1: Sample assessment instrument

This sample has been compiled by the QCAA to assist and support teachers in planning and developing assessment instruments for individual school settings.

Student name	sample only
Student number	sample only
Teacher	sample only
Exam date	sample only

Marking summary

Criterion	Marks allocated	Provisional marks
Data test (10%)	10	
Overall	**10**	

Conditions

Technique	Data test
Unit	Unit 3: Individual thinking
Topic/s	Topic 1: Brain Function Topic 3: Memory
Time	60 minutes + 5 minutes perusal
Seen / Unseen	Unseen questions and data sets
Other	QCAA-approved graphics or scientific calculator permitted.

Instructions

Use the datasets to respond to the associated questions in the spaces provided. Each question is associated with the dataset that immediately precedes it.

Dataset 1

Scientists conducted a study to test whether London taxi drivers' accumulated spatial knowledge affected grey matter volume in the hippocampus. They hypothesised that there would be a relationship between time spent driving and hippocampal volume. The researchers used a similar approach to that used by Maguire, Woollett and Spiers (2006).

Methodology

- Participants were recruited across different levels of driving experience, measured in years.
- Their anterior and posterior hippocampal volumes (HCV) were measured using structural MRI techniques.
- Pearson's correlational coefficient was calculated for each dataset.

Figure 1: The relationship between driving experience and Right Posterior Hippocampal Volume (HCV)

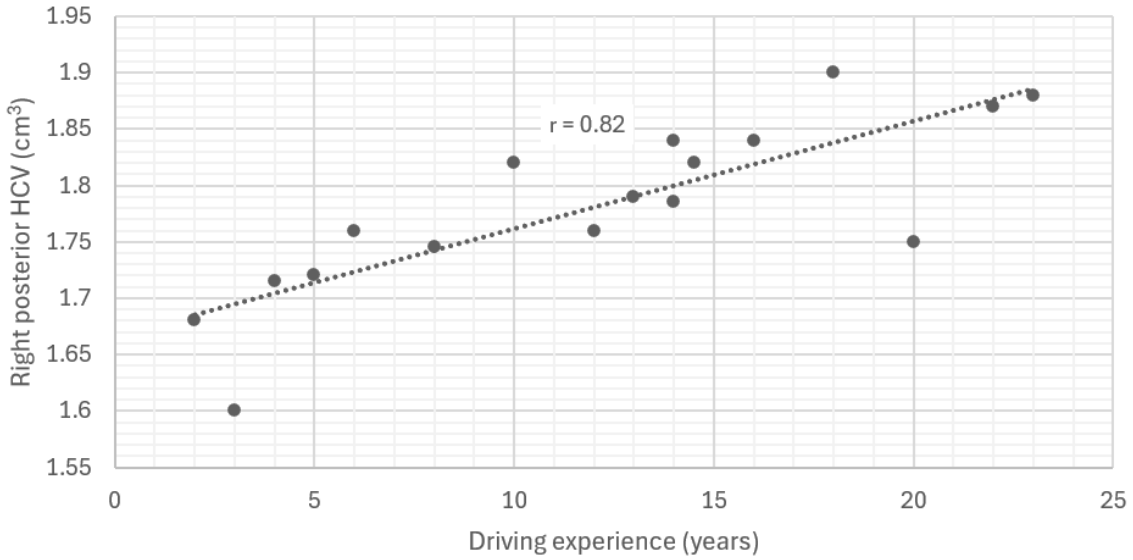
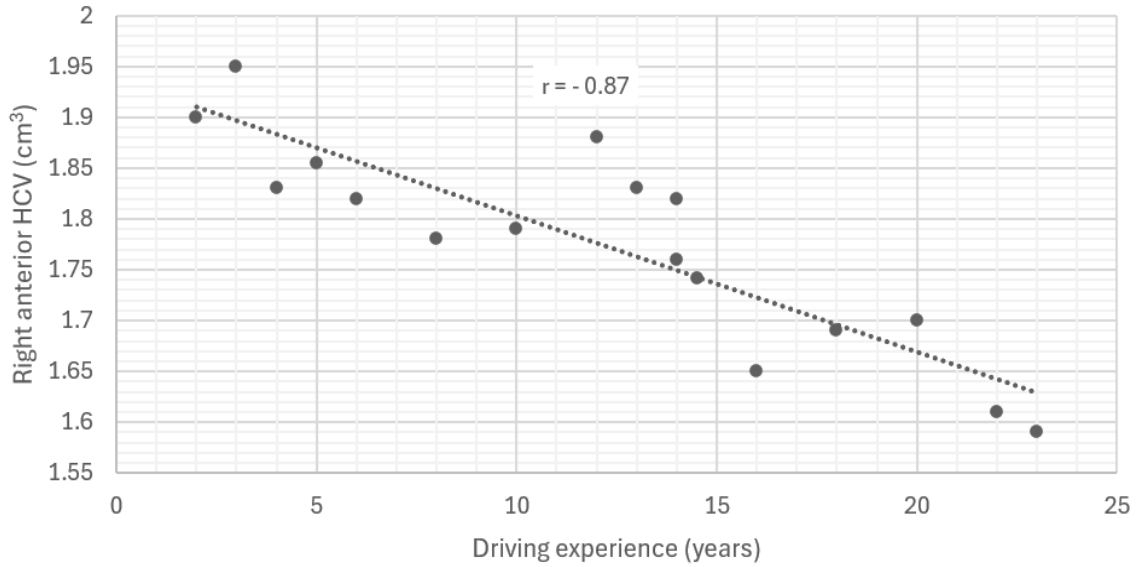


Figure 2: The relationship between driving experience and Right Anterior Hippocampal Volume (HCV)



Question 1 (1 mark)

Identify the right posterior HCV for drivers with 9 years of experience.

Question 2 (2 marks)

Calculate the range of HCV values for the right anterior hippocampus.

Question 3 (1 mark)

Determine the median years of driving experience in the study.

Question 4 (1 mark)

Identify, with reference to Figure 2, the relationship between driving experience and right anterior HCV.

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Question 5 (1 mark)

Contrast the direction of Pearson's correlation coefficient (r) for the datasets in Figures 1 and 2.

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Question 6 (1 mark)

Draw a conclusion about the relationship between driving experience and hippocampal volume.

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Dataset 2

A class modified the experiment by Grant et al. (1998) to determine if context affects memory for newly learnt information.

Null hypothesis: There will be no difference in learning, as measured by recall, between participants in the matching and mismatching conditions.

Alternative hypothesis: Participants in the matching condition will learn more material, as measured by recall, than those in the mismatching condition.

Design

- Independent groups design
- Sample size: 10 per condition

Methodology

- Participants were given new study material to learn in either a noisy or quiet environment.
- Those in the matching condition studied in a noisy environment and completed a short-answer test of the newly learnt material also in a noisy environment.
- Those in the mismatching condition studied in a noisy environment, but then completed a short-answer test of the newly learnt material in a quiet environment.
- A two-sample t-test was used to analyse the data.

Table 2: Raw data for the matching and mismatching conditions

Matching	Mismatching
6	4
7	5
8	4
7	3
6	5
5	5
5	4
6	4
8	3
8	5

Table 3: Standard deviation scores and *p* value for the matching and mismatching conditions

	Standard deviation (s)	*p* value (p)
Matching	1.17	0.01
Mismatching	0.79	

Question 7 (2 marks)

Calculate the mean for the mismatching condition.

Use the formula $\bar{x} = \frac{x_1+x_2+\cdots+x_N}{N}$ where x = raw data point and N = sample size.

Round your answer to the nearest whole number.

$\bar{x}\ mismatching =$

Question 8 (1 mark)

Identify one characteristic of the data in Table 2 that makes it appropriate to use the mean as a measure of its central tendency.

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Question 9 (1 mark)

Distinguish between the standard deviation (s) scores in Table 3.

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Question 10 (1 mark)

Deduce which condition had the greatest variability in its data.

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Question 11 (2 marks)

Identify two characteristics of the data that might challenge the assumptions of the t-test.

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Question 12 (1 mark)

Infer what the results of the statistical test show.

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Dataset 3

Researchers wanted to modify Experiment II from the series of experiments conducted by Craik and Tulving (1975) to investigate depth of processing.

Research question: Does depth of processing increase response latency?

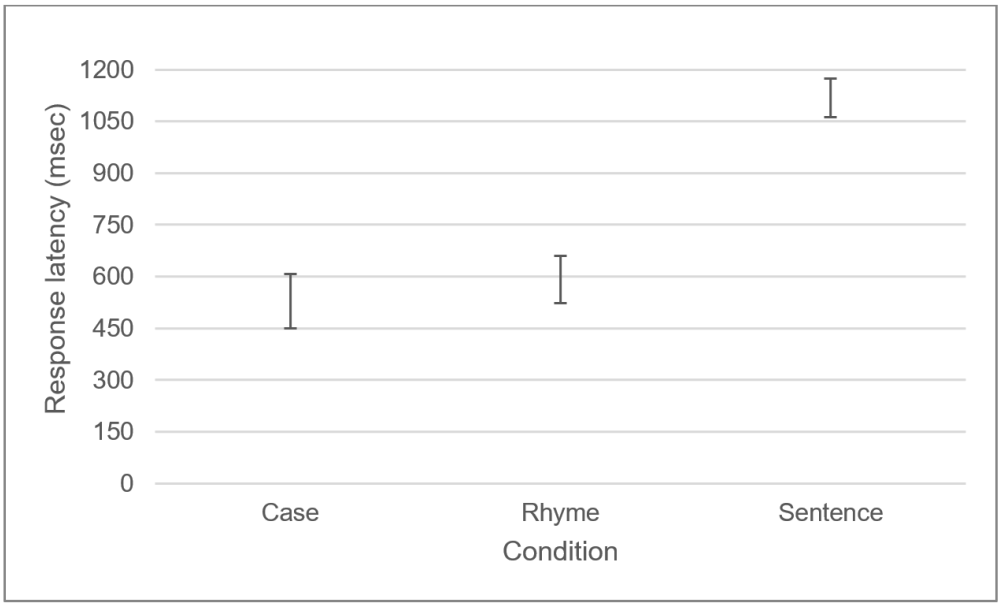
Design

- Independent groups design
- Sample size: 10 participants per condition

Methodology

- Participants were presented with words for 200 milliseconds. Before the word was exposed, participants were asked a question about the word.
- The three types of questions were used to induce the participant to process the word at relatively shallow levels through to relatively deep levels.
- The three conditions of the experiment were
  - case questions, i.e. upper case or lower case
  - rhyme questions, e.g. does the word rhyme with weight?
  - sentence questions, e.g. would the word fit the sentence ‘He met a _____ in the street?’
- The time taken for participants to record a response to the questions was measured.

Figure 2: 95% Confidence intervals for Case, Rhyme and Sentence conditions



Question 13 (1 mark)

Draw a conclusion about the confidence interval for one condition in Figure 2.

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Question 14 (1 mark)

Deduce whether the result for the Case condition is significantly different to the result for the Sentence condition.

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Question 15 (2 marks)

Draw a conclusion about the confidence intervals for the Case and Rhyme conditions. Give a reason for the conclusion.

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Question 16 (1 mark)

Draw a conclusion, with reference to Figure 2, about the depth of processing in the Sentence condition.

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Instrument-specific marking guide (IA1): Data test (10%)

Data test	Cut-off	Marks
The student response has the following characteristics:		
• consistent demonstration, across a range of scenarios, of – selection and correct application of scientific concepts, theories, models and systems to predict outcomes, behaviours and implications – correct calculation of quantities through the use of algebraic, visual and graphical representations of scientific relationships and data – correct and appropriate use of analytical techniques to correctly identify trends, patterns, relationships, limitations and uncertainty – correct interpretation of evidence to draw valid conclusions	>90%	10
	>80%	9
• consistent demonstration of – selection and correct application of scientific concepts, theories, models and systems to predict outcomes, behaviours and implications – correct calculation of quantities through the use of algebraic, visual and graphical representations of scientific relationships and data – correct use of analytical techniques to correctly identify trends, patterns, relationships, limitations and uncertainty – correct interpretation of evidence to draw valid conclusions	>70%	8
	>60%	7
• adequate demonstration of – selection and correct application of scientific concepts, theories, models and systems to predict outcomes, behaviours and implications – correct calculation of quantities through the use of algebraic, visual and graphical representations of scientific relationships and data – correct use of analytical techniques to correctly identify trends, patterns, relationships, limitations and uncertainty – correct interpretation of evidence to draw valid conclusions	>50%	6
	>40%	5
• demonstration of elements of – selection and correct application of scientific concepts, theories, models and systems to predict outcomes, behaviours and implications – correct calculation of quantities through the use of algebraic, visual or graphical representations of scientific relationships or data – correct use of analytical techniques to correctly identify trends, patterns, relationships, limitations or uncertainty – correct interpretation of evidence to draw valid conclusions	>30%	4
	>20%	3
• demonstration of elements of – application of scientific concepts, theories, models or systems to predict outcomes, behaviours or implications	>10%	2
	>1%	1

Data test	Cut-off	Marks
– calculation of quantities through the use of algebraic or graphical representations of scientific relationships and data – use of analytical techniques to identify trends, patterns, relationships, limitations or uncertainty – interpretation of evidence to draw conclusions.		
The student response does not match any of the descriptors above.		0

References

Bugelski, B. R., & Alampay, D. A. (1961). The role of frequency in developing perceptual sets. *Canadian Journal of Psychology, 15*(4), 205–211. https://doi.org/10.1037/h0083443

Craik, F. I. M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology: General, 104*(3), 268–294. https://doi.org/10.1037/0096-3445.104.3.268

Grant, H. M., Bredahl, L. C., Clay, J., Ferrie, J., Groves, J. E., McDorman, T. A., & Dark, V. J. (1998). Context-dependent memory for meaningful material: Information for students. *Applied Cognitive Psychology, 12*(6), 617–623. https://doi.org/10.1002/(SICI)1099-0720(1998120)12:6<617::AID-ACP542>3.0.CO;2-5

Maguire, E.A., Woollett, K. and Spiers, H.J. (2006). London taxi drivers and bus drivers: A structural MRI and neuropsychological analysis, *Hippocampus*, 16, 1091–1101. https://doi.org/10.1002/hipo.20233