

OXFORD

PSYCHOLOGY

FOR VCE

UNITS

3 & 4

STUDENT WORKBOOK

TIARNE NEWTON



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PSYCHOLOGY

FOR VCE

UNITS

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STUDENT WORKBOOK

TIARNE NEWTON

OXFORD
UNIVERSITY PRESS

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MEET THE AUTHOR AND REVIEWER



Author: Tiarne Newton

Tiarne holds a Bachelor of Arts (Psychology & Literature) and Secondary Education. She has been contributing her expertise as a senior Psychology teacher at East Doncaster Secondary College for the past six years. Tiarne has played a pivotal role in enhancing the Science teaching and learning program, notably through the introduction of a novel Psychology curriculum tailored to Year 10 students. She has been actively engaged as a VCAA exam marker and has contributed to writing and reviewing student practice exam papers. Her continued commitment to enhancing student resources, alongside her passion for teaching Psychology to senior students, exemplifies her dedication to educational advancement and creativity.



Reviewer: Salvina Noonan

Salvina Noonan has been teaching VCE Psychology at various schools for 15 years. Since 2018, she has been employed by the VCAA as a VCE Psychology assessor. With a passion for education and a strong background in psychology, Salvina is a regular presenter at an annual conference focused on the teaching of VCE Psychology. She has completed a Bachelor of Science, a Bachelor of Education, and a Master of Education specialising in Student Wellbeing. Salvina has held several positions of leadership within schools, including Year 12 Coordinator and Assistant Head of Department, Science.

Key science skills map

Use this map to see which activities you should complete to practise your key science skills.

- CC = Case cracker
- DD = Data drill
- II = Investigation inspector
- EE = Evaluating ethics
- RR = Research review

Key science skill	VCE Psychology Units 1–4	1	2	3	4	5	6	7	8	9	10	11
Develop aims and questions, formulate hypotheses and make predictions	• identify, research and construct aims and questions for investigations	RR 1.1	RR 2	RR 3						II 9		
	• identify independent, dependent and controlled variables in controlled experiments	RR 1.1; II 1.2	DD 2	RR 3			RR 6			II 9		II 11.1
	• formulate hypotheses to focus investigations	RR 1.1	II 2								II 10	
	• predict possible outcomes of investigations	RR 1.1								II 9		
Plan and conduct investigations	• determine appropriate investigation methodology: case study; classification and identification; controlled experiment (within-subjects, between-subjects, mixed design); correlational study; fieldwork; literature review; modelling; product, process or system development; simulation	II 1.2		DD 3; II 3	II 4; RR 4		RR 6; II 6			II 9		II 11.1
	• design and conduct investigations; select and use methods appropriate to the investigation, including consideration of sampling techniques (random and stratified) and size to achieve representativeness, and consideration of equipment and procedures, taking into account potential sources of errors and uncertainty; determine the type and amount of qualitative and/or quantitative data to be generated or collated					II 5	RR 6	RR 7	II 8	II 9		II 11.1
	• work independently and collaboratively as appropriate and within identified research constraints, adapting or extending processes as required and recording such modifications						II 6					

Key science skill	VCE Psychology Units 1–4	1	2	3	4	5	6	7	8	9	10	11
Comply with safety and ethical guidelines	<ul style="list-style-type: none"> demonstrate ethical conduct and apply ethical guidelines when undertaking and reporting investigations 	EE 1.3	EE 2		EE 4	EE 5	EE 6	II 7	EE 8	EE 9		II 11.1
	<ul style="list-style-type: none"> demonstrate safe laboratory practices when planning and conducting investigations by using risk assessments that are informed by safety data sheets (SDS), and accounting for risks 							II 7; RR 7				
	<ul style="list-style-type: none"> apply relevant occupational health and safety guidelines while undertaking practical investigations 							II 7; RR 7		EE 9		
Generate, collate and record data	<ul style="list-style-type: none"> systematically generate and record primary data, and collate secondary data, appropriate to the investigation 			II 3		RR 5						
	<ul style="list-style-type: none"> record and summarise both qualitative and quantitative data, including use of a logbook as an authentication of generated or collated data 		DD 2							DD 9		
	<ul style="list-style-type: none"> organise and present data in useful and meaningful ways, including tables, bar charts and line graphs 	DD 1.4	DD 2						DD 8		DD 10	DD 11.2
Analyse and evaluate data and investigation methods	<ul style="list-style-type: none"> process quantitative data using appropriate mathematical relationships and units, including calculations of percentages, percentage change and measures of central tendencies (mean, median, mode), and demonstrate an understanding of standard deviation as a measure of variability 				DD 4	DD 5		DD 7	II 8	DD 9		DD 11.2
	<ul style="list-style-type: none"> identify and analyse experimental data qualitatively, applying where appropriate concepts of accuracy, precision, repeatability, reproducibility and validity; errors; and certainty in data, including effects of sample size on the quality of data obtained 	DD 1.5	II 2	II 3				II 7	II 8			DD 11.2
	<ul style="list-style-type: none"> identify outliers and contradictory or incomplete data 			DD 3		DD 5						DD 11.2
	<ul style="list-style-type: none"> repeat experiments to ensure findings are robust 					RR 5				II 9		II 11.1
	<ul style="list-style-type: none"> evaluate investigation methods and possible sources of error or uncertainty, and suggest improvements to increase validity and to reduce uncertainty 		II 2	DD 3; II 3	II 4	II 5	II 6	II 7		II 9	II 10	II 11.1

Key science skill	VCE Psychology Units 1–4	1	2	3	4	5	6	7	8	9	10	11
Construct evidence-based arguments and draw conclusions	• distinguish between opinion, anecdote and evidence, and scientific and non-scientific ideas	CC 1.6							RR 8			
	• evaluate data to determine the degree to which the evidence supports the aim of the investigation, and make recommendations, as appropriate, for modifying or extending the investigation						DD 6; II 6					
	• evaluate data to determine the degree to which the evidence supports or refutes the initial prediction or hypothesis					DD 5; RR 5				DD 9		DD 11.2
	• use reasoning to construct scientific arguments, and to draw and justify conclusions consistent with evidence base and relevant to the question under investigation	DD 1.4		DD 3	DD 4		DD 6		DD 8	DD 9	DD 10	DD 11.2; RR 11.3
	• identify, describe and explain the limitations of conclusions, including identification of further evidence required										II 10	RR 11.3
	• discuss the implications of research findings and proposals, including appropriateness and application of data to different cultural groups and cultural biases in data and conclusions								DD 8		DD 10; II 10	RR 11.3

Key science skill	VCE Psychology Units 1–4	1	2	3	4	5	6	7	8	9	10	11
Analyse, evaluate and communicate scientific ideas	<ul style="list-style-type: none"> use appropriate psychological terminology, representations and conventions, including standard abbreviations, graphing conventions and units of measurement 		CC 2	CC 3	CC 4		CC 6	CC 7		CC 9; RR 9	CC 10; II 10	II 11.1; RR 11.3
	<ul style="list-style-type: none"> discuss relevant psychological information, ideas, concepts, theories and models and the connections between them 		CC 2	CC 3	CC 4	CC 5	CC 6; RR 6	CC 7; DD 7	CC 8	CC 9; RR 9	CC 10	RR 11.3
	<ul style="list-style-type: none"> analyse and explain how models and theories are used to organise and understand observed phenomena and concepts related to psychology, identifying limitations of selected models/theories 			CC 3			CC 6		CC 8	CC 9		
	<ul style="list-style-type: none"> critically evaluate and interpret a range of scientific and media texts (including journal articles, mass media communications, opinions, policy documents and reports in the public domain), processes, claims and conclusions related to psychology by considering the quality of available evidence 				CC 4	II 5	RR 6		CC 8; RR 8	RR 9	RR 10	
	<ul style="list-style-type: none"> analyse and evaluate psychological issues using relevant ethical concepts and guidelines, including the influence of social, economic, legal and political factors relevant to the selected issue 			EE 3	EE 4			EE 7			EE 10	
	<ul style="list-style-type: none"> use clear, coherent and concise expression to communicate to specific audiences and for specific purposes in appropriate scientific genres, including scientific reports and posters 									RR 9		RR 11.3
	<ul style="list-style-type: none"> acknowledge sources of information and assistance, and use standard scientific reference conventions 	RR 1.7								RR 8		

Psychology toolkit

In VCE Psychology, you will engage in a diverse range of scientific investigation methods and enhance your key science skills.

You will develop aims and questions, formulate hypotheses and make predictions. You will plan and conduct investigations, including the student-designed investigation in Unit 4 Area of Study 3. You will work collaboratively and independently to plan and conduct investigations, with a focus on conducting research that adheres to ethical and safety guidelines.

You will generate, collate and record data, think critically, evaluate evidence and consider how psychological knowledge evolves in response to emerging research. Combined with your analysis and evaluation of investigation methods, you will construct evidence-based arguments and draw conclusions. Then, you will analyse, evaluate and communicate your scientific ideas.

VCE Psychology provides you with the opportunity to understand how psychology can address real-world problems and highlight its relevance in our rapidly changing world.



CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
outline the structure of the VCE Psychology course, including the areas of study, their outcomes and assessments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.1 Pages 4–8
recognise the importance of key science skills	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.1 Pages 4–8
describe the process of the scientific method	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.2 Pages 9–13
identify independent, dependent, controlled, extraneous and confounding variables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.2 Pages 9–13
construct aims, research questions and hypotheses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.2 Pages 9–13
describe the scientific investigation methodology relevant to VCE Psychology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.3 Pages 14–24
contrast the methods for participant selection, including random and stratified sampling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.3 Pages 14–24
contrast the investigation designs, including participant allocation, within-subjects design, between-subjects design and mixed design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.3 Pages 14–24
contrast the types of ethical approaches	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.4 Pages 25–29
describe the ethical concepts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.4 Pages 25–29
describe the ethical guidelines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.4 Pages 25–29
recognise the importance of laboratory safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.4 Pages 25–29
conduct a risk assessment, including locating safety data sheets for specific chemicals or substances	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.4 Pages 25–29
contrast qualitative and quantitative data; discrete and continuous data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.5 Pages 30–34
describe different ways in which data can be collected, including observations, interviews, questionnaires and yarning circles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.5 Pages 30–34
recognise the types of information that are recorded in a logbook	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.5 Pages 30–34
present data in appropriate ways, such as in a table or graph	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.6 Pages 35–42
process and analyse data quantitatively, including the calculation of percentages, percentage change, measures of central tendency and variability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.6 Pages 35–42
analyse data and methods qualitatively, including accuracy and precision, repeatability, reproducibility and validity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.7 Pages 43–46
identify errors, sources of uncertainty and outliers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.7 Pages 43–46
distinguish between evidence, anecdote, opinion, scientific ideas and non-scientific ideas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.8 Pages 47–51

I can...	Confidently	Partially	Not really	Revision link in your Student Book
construct evidence-based arguments and draw conclusions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.8 Pages 47–51
identify the limitations and implications of research findings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.8 Pages 47–51
recognise the different types of scientific information, including ideas, concepts, models and theories	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.9 Pages 52–55
outline the strengths and weaknesses of the different sources of scientific information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.9 Pages 52–55
describe the factors affecting psychological issues	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.9 Pages 52–55
identify the features of effective scientific communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.10 Pages 56–58
list some ways to communicate scientific findings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.10 Pages 56–58
understand how to engage with Aboriginal and Torres Strait Islander peoples knowledges, cultures and histories in VCE Psychology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.11 Pages 59–65
recognise some key strategies to maximise exam success	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.12 Pages 66–69
understand what questions are asking based on the command terms used	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 1.12 Pages 66–69

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1.1

Develop aims and questions, formulate hypotheses and make predictions

Psychological research follows the scientific method. The first step in this process is to select a specific issue or problem and develop a research question and aim, which outlines the intention of the investigation. Following this, you will gather relevant information to assist in forming your hypothesis, a testable prediction about the outcome of the investigation. It is important to conduct these steps at the beginning of an investigation as they allow for meaningful analysis of results and drawing of conclusions.

RESEARCH REVIEW 1.1

KEY SCIENCE SKILLS: Develop aims and questions, formulate hypotheses and make predictions

Defining parameters for research on learning

For each of the following research scenarios, create a research question and aim, and identify the independent and dependent variables of the research. Use this information to construct a hypothesis that predicts the outcome of the investigation.

Research scenario 1

Dr Trinh is interested in finding out whether children will complete more schoolwork if they receive praise. To conduct her investigation, she recruits two teachers in different classrooms. Dr Trinh instructs one teacher to praise her students every time they complete one piece of work, while the other teacher is told not to offer any praise to her students for completing any work. At the end of the day, she counts how many pieces of work the students in each class have completed, and compares the total.

Research question	
Aim	
Independent variable	
Dependent variable	
Hypothesis	

Research scenario 2

Jeffrey wants to find out whether a person's ability to concentrate is influenced by consuming a diet high in vitamin C. He obtains 30 participants who are nurses at a local hospital and organises for all their meals to be provided for two weeks. During the first week of the research, the nurses are provided with meals that have very low levels of vitamin C. Each day, they complete an online test that measures their ability to focus on stimuli while ignoring others. During the second week of the research, the nurses are provided with meals that are high in vitamin C and they complete the same online test each day. Jeffrey compares their average performance across the two-week period.

Research question	
Aim	
Independent variable	
Dependent variable	
Hypothesis	



FIGURE 1 Asking investigable questions is the important first step of the scientific method.

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1.2

Plan and conduct investigations

After creating a research question and aim, and formulating a hypothesis, you will begin to plan how to conduct your investigation. This involves selecting the most appropriate investigation methodology to achieve your aim.

Selecting an investigation methodology

The type of investigation methodology chosen may depend on the topic, the resources available or the type of data required. Sometimes, a researcher may have to choose between several different methodologies. For example, if you were investigating the impact of gaming on sleep quality in adolescents, you could conduct a controlled experiment to test whether restricting the amount of time gaming improves sleep quality for adolescents. Alternatively, you could conduct a correlational study to determine whether there is a relationship between gaming hours and sleep quality.

Both of these will help you study the relationship between two variables, but choosing a correlation study over a controlled experiment may limit your ability to draw a cause-and-effect relationship between variables. Sometimes, you may select a correlational study over a controlled experiment because you cannot adequately control the variables. This is assessed on a case-by-case basis, with some investigation methodologies being more appropriate for certain studies than others.

Selecting a research design

Once an appropriate research methodology has been selected, you'll begin to design your investigation. This includes, where appropriate, selecting a sampling procedure that allows you to obtain a sample to represent your target population.

You also need to consider what equipment you require and what procedures you will need to follow to systematically gather data during your investigation. You may work alone or collaborate with others throughout the investigation. At times, you may need to adapt or modify sections of your research in response to research constraints. Any such changes should always be documented in a logbook for future reference.

INVESTIGATION INSPECTOR 1.2

KEY SCIENCE SKILLS: Develop aims and questions, formulate hypotheses and make predictions; Plan and conduct investigations

Comparing investigation designs

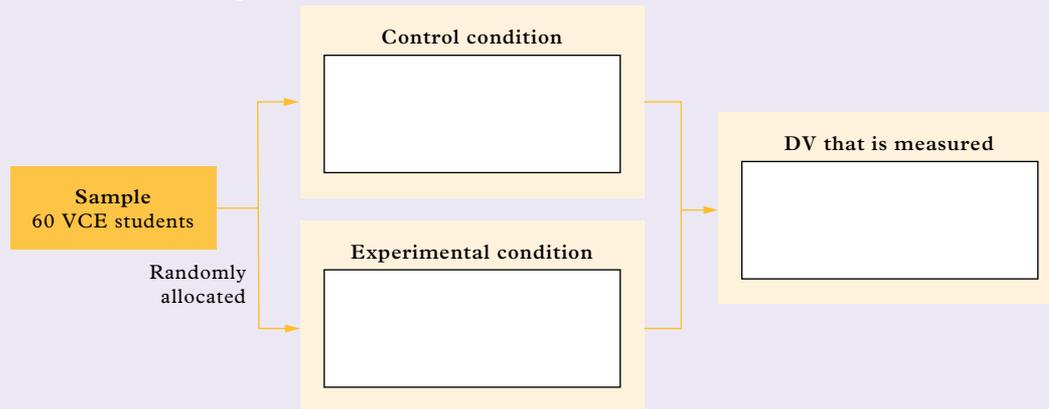
A controlled experiment is one investigation methodology that can be used to determine a cause-and-effect relationship between two variables. When designing a controlled experiment, there are three different investigation designs that can be used, each with its own advantages and disadvantages.

- 1 Use three different colours to match each investigation design to its correct description and its advantages and disadvantages, which have been jumbled in the table.

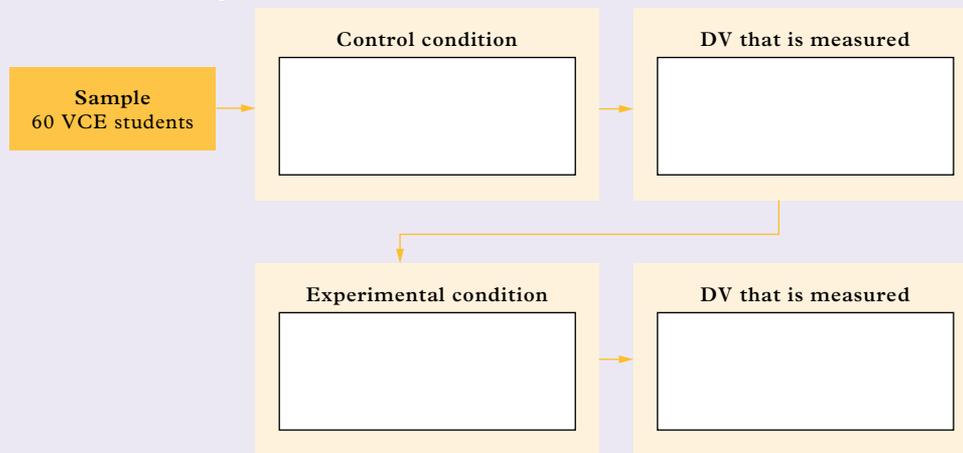
Investigation design	Description	Advantages and disadvantages
Between-subjects	Each participant in the sample is tested under all conditions of the experiment.	Advantage: Can provide more detailed data as more than one independent variable can be investigated within the research Disadvantage: Can be very complex and findings may be difficult to interpret
Within-subjects	A combination of multiple designs. This design is often used when there is more than one independent variable that can affect the dependent variable.	Advantage: Can be done all at once, making it time-efficient Disadvantage: Requires a larger sample size to ensure a spread of participant variables that reflects the population
Mixed design	Each group only experiences one condition of the experiment.	Advantage: Eliminates individual participant differences Disadvantage: Takes a longer amount of time to complete than other designs

- 2 A researcher assesses the three potential investigation designs to explore whether 15 minutes of meditation influences short-term memory compared to no meditation in VCE students. Complete the flowchart by identifying the control conditions, experimental conditions and dependent variables.

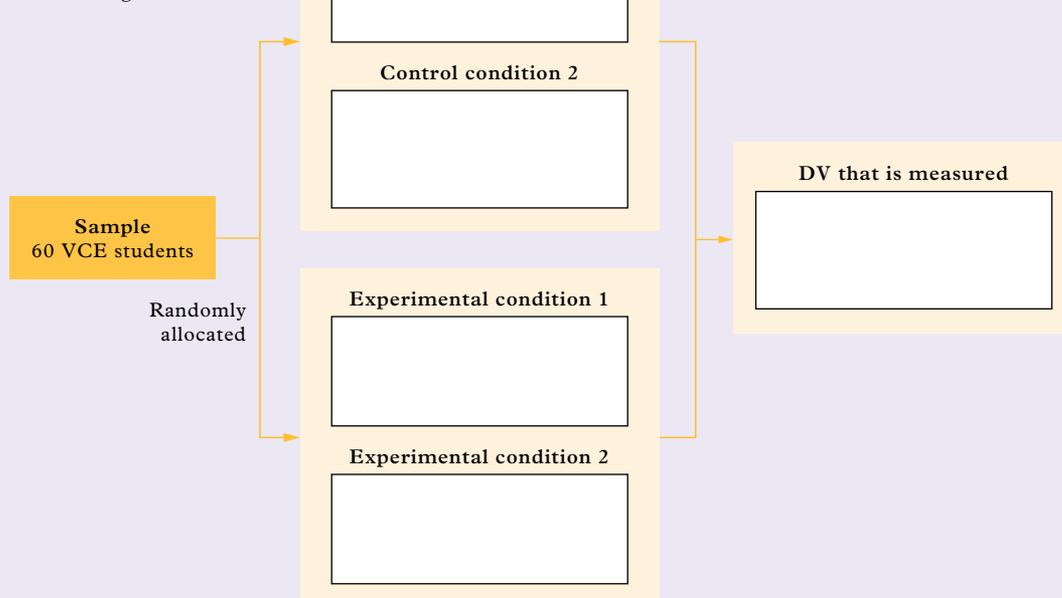
Between-subjects design



Within-subjects design



Mixed design



1.3

Comply with safety and ethical guidelines

Psychological research often involves the use of humans or animals as participants to study a concept or theory related to the brain, its function and behaviours. As humans and animals are living entities, it is important to understand and uphold ethical principles to protect the rights and wellbeing of these participants.

In VCE Psychology, you need to consider five ethical concepts to determine the acceptability of effects and research: respect, beneficence, justice, integrity and non-maleficence.

Ethical guidelines

Before undertaking psychological research, a proposal must be submitted to an ethics committee for approval. The committee will study the proposal to ensure that all necessary ethical guidelines will be upheld throughout the research. This particularly relates to protecting the rights of participants in research through six ethical guidelines:

- confidentiality
- voluntary participation
- informed consent procedures
- withdrawal rights
- use of deception in research
- debriefing.

Approval to conduct research will be granted only when the ethics committee is satisfied that all these guidelines have been met.

Complying with safety in research

A lot of psychological research is undertaken in laboratories or environments that can potentially pose risks to the researchers, their participants or other people involved. Therefore, it is necessary to follow safe laboratory procedures to minimise these risks.

This can include practices such as following directions from a supervisor or ensuring that personal protective equipment is worn when appropriate. It is also important to undertake a risk assessment to understand and minimise any risks, including investigations conducted in the field. Safety data sheets may be used as part of a risk assessment when using chemicals, or common foods and drinks are involved.



FIGURE 1 Individuals are made fully aware of any known risks and benefits of participating in the research before they decide to voluntarily participate.

EVALUATING ETHICS 1.3

KEY SCIENCE SKILL: Comply with safety and ethical guidelines

Understanding ethical guidelines in studies about learning

In VCE Psychology, there are several ethical guidelines that need to be considered when conducting or analysing psychological research.

1 Match each ethical guideline to its description.

Ethical guideline	Description
Confidentiality	Participants have the right to refuse to take part in a study. There must not be any pressure to take part in a study, nor should the participants be tricked into taking part.
Voluntary participation	Participants have the right to leave a study at any stage, regardless of the possible effects on the results.
Informed consent	Provision of false or incomplete information for the purpose of misleading research participants is only permitted if the results would be confounded if the participants had such information before taking part in the study.
Withdrawal rights	Participants must not be identified in any way in terms of test results, their involvement in the study or any other personal data. Data needs to be stored and disposed of using secure procedures.
Deception	After completion of the study, participants are told the aim, results and conclusions of the study. Any erroneous beliefs must be corrected, and counselling offered to participants.
Debriefing	Participants must be given information about a study, including any risks involved, and understand the nature of the study before they agree to take part. If they are unable to do so themselves, their guardian must be given the information before agreeing to take part on their behalf.

2 Read through the following scenarios. Identify two ethical guidelines that have been breached in each and suggest a way that they could be rectified in the research.

Scenario 1

Ms Thorne wants to find out whether students learn better when they receive written or verbal instructions to complete a task. She invites her students to participate in her research; however, she tells them that those who choose not to participate will have their report marks reduced. All her students agree to participate and at the end of the research, Ms Thorne concludes that students learn better when given written instructions. She decides to publish each student's results in the staff room so other teachers can view the students' performance.

a Name two ethical guidelines that were breached by Ms Thorne.

b Describe how each breach could be rectified.



FIGURE 2 Do students learn better after receiving written or verbal instructions about their task?

Scenario 2

A psychologist, Dr Alexei, is interested in finding out whether watching educational television shows improves cognitive development in children. Dr Alexei recruits children from a local childcare centre. He posts a notice at the front doorway of the centre to alert parents and guardians of the research he will undertake. Over the next 3 months, the children spend 30 minutes each day at childcare watching educational television shows. Dr Alexei gives the children weekly tests to determine their progressive cognitive development. On completion of the research, he gives each child a sticker for participating in his research.



FIGURE 3 Does watching educational television affect cognitive development in children?

a Name two ethical guidelines that were breached by Dr Alexei.

b Describe how each breach could be rectified.

1.4

Generate, collate and record data

When undertaking an investigation, you must plan and prepare for how you will systematically generate and record primary data or collate secondary data. This helps to reduce the likelihood of obtaining incomplete or missing data, which can reduce the validity of the investigation.

In VCE Psychology, you will maintain a logbook to record and summarise the data that you collect during an investigation. It is important to date all entries in your logbook. Each entry should demonstrate a sequential flow of ideas from when you begin planning your investigation, through to collating your data, and analysing and evaluating your results. Your teacher will use this logbook to authenticate your coursework.

When you generate data in an investigation, this is referred to as raw data, in its original form without any calculations or analysis. However, to analyse data, it needs to be organised in a clear and logical format. This can be done by putting information into a table, chart or graph, which allows trends or patterns to be seen more easily.

Organising and presenting data

In VCE Psychology, you are required to organise and present data in useful and meaningful ways. Graphs are an effective way of representing data to show visual relationships between variables. When presenting data in a graph, remember to do the following:

- Select the appropriate type of graph depending on the data you have. Typically, a line graph is used to display continuous data that has been measured over time, while a bar or column graph is used to display data collected at specific intervals or in distinct categories.
- Include a descriptive title above your graph that clearly outlines the independent and dependent variables.
- Ensure you use a consistent scale when drawing your axes, i.e. the increments should be evenly spaced.
- Clearly label each axis, including any units of measurement.
- Use different colours or symbols for multiple pieces of information. A key should also be provided.

DATA DRILL 1.4

KEY SCIENCE SKILLS: Generate, collate and record data; Construct evidence-based arguments and draw conclusions

Presenting data about preferred coping strategies

Feng has created a survey to find out what type of coping strategy people prefer to use when they feel stressed. He is interested in finding out whether preferred coping strategies change depending on where the person is in their life span. He has collected responses from 20 participants and they are shown in Table 1.



FIGURE 1 Feng investigated the coping strategies used by people when they are feeling stressed.

TABLE 1 Preferred coping strategies across different stages of the life span

Participant	Stage of life span	Preferred coping strategy
1	Adolescent	Listening to music
2	Child	Listening to music
3	Elderly	Listening to music
4	Adult	Exercising
5	Child	Listening to music
6	Elderly	Exercising
7	Adolescent	Listening to music
8	Elderly	Listening to music
9	Adult	Practising mindfulness
10	Child	Listening to music
11	Adult	Listening to music
12	Adolescent	Listening to music
13	Elderly	Practising mindfulness
14	Adolescent	Exercising
15	Adult	Exercising
16	Child	Practising mindfulness
17	Adult	Exercising
18	Adolescent	Listening to music
19	Elderly	Practising mindfulness
20	Child	Practising mindfulness

1 Using the checklist provided in this topic to help you graph the data in Table 1.

2 Explain why it is more effective to display this data in a graph rather than a table.

3 Discuss whether there are any clear trends or patterns in Feng's data.

1.5

Analyse and evaluate data and investigation methods

Once raw data has been collected in an investigation, the data must be processed before the results can be analysed. If quantitative data has been collected, mathematical calculations can be performed to obtain descriptive statistics, which describe and summarise features in the dataset.

In VCE Psychology, you need to be able to interpret calculations of percentages and percentage changes, measures of central tendencies (mean, median and mode), as well as understand how standard deviations represent variability in data. Calculating these types of statistics allow you to identify potential trends or patterns in the data. In an investigation, this can help you to determine whether the independent variable has influenced the dependent variable.

You can also consider the accuracy and precision of any measurements recorded throughout the investigation and whether these measurements have been influenced by any potential random, systematic or personal errors.

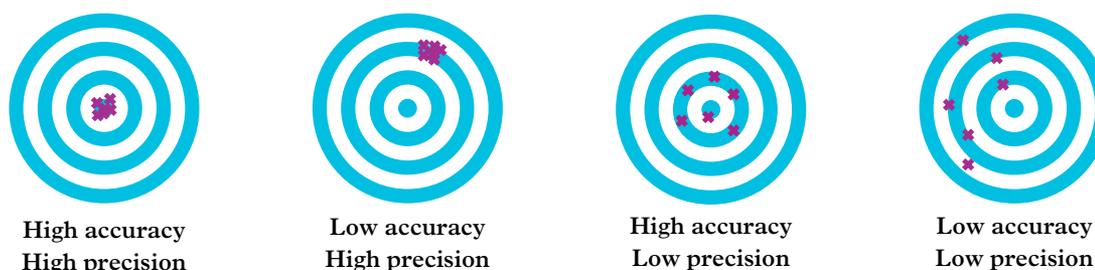


FIGURE 1 Accuracy and precision are different concepts.

Errors, outliers or contradictory data reduce the certainty in data and the validity of an investigation. They can also compromise an investigation's repeatability and reproducibility. Therefore, you should repeat the experiment multiple times and make improvements as necessary to make sure that your findings are robust. This will also improve the validity of your investigation and your certainty in your data.

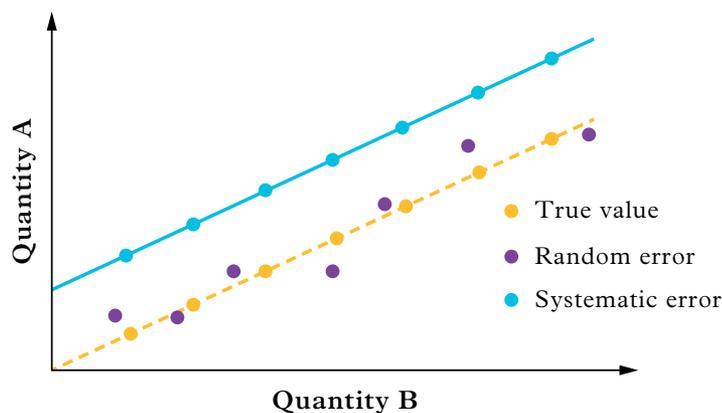


FIGURE 2 Random and systematic errors can influence the robustness of your results and your certainty in the data.

DATA DRILL 1.5**KEY SCIENCE SKILL:** Analyse and evaluate data and investigation methods**Qualitatively analysing experimental data about learning**

Dr Khshayarsha wants to investigate whether exposure to loud noises at school influences the ability for students to learn. To measure noise levels, she uses a sound meter. Two types of sound meters are available, so Dr Khshayarsha decides to test them both. To do this, she takes four successive measurements in the same room with the same sounds. The volumes are measured in dBA, which is decibels adjusted to human hearing.

**FIGURE 3** A sound meter

She obtains the results displayed in Table 1.

TABLE 1 Noise levels recorded by sound meters in the same room

Time (a.m.)	Reading from sound meter A (dBA)	Reading from sound meter B (dBA)
11.00	31	33
11.01	30	33
11.02	30	33
11.03	32	33

- 1 If the true noise levels in the room at the times of testing were 31 dBA, determine which sound meter displayed the highest level of accuracy. Justify your response.

- 2 When analysing data, describe what the term “precision” refers to and identify which sound meter recorded more precise measurements of noise.

- 3 The accuracy of results can be influenced by systematic errors. Explain what the term “systematic error” means, with reference to the data provided in Table 1.

1.6

Construct evidence-based arguments and draw conclusions

Once data has been analysed in an investigation, you can use this as evidence to form arguments and draw conclusions. However, it is important to evaluate any evidence that has been generated or collected in an investigation before using it to form an argument. This includes considering the type and source of information, as not all sources are based on scientific ideas.

During this process, consider to what degree the evidence supports your initial research question, aim and hypothesis. This is also an opportunity to make recommendations on how to modify or extend the investigation to improve the quality of the evidence.

Considering validity

After constructing your arguments, you can form an evidence-based conclusion. You should consider the validity of your investigation:

- low internal validity: a conclusion cannot be drawn, as the research did not achieve what it set out to do
- high internal validity: a conclusion can be formed and should answer the initial research question.

In VCE Psychology, most conclusions from an investigation are limited to the population of the specific study. Conclusions for a wider population can only be drawn if the investigation is externally valid. This means that the sample reflects the characteristics of the general population; that is, the findings are applicable to diverse ages, ethnicities, cultures, etc.

Limitations and implications

Finally, you should consider any limitations of your conclusions and the implications of your findings. This includes considering if it is appropriate to apply your findings to different cultural groups or whether there were cultural biases in your investigation, reducing the application of findings to a wider population.



FIGURE 1 In Case cracker 1.6, you will evaluate the quality of different pieces of evidence.

CASE CRACKER 1.6**KEY SCIENCE SKILL:** Construct evidence-based arguments and draw conclusions**Distinguishing between opinions, anecdotes and evidence**

In the modern world, information is available to us in a wide variety of formats, such as news reports, ads, blog posts, podcasts, social media posts, etc. We have access to extensive amounts of information at our fingertips. However, not all information that we come across is scientific or evidence-based, even if it appears to be so. We need to be able to distinguish between different sources of information and recognise that the ideas being communicated may not always be factual.

- 1 You will need to be able to critically evaluate different sources of information. Define the following terms in your own words. Note: Refer back to the Psychology toolkit in your Student Book for a refresher.
 - a opinion _____
 - b anecdote _____
 - c evidence _____
 - d scientific idea _____
 - e non-scientific idea _____
- 2 Three pieces of information relating to the effects of sleep on mental wellbeing are presented. Read each one and determine whether the information is an opinion, anecdote or evidence. Consider whether the information involves scientific or non-scientific ideas and justify your choices.

Source 1

A study conducted by Freeman et al. (2017) found that, for university students who experienced insomnia, undertaking 10 weeks of digital cognitive behavioural therapy (CBT) reduced their experiences of insomnia, paranoia and hallucinations compared to usual practices.

Source 2

Some parents believe that children should not be allowed to use devices in their bedrooms at night as this encourages them to stay up late using social media. This can contribute to reduced social and emotional wellbeing, including lower levels of self-esteem.

Source 3

I can recall a time when I was only sleeping about 3 hours each night for a month. I was staying up completing university assignments during my final semester. I remember how fatigued and stressed I felt each day and even though I was putting in many hours of work at night, the quality of my assignments seemed to decline.

1.7

Analyse, evaluate and communicate scientific ideas

Once an investigation has been complete, it is important that the findings and scientific information can be shared to benefit others. But before you do this, you must carefully analyse and evaluate your scientific ideas.

Analysis and evaluation of scientific ideas

When analysing and evaluating scientific ideas, you must describe connections between different psychological concepts, theories and models. This may involve considering similarities or differences, and identifying strengths and limitations when comparing ideas or sources of information.

You will also need to critically evaluate different types of texts, processes, claims and conclusions. This involves forming an evaluative statement where you weigh up the quality of evidence that is provided and determine whether the strengths or advantages outweigh the potential weaknesses or disadvantages that are presented.

Communicating science

It is not enough to throw together your ideas and expect your audience to understand and recognise the importance of the work. In particular, scientific ideas and terminology can be difficult to understand for those not in the scientific community. Therefore, being able to organise, connect and then effectively communicate science to share this information in an approachable way for others is an important skill. This includes using appropriate language and terminology for the target audience, and writing succinctly and clearly. Use of labelled diagrams or visuals is also an effective way to convey some information in a more approachable format.

In VCE Psychology, you will undertake a student-designed investigation as part of your Unit 4 Area of Study 3 assessment. In this task, you will report your findings in the format of a scientific poster. Your teacher will provide you with a template and directions on how to complete this poster and adhere to the correct reporting conventions.

To help prepare for this task, remember to always keep track of any references you use. You should also practise using correct graphing conventions and units of measurements whenever you plot your data throughout your VCE Psychology course.



FIGURE 1 When you communicate science, you should be mindful of your target audience and use language that is appropriate for them. This work must not be reproduced, stored, transmitted or circulated in any other form.

RESEARCH REVIEW 1.7

KEY SCIENCE SKILL: Analyse, evaluate and communicate scientific ideas

Referencing using the APA style

As part of your VCE Psychology studies, you will conduct research and source secondary data; that is, you will use data that has been collected by someone else. Whenever you use someone else's work, whether that is data or ideas, you must appropriately reference this source so that you do not plagiarise their work. Therefore, understanding referencing and being able to reference research appropriately are important skills in Psychology.

Psychology uses a system called APA (American Psychological Association) referencing, which has a standard structure for referencing sources. Style guides are available online for acknowledging the use of any materials from journal articles to published books, to blog posts, YouTube videos, and even social media posts. Examples of how to reference journal articles and books are shown in Figure 2.

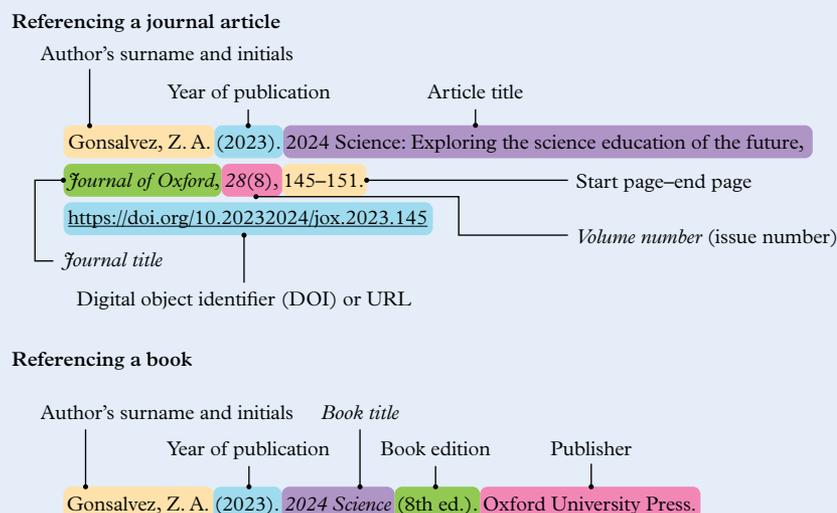


FIGURE 2 Examples of how to reference journal articles and books using the APA style guide, 7th edition

- 1 Investigate one resource by Richard Atkinson and Richard Shiffrin that explores human memory.
 - a Identify the date of publication.

- b State the type of publication (journal article, book, news article, etc.).

- c Identify the publisher.

- d Write the reference in APA style.

Study tip

Keeping track of all your sources and research from the start will make it easier when undertaking your scientific investigation in Unit 4 Area of Study 3. Using a logbook to keep a list of your references, the date of publication, methodology and results is a great way to have an overview of your learning.

How does experience affect behaviour and mental processes?

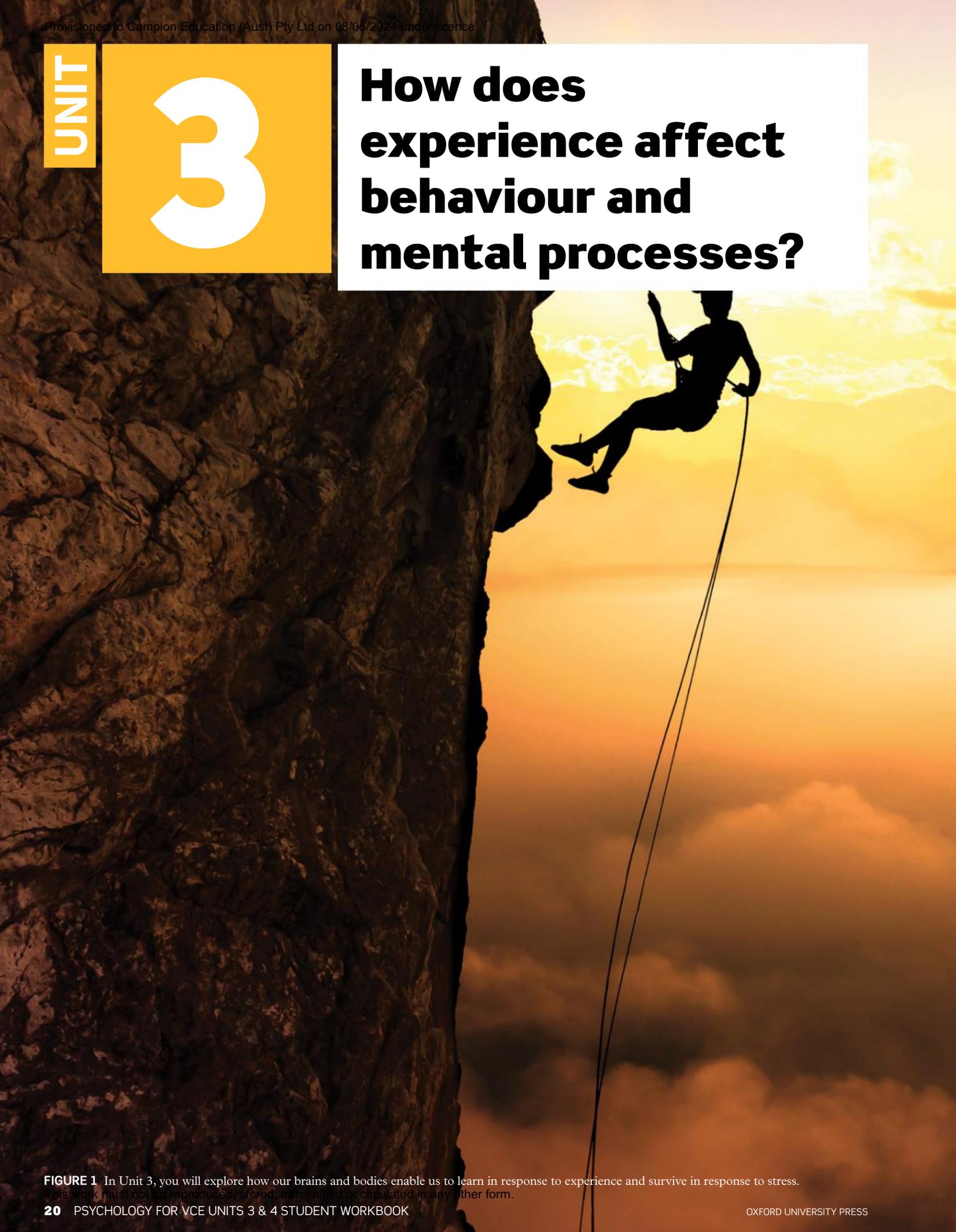


FIGURE 1 In Unit 3, you will explore how our brains and bodies enable us to learn in response to experience and survive in response to stress. This work must not be reproduced, stored, transmitted or circulated in any other form.

WORD WIZARD

Draw a line to match each term with the correct definition.

A CENTRAL NERVOUS SYSTEM

B EXCITATORY EFFECT

C LONG-TERM POTENTIATION

D GENERAL ADAPTATION SYNDROME

E TRANSACTIONAL MODEL OF STRESS AND COPING

F GUT-BRAIN AXIS

G AVOIDANT COPING STRATEGY

H SOCIAL-COGNITIVE APPROACHES TO LEARNING

I CLASSICAL CONDITIONING

J OPERANT CONDITIONING

K SYSTEM OF KNOWLEDGE

L MULTI-STORE MODEL OF MEMORY

M EXPLICIT MEMORY

N POSSIBLE IMAGINED FUTURE

O MNEMONIC DEVICE

1 the long-lasting strengthening of neural connections

2 a mental technique or strategy for improving the encoding, storage or retrieval of memory

3 a hypothetical scenario that an individual has formed in their mind

4 a behaviourist approach to learning where an individual forms an association between two stimuli to produce a learnt response

5 a biological model that describes the physiological changes the body undergoes during stress

6 a model that suggests that memory consists of sensory, short-term and long-term memory, which work together to encode, store and retrieve information

7 a psychological model of stress proposing that a person's ability to cope with stress is influenced by how they assess the stressor

8 a structured and interconnected framework for understanding

9 perspectives that stress the importance of social interactions and cognitive processes in shaping human learning and behaviour

10 a major division of the human nervous system, consisting of the brain and spinal cord

11 an effect that increases the likelihood of a postsynaptic neuron firing an action potential

12 a complex bidirectional communication system between the brain and enteric nervous system that occurs through the vagus nerve

13 a memory of knowledge, facts and personal experiences that can be retrieved consciously

14 a cognitive and behavioural method for distracting or delaying dealing with a stressor

15 a behaviourist approach to learning where an individual learns through associating a behaviour with a consequence

Nervous system functioning

The role of the human nervous system

The human nervous system enables us to receive, process and respond to information in the world around us. The nervous system is divided into different branches, each with its own key functions.

The central nervous system comprises the brain and spinal cord. It is primarily involved in processing incoming information and coordinating a response. The peripheral nervous system comprises the:

- somatic nervous system, which plays a key role in voluntary movement of our skeletal muscles
- autonomic nervous system, which keeps our internal organs and glands functioning continuously; this is further divided into the sympathetic and parasympathetic branches, which respond to the demands placed on the body by increasing or decreasing internal activity. The enteric nervous system is a subdivision of the autonomic nervous system.

Conscious and unconscious responses

When information is received by the nervous system, two types of responses can be made: conscious responses, which involve awareness and are typically voluntary reactions, or unconscious responses, which occur without awareness and are typically involuntary and automatic. The spinal reflex is an example of an unconscious response. It occurs when interneurons located within the spinal cord initiate a motor response without involvement of the brain (that is, without awareness).

Neurotransmitters and neuromodulators

For information to travel around the nervous system, neurons must communicate with one another. This occurs through chemicals known as neurotransmitters, which are released from the axon terminal of the presynaptic neuron into the synaptic gap, before binding to a specific/complementary receptor site on the postsynaptic neuron. Here, the neurotransmitter will pass on either an excitatory or inhibitory effect. Neuromodulators are types of neurotransmitters that can affect multiple postsynaptic neurons and, therefore, can influence activity in entire neural pathways or brain regions.

Synaptic plasticity

The structure and functioning of neurons can change from experience. This occurs through the process of synaptic plasticity. Long-term potentiation involves connections between neurons being strengthened. This occurs when we learn or remember things. Conversely, long-term depression involves the weakening of connections between neurons. This allows the brain to regulate the number of neural connections needed to enhance learning and memory.

CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
identify the different subdivisions of the nervous system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 2.1 Pages 78–82
describe the role of different subdivisions of the central and peripheral nervous systems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 2.1 Pages 78–82
contrast conscious and unconscious responses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 2.2 Pages 83–86
describe the spinal reflex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 2.2 Pages 83–86
label the parts of a neuron and describe their roles in neural transmission	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 2.3 Pages 87–89
define the terms “neurotransmitter” and “neuromodulator”	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 2.3 Pages 87–89
contrast the effects of neurotransmitters (such as glutamate and gamma-aminobutyric acid) and neuromodulators (such as dopamine and serotonin)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topics 2.4 and 2.5 Pages 90–92 and 93–96
explain how synaptic plasticity affects memory formation and learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 2.6 Pages 97–101

Source: Adapted from *VCE Psychology Study Design (2023–2027)* reproduced by permission © VCAA

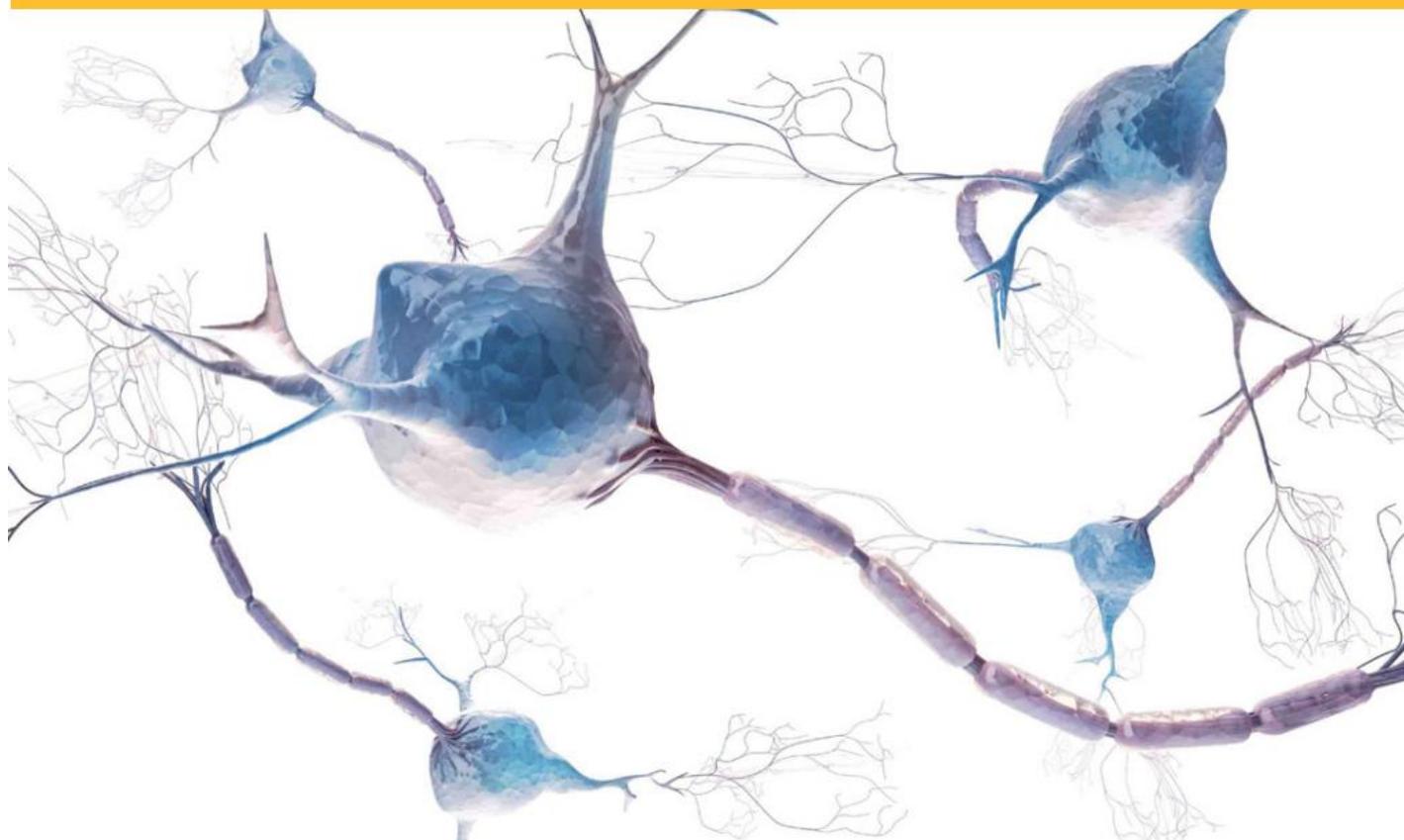


FIGURE 1 The average number of neurons in the human brain is 100 billion, compared to 13.5 million in the spinal cord. This work must not be reproduced, stored, transmitted or circulated in any other form.

GROUNDWORK 2

Multiple choice

- 1 The central nervous system comprises the:
 - A sympathetic and parasympathetic nervous systems.
 - B somatic and autonomic nervous systems.
 - C brain and spinal cord.
 - D enteric nervous system and brain.
- 2 What is the primary excitatory neurotransmitter in the central nervous system?
 - A Glutamate
 - B GABA
 - C Dopamine
 - D Serotonin



FIGURE 2 Neurotransmitters allow neurons to communicate.

- 3 Which division of the nervous system is found embedded in the walls of the gut?
 - A Sympathetic nervous system
 - B Parasympathetic nervous system
 - C Somatic nervous system
 - D Enteric nervous system
- 4 In relation to synaptic plasticity, the growth of new dendrites or axons on a neuron is referred to as:
 - A pruning.
 - B rerouting.
 - C sprouting.
 - D connecting.
- 5 Which of the following is a function of the neuromodulator serotonin?
 - A Coordination of movement
 - B Physical growth and development
 - C Mood regulation
 - D Motivation

Short answer

6 Contrast conscious and unconscious responses to sensory stimuli.

7 Compare neurotransmitters and neuromodulators.

8 Outline the key processes involved in a spinal reflex, with reference to three different types of neurons involved.

9 With reference to GABA, describe the process of successful neural transmission.

10 Describe how long-term potentiation and long-term depression are involved when a chef learns a new way to cook a steak and, months later, has forgotten the original technique they previously used to cook steak.

CASE CRACKER 2

KEY SCIENCE SKILL: Analyse, evaluate and communicate scientific ideas

Exploring Parkinson's disease

Parkinson's disease is a progressive neurodegenerative disease that occurs due to the death of neurons within the substantia nigra, a structure within the midbrain. Neurons in this part of the brain are responsible for producing dopamine, which plays a key role in allowing smooth bodily movements.

As a result of Parkinson's disease, the amount of dopamine being produced declines. This results in a range of motor symptoms, including tremors, rigid muscles and stooped posture. Research has shown that Parkinson's disease can also disrupt the balance of other chemicals within the brain alongside dopamine, including serotonin and noradrenaline.

There is currently no known cure for Parkinson's disease. However, there are medications that can assist in slowing the effects. Levodopa is a medication that patients with Parkinson's disease can take orally (in tablet form). It is then absorbed into the blood, before being converted into dopamine in the brain. By increasing the amount of dopamine in the brain, levodopa can help to minimise the motor effects of Parkinson's disease and greatly improve quality of life.



FIGURE 3 Levodopa is used to treat Parkinson's disease.

- 1 Parkinson's disease is described as a "progressive neurodegenerative disease". Other disorders, including Alzheimer's disease, also fall into this category. Break down and consider what "progressive" and "neurodegenerative" may mean and then write your own definitions for this term.

- 2 Identify the type of chemical that dopamine is and list one other important role of dopamine, other than being involved in movement of the body.

- 3 A person living with Parkinson's disease may have difficulty walking, as their posture and balance decline. Outline the role of two subdivisions of the nervous system that are involved when a person walks.

- 4 Depression is one non-motor symptom that some people experience due to Parkinson's disease. Suggest how this might be linked to the changes in brain chemistry that can occur.

DATA DRILL 2**KEY SCIENCE SKILLS:** Develop aims and questions, formulate hypotheses and make predictions; Generate, collate and record data**Interpreting data about heart rate**

Nhi's heart rate is recorded at hourly intervals from 7 a.m. to 12 p.m. This data is shown in Table 1.

TABLE 1 Heart rate recordings over time

Time	Heart rate (beats per minute)
7 a.m.	75
8 a.m.	83
9 a.m.	135
10 a.m.	105
11 a.m.	88
12 p.m.	78

- 1 Identify the independent and dependent variables from Table 1.

- 2 Explain whether the data in Table 1 is quantitative or qualitative.

- 3 Construct a graph to present the data in Table 1.

- 4 Based on the data in Table 1, identify one time when it is likely that Nhi's sympathetic nervous system was activated. Justify your inference.

Study tip

If a question states "refer to the data/scenario provided" or "with reference to...", your answer must include a specific reference to the stimulus material. If you give a generalised answer that does not refer to the material, it is likely that you will not obtain full marks for the question, even if your answer is accurate.

INVESTIGATION INSPECTOR 2

KEY SCIENCE SKILLS: Develop aims and questions, formulate hypotheses and make predictions; Analyse and evaluate data and investigation methods

Evaluating research on practising skills

Research has shown that the more a person practises a skill, the easier this skill becomes. This is why even elite sports players continue to train and practise their skills.

A wealth of research supports the idea that neuroplasticity is the basis of learning. Long-term potentiation occurs when you practise the same skill multiple times. Neurons will repeatedly fire within a neural pathway, strengthening their connections and helping you to remember the information when needed.

Gareth decided to test whether practising shooting a basketball every day improved shooting accuracy. He recruited 12 friends from his high school to participate in his research: seven males and five females aged between 15 and 18 years old.

Before the start of the experiment, Gareth asked each participant to shoot 10 shots and he recorded how many of them scored or missed. Participants then practised shooting for 10 minutes each morning at school for five days in a row. On the sixth day, Gareth again asked each participant to shoot 10 shots and recorded how many they scored or missed.



FIGURE 4 Does practice make perfect?

1 Write an appropriate hypothesis for Gareth’s research.

2 Explain whether Gareth has obtained a representative sample for this research.

3 Explain whether Gareth has used a within-subjects or between-subjects design for his controlled experiment, with reference to the scenario.

4 Describe one extraneous variable that Gareth should have considered prior to undertaking this research.

5 Suggest how Gareth could test the reproducibility of his research.

EVALUATING ETHICS 2

KEY SCIENCE SKILL: Comply with safety and ethical guidelines

Applying ethical concepts to research about synaptic plasticity

Dr London wants to conduct research to test whether synaptic plasticity declines as a person ages. To do this, they plan on carrying out research with children, adolescents, adults and elderly people. Each participant will undertake a short introductory course on how to speak Italian over a 2-month period. After this, Dr London will test each participant on their skills in speaking, writing and reading in Italian. They predict that the children and adolescents will perform better on these tests as their brains have greater plasticity due to their younger age, compared to adults and elderly participants.

To undertake this research, Dr London will need to submit a proposal to an ethics committee. The committee will approve Dr London's research if they believe there is evidence that they will uphold all relevant ethical principles or guidelines throughout their research.

1 Define the following terms in relation to psychological research.

a beneficence

b integrity

c non-maleficence

2 Outline how Dr London could uphold each of these ethical principles in their proposed research.

a beneficence

b integrity

c non-maleficence

RESEARCH REVIEW 2

KEY SCIENCE SKILL: Develop aims and questions, formulate hypotheses and make predictions

Developing good research questions is a key skill when undertaking any scientific investigation. A good research question will help to provide direction as you begin your investigation.



FIGURE 5 An investigation starts with a good research question.

Research questions should be clear and concise. Typically, they will only be one sentence. They require investigation or testing, so they should not be a simple “yes” or “no” question. Look at the example provided, which shows a poor research question.

Poor research question: Do parts of the nervous system work together?

This question is too vague. What does “work together” mean? What parts of the nervous system are being referred to? Look at the revised example for a more specific, clear and concise research question.

Better research question: How do the central and peripheral nervous systems communicate when processing sensory stimuli?

1 Consider the research question: Does synaptic plasticity occur less in older people?

a Explain why this would be considered a poor question.

b Rewrite this question as a good research question.

2 Consider the research question: Is serotonin linked to mood?

a Explain why this would be considered a poor question.

b Rewrite this question as a good research question.

Stress as a psychobiological process

The stress response

A stressor is a perceived challenge that surpasses your coping abilities, causing you to experience stress. They can arise internally from mental processes or biological factors, or externally from interactions with the environment. Short-term, intense stress is referred to as acute stress. Increased adrenaline release triggers a flight-or-fight-or-freeze response. Prolonged stress becomes chronic stress, with cortisol acting as the main stress hormone. Stress can significantly affect a person's physical and mental wellbeing.

The gut-brain axis and stress

The gut-brain axis (GBA) is a bidirectional communication system between the brain and the gut. Microorganisms exist within the gut and have a wide variety of impacts on the physiological and psychological functioning of the body. Research shows there is a complex relationship between stress and the microbiome. Experiencing chronic stress can have a negative impact on the health of the gut. At the same time, a lack of diversity in the gut can impact your susceptibility to experiencing stress.

Biological responses to stress

According to Hans Selye's General Adaptation Syndrome (GAS) model, when you experience stress, your body will undergo a series of biological changes. When you first encounter the stressor, you enter shock. Then, you rebound and enter countershock. If the stressor persists, you transition to resistance to sustain your stress response over a period of time. However, eventually your body's resources become depleted, causing you to enter the final stage of exhaustion where you are vulnerable to experiencing significant illnesses.

Psychological responses to stress

The Transactional Model of Stress and Coping highlights the psychological responses that you may experience when you encounter a stressor. Initially, you will go through a primary appraisal, where you consider if the stressor is relevant to you. If you decide that it is relevant, you will complete a secondary appraisal, which involves evaluating your coping resources. If you deem that your resources are adequate, you will only experience minimal stress; however, if you determine that your resources are inadequate, you are likely to experience higher levels of stress.

Coping with stress

When confronted with a stressor, you can confront it directly through use of an approach strategy, or you may indirectly manage your stress through an avoidance strategy. Various coping strategies suit different stressors; therefore, recognising ineffective strategies and choosing more effective options displays coping flexibility, which helps you reduce your experience of stress.

CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
explain what stress is	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.1 Pages 108–115
compare and provide examples of internal and external stressors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.1 Pages 108–115
contrast acute and chronic stress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.1 Pages 108–115
describe the flight-or-flight-or-freeze response	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.1 Pages 108–115
describe the phases of Hans Selye’s General Adaptation Syndrome (GAS)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.2 Pages 116–120
discuss the explanatory power of the GAS	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.2 Pages 116–120
describe the stages of Richard Lazarus and Susan Folkman’s Transactional Model of Stress and Coping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.3 Pages 121–125
discuss the explanatory power of the Transactional Model of Stress and Coping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.3 Pages 121–125
describe the components of the gut–brain axis (GBA), including the gut microbiota and the enteric nervous system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.4 Pages 126–133
explain the role that the GBA has in the stress response and vice versa	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.4 Pages 126–133
contrast approach and avoidance strategies for coping with stress	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.5 Pages 134–137
evaluate context-specific effectiveness of coping strategies and coping flexibility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 3.5 Pages 134–137

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GROUNDWORK 3

Multiple choice

- Raima is feeling very frustrated after misplacing her car keys. Her lost keys would be considered:
 - a psychological stress response.
 - a physiological stress response.
 - an internal stressor.
 - an external stressor.
- During which stage of Selye’s General Adaptation Syndrome do cortisol levels peak?
 - Shock
 - Countershock
 - Alarm reaction
 - Resistance

- 3 According to Lazarus and Folkman’s Transactional Model of Stress and Coping, which of the following is not a possible primary appraisal of a stressor?
- A Threat
 - B Unimportant
 - C Harm/loss
 - D Challenge
- 4 In relation to the gut–brain axis, the term bidirectional relates to:
- A two-way communication between the brain and the somatic nervous system.
 - B the way two sets of information can travel in different subdivisions of the nervous system.
 - C two-way communication between the brain and the gastrointestinal tract.
 - D the ability for the brain to be influenced by the health of the gut.
- 5 Darwin has just been fired from his job as a chef and is worried he will not be able to afford to pay his rent. Which of the following is not an example of an approach coping strategy that he could use to manage his stress?
- A Reach out to his family members for some temporary financial assistance.
 - B Reflect on his happiest memories from when he first became a chef.
 - C Research TAFE courses to gain a new qualification to find another job.
 - D Create a weekly budget to limit any unnecessary spending.

Short answer

- 6 Contrast the roles of adrenaline and cortisol in the stress response.

- 7 Kipo has arrived home to find that someone has broken into his house. According to Lazarus and Folkman’s Transactional Model of Stress and Coping, describe one primary appraisal he might make in this situation.

- 8 Dom has been admitted to hospital as he is experiencing chronic fatigue. Identify which stage of Selye’s General Adaptation Syndrome he would likely be in and justify your choice.

- 9 Define the term “gut dysbiosis” and identify one factor that can contribute to a person experiencing gut dysbiosis.

- 10 Using an example, demonstrate how the terms “coping flexibility” and “context-specific effectiveness” can relate to each other.

CASE CRACKER 3

KEY SCIENCE SKILL: Analyse, evaluate and communicate scientific ideas

Exploring ways to harness stress for success**The secret to success may be stress!**

Experiencing stress is inescapable in our modern lifestyles. While chronic stress can have negative impacts on your wellbeing, short bursts of acute stress in a controlled manner can be beneficial. For VCE students, being able to harness the benefits of stress may, in fact, improve performance at school and beyond. So, what are some of the benefits of acute stress?

Improved cognitive performance

Compared to what you might think, research has shown that moderate levels of stress can enhance cognitive performance. When the stress response is triggered, a combination of hormones including cortisol are produced, which have been shown to boost focus and can lead to a temporary surge in mental alertness. So, for students, feeling that burst of stress before undertaking an assessment task or presentation may actually be beneficial!

Increased motivation and productivity

Harnessing bursts of stress can help individuals to achieve their goals. In the face of a moderately challenging task, a surge of focus and determination can help a person perform more effectively than they otherwise might. This optimal level of stress can help athletes to break personal records, inspire artists to create new material, or help students achieve success in their studies.

Resilience building

When managed effectively, stress can result in personal growth and development of resilience. When faced with challenging situations, a person will learn to problem-solve, adapt and bounce back from adversity. As a person learns to navigate stressful circumstances, they can develop greater self-belief and foster a positive mindset, which will help them to overcome future challenges. As students are faced with increasing challenges throughout their final years of school, learning ways to manage and adapt in these circumstances can set them up to continue to succeed later in life.



FIGURE 1 Short bursts of stress can actually increase success and wellbeing.

- 1 The article refers to the stress response. Identify which subdivision of the nervous system is activated during this response.

- 2 The article states that the release of cortisol can improve cognitive performance when a person is stressed. Describe another role of cortisol when someone is experiencing stress.

- 3 An athlete is feeling motivated about an upcoming competition. Describe a potential primary and secondary appraisal they might experience according to Lazarus and Folkman's Transactional Model of Stress and Coping.

- 4 For a student who is feeling stressed about the challenges of VCE, suggest one potential approach strategy and one potential avoidance strategy that they may use to help them cope with their situation.



FIGURE 2 Stress can help inspire artists to create new material!

DATA DRILL 3

KEY SCIENCE SKILLS: Plan and conduct investigations; Analyse and evaluate data and investigation methods; Construct evidence-based arguments and draw conclusions

Analysing and evaluating data about sleep and stress

Dr Hubert conducted research to investigate whether the amount a person sleeps influences their stress levels the following day. He recruited 20 participants who recorded the number of hours of sleep they had, using a mobile app. At the end of the following day, they rated their levels of stress using a 10-point Likert scale, where 1 was a very low stress rating and 10 was extremely high levels of stress. The data obtained is shown in Figure 3.

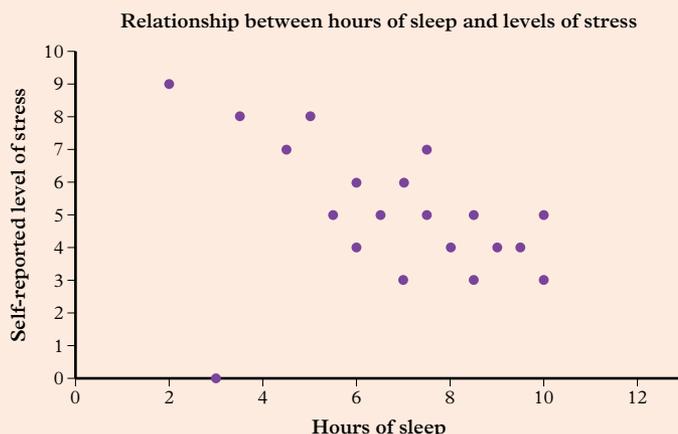


FIGURE 3 The relationship between hours of sleep and self-reported stress levels.

1 Identify the scientific investigation methodology used in Dr Hubert’s research. Justify your choice.

2 Describe the type of relationship that can be seen between hours of sleep and stress levels.

3 Identify any outliers in the data and explain what impact they would have on the validity of the research.

4 Evaluate one strength and one weakness of using a Likert scale to collect data in this research.

5 Suggest one modification Dr Hubert could make to his data collection methods to improve the certainty in the data obtained.

INVESTIGATION INSPECTOR 3

KEY SCIENCE SKILLS: Plan and conduct investigations; Generate, collate and record data; Analyse and evaluate data and investigation methods

Testing your stress

Go online and complete this simple stress test, based on your thoughts and feelings over the past month:

<https://www.bemindfulonline.com/test-your-stress>



FIGURE 4 What is your level of stress?

Once you have completed the test, record your stress score: _____

- 1 Identify whether this stress test recorded primary or secondary data that was objective or subjective in nature. Justify your answer.

- 2 Discuss the benefits and limitations of collecting data about a person's level of stress using a self-report method as used in this online test.

- 3 Suggest a different research methodology that could be used to gather data about a person's levels of stress over a 1-month period.

- 4 If the same person completed this online stress test three times over three consecutive days and received stress level scores of 5, 35 and 10, comment on the precision of these measurements.

RESEARCH REVIEW 3

KEY SCIENCE SKILL: Develop aims and questions, formulate hypotheses and make predictions

Understanding the connection between extraneous variables, controlled variables and internal validity

If a researcher fails to identify extraneous variables when planning an investigation, they might mistakenly attribute changes in the dependent variable to the independent variable, when the changes could be due to the influence of these extraneous variables. This creates uncertainty in the data and reduces the internal validity of the investigation.

Therefore, it is important that a researcher tries to identify and minimise the potential impact of any extraneous variables before undertaking their investigation. This can be achieved by keeping any other variables consistent throughout the investigation, known as controlled variables.

Avanishika is a Year 12 Psychology student who is undertaking her Unit 4 student investigation. She has formed the following research question: “What effect does daily mindfulness have on students’ stress levels?”



FIGURE 6 What effect does daily mindfulness have on students’ stress levels?

1 Write an aim for Avanishika’s investigation.

2 Identify the independent variable in Avanishika’s investigation and explain how she could manipulate this variable in a controlled experiment using a between-subjects design.

3 Identify the dependent variable in Avanishika’s investigation and describe how she could measure this variable in her investigation.

4 Identify two potential extraneous variables that may influence Avanishika’s research.

5 Describe how each of the variables you have identified in question 4 could be turned into controlled variables in Avanishika’s investigation.

Approaches to understand learning

Behaviourist approach to learning

Behaviourist approaches refer to learning that occurs through an interaction with the environment. Classical conditioning is a behaviourist approach that involves learnt associations between two or more stimuli to produce a conditioned response; for example, when a dog gets excited upon seeing its lead. This occurs because the dog has learnt an association between the lead (a previously neutral stimulus) and going on a walk (unconditioned stimulus), which makes the dog feel happy and excited (unconditioned response).

Operant conditioning is a different behaviourist approach to learning that involves a learnt behaviour based on the consequence it receives. If a behaviour receives a positive consequence, such as a child being given pocket money for cleaning their room, then it is more likely this behaviour will be repeated in the future. On the other hand, if a behaviour is followed by a negative consequence—for example, a child is given time out for not cleaning up their room—this will discourage the behaviour to be repeated again.

Social-cognitive approach to learning

Social-cognitive approaches emphasise the importance of learners engaging with and retaining information in social contexts. This process is shown through observational learning, in which a learner observes a behaviour, retains this information, and then attempts to reproduce this behaviour themselves. A learner must be motivated for learning to occur and if their behaviour is positively reinforced, they are likely to repeat this behaviour again.

Aboriginal and Torres Strait Islander peoples' ways of knowing

Aboriginal and Torres Strait Islander peoples often learn and share knowledge and skills in ways that can be different from Western cultures. Learning is generally viewed in a more holistic way and involves connection to Country. This encompasses the spiritual, living, emotional and intellectual connections tied to that land. For many Aboriginal and Torres Strait Islander peoples, learning can occur in a variety of forms, such as through Story Sharing or Symbols, and a learner is viewed within a larger system of knowledge. Relationships are critical in this process, as knowledge is shared among various members of the community. This contributes to a holistic knowledge system that has developed over thousands of years.

CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
define learning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 4.1 Pages 154–156
describe classical conditioning as a three-phase process, with reference to Pavlov’s research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 4.2 Pages 157–162
describe operant conditioning as a three-phase process involving reinforcement and punishment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 4.3 Pages 163–168
describe observational learning as a process involving attention, retention, reproduction, motivation and reinforcement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 4.4 Pages 169–174
describe Aboriginal and Torres Strait Islander peoples’ ways of knowing, including the 8 Ways of Learning framework	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 4.5 Pages 175–179
contrast behaviourist approaches to learning, social-cognitive approaches to learning and approaches to learning that situate the learner within a system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 4.5 Pages 175–179

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GROUNDWORK 4

Multiple choice

- Which of the following statements best defines “learning”?
 - Learning is a change in behaviour that can only occur intentionally.
 - Some types of learning are specific to certain species of animals only.
 - Learning is a lasting change in behaviour that occurs as a result of prior experience.
 - Learning will not occur unless the learner is motivated to want to learn.
- An important difference between negative reinforcement and punishment is that negative reinforcement _____ a response, whereas a punishment _____ a response.
 - strengthens; weakens
 - always involves an unpleasant consequence for; does not necessarily elicit
 - weakens; strengthens
 - always involves a pleasant consequence for; always elicits
- According to the three-phase process of operant conditioning, if you have taught a dog to sit at the sound of the bell, the dog hearing the bell would be:
 - the consequence.
 - the behaviour.
 - the antecedent.
 - the conditioned stimulus.
- The second stage of observational learning involves:
 - paying attention to the model who is demonstrating a behaviour.
 - having the necessary skills to reproduce a behaviour.
 - feeling interested in trying to learn a new behaviour.
 - retaining a mental representation of the observed behaviour.

- 5 In First Nations cultures, learning typically occurs in a _____ manner and is less _____ compared to approaches to learning in Western cultures.
- A written; verbal
 - B holistic; segmented
 - C social; comprehensive
 - D holistic; connected

Short answer

- 6 Describe what a multimodal system of knowledge means in relation to Aboriginal and Torres Strait Islander peoples' approaches to learning.

- 7 Explain why feeling excited when you hear the music from an ice-cream truck is an example of learning that has occurred through classical conditioning and not operant conditioning.

- 8 Margaret has learnt that she will only be allowed to eat dessert if she eats all the vegetables on her dinner plate. According to the three-phase model of operant conditioning, explain how Margaret has learnt this behaviour.

- 9 Neda is watching a YouTube tutorial that demonstrates how to braid hair. Outline how the stages of reproduction and motivation in the observational learning model would apply to Neda as she tries to braid her own hair.

- 10 Compare observational learning to Aboriginal and Torres Strait Islander ways of knowing.

CASE CRACKER 4

KEY SCIENCE SKILL: Analyse, evaluate and communicate scientific ideas

Investigating how understanding of learning is used in advertisements

Advertisements skilfully incorporate elements of various learning models to promote products, services or ideas. One prevalent technique is the use of classical conditioning, where ads create positive associations and desired emotional responses (e.g. excitement or intrigue) towards a brand. By pairing a neutral stimulus (e.g. a logo or product) with an unconditioned stimulus (e.g. a celebrity or humour), advertisers condition buyers to connect their brand or product with positive emotions.

Advertisers also frequently employ elements of observational learning to influence consumer behaviour. For example, in road-safety ads, viewers observe the often graphic or emotional consequences of unsafe road behaviours being modelled. Advertisers vicariously condition the viewer, so they do not imitate these unsafe behaviours. This leverages observational learning to shape attitudes and behaviours related to responsible driving.

1 Outline how Figure 1a attempts to classically condition the viewer to feel positively about the car company.



FIGURE 1 **a** A group of people looking happy and having a good time as they travel in their car. **b** Graphic imagery is used in road safety ads to deter drivers from unsafe behaviours such as texting while driving.

2 Figure 1b shows the consequences of unsafe driving. Evaluate how effective the image would be at discouraging unsafe driving. In your response, use an example to explain how observational learning could be incorporated into the advertisement to make it more effective.

3 Vicarious conditioning involves observing someone else's behaviour being reinforced or punished, and thereby adjusting your own behaviour based on this consequence. Describe how vicarious conditioning applies in road safety ads.

DATA DRILL 4**KEY SCIENCE SKILLS:** Analyse and evaluate data and investigation methods; Construct evidence-based arguments and draw conclusions**Analysing data about role models and aggressive behaviour**

Joe wanted to find out whether children today would still imitate live role models, given the impact of social media. Joe modified the classic study by Bandura et al. (1961) by measuring only imitative aggressive behaviours. He recruited both male and female adult role models. Joe then went to a local day care centre where he gained parental consent to study 30 boys and girls aged 4 to 6 years old. His results are shown in Table 1.

TABLE 1 Mean aggression scores for experimental and control participants

Participant response	Experimental group				Control group
	Aggressive role models		Non-aggressive role models		
	Female	Male	Female	Male	
Imitative physical aggression					
Female	11.9	3.0	3.5	0	1.8
Male	7.2	15.8	1.2	2	3.9
Imitative verbal aggression					
Female	17.2	3.0	0.1	0	1.1
Male	5.9	11.2	1.4	0	2.7
Hammer aggression					
Female	13.2	15.5	0.8	0.8	11.2
Male	16.9	32.7	17.3	4.9	13.3
Punches bobo doll					
Female	7.3	17.5	5.2	3.2	9.7
Male	19.8	13.3	17.3	19.8	13.8

- 1 Compare the imitative physical aggression scores for males in the aggressive condition to those in the non-aggressive condition. Explain what the results suggest about modelling.

- 2 Compare the verbal aggressive scores in the aggressive condition of females to males. Draw a conclusion about who is more verbally aggressive.

- 3 Describe what the statistics suggest about same-sex role models.

INVESTIGATION INSPECTOR 4

KEY SCIENCE SKILLS: Plan and conduct investigations; Analyse and evaluate data and investigation methods

Using classical conditioning to treat bedwetting

Classical conditioning can be used to treat bedwetting. A study investigated participants with a condition called enuresis (persistent involuntary discharge of urine, when in bed or on clothing, after the age when bladder control is expected).

Two hundred participants between the ages of 5 and 9 years old were gathered. Participants were divided into two groups of 100 each; one group would receive 3 months of treatment, and the other group would not receive any treatment.

Researchers decided to use the sound of a buzzer as the unconditioned stimulus (UCS) that awakens a sleeping child when urine hits a pad underneath them. The sound of the buzzer would soon be paired with the sensation of a full bladder. The researchers reasoned that after a series of such paired presentations, the response of waking up (at first, only triggered by the buzzer) should begin to occur in response to stimulation from a full bladder. They predicted that the child would go to the toilet instead of wetting the bed while asleep.

In the non-treatment group, the results were as follows:

- 60 participants wet the bed on more than 75 per cent of nights.
- 27 wet the bed between 50 and 75 per cent of the time.
- 13 wet the bed less than 50 per cent of the time.

In the treatment group, the results were as follows:

- 48 participants never wet the bed on any night.
- 14 participants wet the bed less than 10 per cent of nights.
- 18 participants wet the bed between 10 and 20 per cent of nights.
- 20 wet the bed 20 per cent or more of nights.

1 Identify the scientific investigation methodology and research design used by the researchers.

2 Identify one strength and one limitation of the sample that the researchers used in this research.

3 Propose two modifications for this experiment and outline how these modifications would extend or improve the research.



FIGURE 2 Classical conditioning could help save you from having to do some extra washing! This work must not be reproduced, stored, transmitted or circulated in any other form.

EVALUATING ETHICS 4

KEY SCIENCE SKILLS: Comply with safety and ethical guidelines; Analyse, evaluate and communicate scientific ideas

Exploring ethical breaches in research on Little Albert

In 1920, John B. Watson and his colleague Rosalie Rayner aimed to investigate the acquisition of phobias through classical conditioning. The study involved a 9-month-old infant referred to as Albert. Initially, Albert showed no fear of a white rat or similar objects. However, the researchers paired the presentation of the rat with a loud noise, which frightened Albert.

Over time, Albert began to exhibit fear and distress when presented with the rat alone, as well as with other white, furry objects. This demonstrated that a conditioned emotional response (fear) could be elicited through the pairing of a neutral stimulus (rat) with an aversive stimulus (loud noise).

The Little Albert investigation raised ethical concerns due to the potential psychological harm inflicted on the child and the lack of informed consent from Albert's mother. The long-term effects on Albert remain unknown; the study was ended prematurely as Albert and his mother were believed to have moved away suddenly.



FIGURE 3 In the Little Albert experiment, a rat acted as the neutral stimulus.

- 1 Identify which ethical guideline was not followed after conditioning Little Albert's fear, and describe what should have occurred during this process.

- 2 Define the term "non-maleficence". Describe how this was breached in the investigation.

- 3 Based on the information provided about the investigation, critically evaluate the claim that "the Little Albert experiment only damaged the reputation of psychology".

Study tip

Students need to understand the difference between ethical concepts and ethical guidelines in VCE Psychology. Ethical concepts are more general in nature and include beneficence, respect, non-maleficence, integrity and justice. Ethical guidelines relate to protecting the rights of participants in research including voluntary participation, informed consent, confidentiality, withdrawal rights, use of deception and debriefing.

RESEARCH REVIEW 4

KEY SCIENCE SKILL: Plan and conduct investigations

Using different investigation methodologies to study operant conditioning

When undertaking a scientific investigation in VCE Psychology, there are several different investigation methodologies that can be used. To review these methodologies, refer to Topic 1.3 in your Student Book.

Consider how each of the scientific methodologies listed below could be used to conduct research on operant conditioning. Write a short summary of the key elements that would be included for each methodology. Some examples have been provided for you.

Methodology	Description	How it can be used to research operant conditioning
Case study	Investigating a specific event, activity or problem	
Classification and identification		Classify the types of consequences that teachers use in their class as either positive or negative reinforcements or punishments.
Controlled experiment		
Correlational study		
Fieldwork		Visit an office workplace and observe the types of reinforcements or punishments employed by managers and the effect this has on their workers' behaviours.
Literature review	Researching, gathering and interpreting secondary sources to answer a research question	
Modelling		
Product, process or system development		
Simulation		Using technology, simulate how much money the government could save on health care if they rewarded adults for engaging in daily exercise and physical activity.

The psychobiological process of memory

Memory storage and retrieval

Atkinson and Shiffrin described human memory as a multi-store model. Information is received through sensory memory, and if you pay attention to it, the information enters short-term memory where you become consciously aware of it. If rehearsed, this information can then be transferred into long-term memory for storage, where it will likely remain until the information is needed again and retrieved.

Not all long-term memories are stored within the same regions of the brain. Different types of long-term memories are processed in and distributed to various regions. The hippocampus and neocortex work together to consolidate and then store explicit long-term memories. The amygdala processes the implicit, emotional content in a memory. The cerebellum and basal ganglia are both involved in the processing and storage of implicit procedural memories.

Autobiographical memories and imagined futures

When we retrieve autobiographical memories – memories of our own lives – we draw on both our semantic memory (memory of facts and general knowledge) and episodic memory (memory of personally experienced events). When we imagine possible future scenarios, we seem to use these similar aspects from our long-term memory.

When a person suffers from Alzheimer's disease, which initially causes neuronal death in brain regions specifically involved in memory, their autobiographical memories and episodic future-thinking abilities decline. People with aphantasia are not able to visualise imagery in their minds. This also appears to affect their autobiographical memories and ability to imagine possible future scenarios. They struggle to visualise previous experiences from their lives. This indicates that similar regions of the brain are used in both our autobiographical memories and our ability to construct imagined futures.

Improving memory with mnemonics

Mnemonic devices are tools that can be used to improve our ability to remember information. In Western written cultures, some common examples include using acronyms, acrostics and the method of loci. These techniques enhance the encoding and rehearsal of information into our long-term memory, and provide additional cues that aid in information retrieval.

In oral cultures, different types of mnemonics are used to enhance memory. A specific example is the use of Songlines by many Aboriginal and Torres Strait Islander peoples. Songlines can include sung narratives that connect physical locations of Country, each with its own significance. Songlines explain the journey of Ancestral Beings throughout history as they travelled across Country, and use songs and music to connect information within the narrative. This enhances the ability to recall a large amount of detailed cultural information.

CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
describe the Atkinson-Shiffrin multi-store model of memory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 5.1 Pages 186–194
contrast sensory, short-term and long-term memory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 5.1 Pages 186–194
discuss the explanatory power of the multi-store model of memory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 5.1 Pages 186–194
contrast long-term implicit memory (procedural and classically conditioned memory) and explicit memory (semantic and episodic memory)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 5.1 Pages 186–194
describe the role of the different regions of the brain in memory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 5.2 Pages 195–203
explain how autobiographical events are reconstructed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 5.3 Pages 204–213
describe the role of episodic and semantic memory in the construction of imagined futures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 5.3 Pages 204–213
explain how the retrieval of episodic and semantic memory is altered in Alzheimer’s disease and aphantasia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 5.3 Pages 204–213
explain how mnemonic devices are used in written cultures, including acronyms, acrostics and the method of loci	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 5.4 Pages 214–221
explain how mnemonic devices are used in oral cultures, including sung narrative and Songlines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 5.4 Pages 214–221

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FIGURE 1 Wouldn't it be handy if you could improve the memory of your brain by inserting a memory card?

GROUNDWORK 5

Multiple choice

- Which of the following is true of short-term memory (STM)?
 - People can hold no more than nine pieces of information in STM.
 - STM receives information from both sensory memory and long-term memory.
 - STM can hold information for 0.3 to 4 seconds.
 - Information cannot be lost from STM.
- Identify the part of the brain that consolidates explicit long-term memories.
 - Amygdala
 - Neocortex
 - Cerebellum
 - Hippocampus
- Which type of long-term memory is a person using when they recall how to rollerskate after many years?
 - Procedural memory
 - Semantic memory
 - Classically conditioned memory
 - Episodic memory
- Retrieval of autobiographical memories involves:
 - episodic and procedural memories.
 - episodic and semantic memories.
 - semantic and procedural memories.
 - semantic and classically conditioned memories.
- The term ANZAC (Australian and New Zealand Army Corps) is an example of:
 - an acronym.
 - an acrostic.
 - applying the method of loci.
 - applying maintenance rehearsal.

Short answer

- 6 Define the term “rehearsal” in relation to memory.

- 7 Contrast the roles of the neocortex and amygdala in memory.

- 8 Describe how a person would use semantic memory when they imagine themselves visiting New York in the future.

- 9 Describe one difference between neurofibrillary tangles and amyloid plaques, which occur in the brain of a person with Alzheimer’s disease.

- 10 Describe one similarity between the use of Songlines and the method of loci.

CASE CRACKER 5**KEY SCIENCE SKILL:** Analyse, evaluate and communicate scientific ideas**Exploring superior autobiographical memory**

Superior autobiographical memory (SAM) refers to an extraordinary memory ability in which individuals can recall specific details of their personal experiences with exceptional accuracy and vividness. While most people can remember only a few vivid memories from their childhood, people with SAM possess the ability to remember specific dates, events and even minute details from their past with remarkable clarity. People with SAM often describe their memories as involuntary and automatic, with the ability to mentally “replay” past events as if reliving them.

SAM was first identified and studied by researchers in the early 2000s. These individuals have been extensively tested and verified through rigorous memory assessments. The ability appears to be innate, although the underlying mechanisms and neurological basis are not yet fully understood.

Research on SAM has shed light on the unique cognitive processes and neural structures involved in autobiographical memory. However, it remains a relatively rare phenomenon, with estimates suggesting that only a small number of individuals worldwide possess this ability.



FIGURE 2 Unlike people who experience SAM, most people do not have such vivid memories of almost all moments of their life.

- 1 Explain why conducting research on individual experiences with SAM would be characterised as a case study rather than a controlled experiment.

- 2 Using your understanding of brain regions associated with long-term memories, suggest which area(s) of the brain could exhibit heightened functionality in individuals with SAM compared to those without it. Explain your response.

- 3 Propose a potential implication of investigating SAM and the activity within the brain of people with SAM.

DATA DRILL 5**KEY SCIENCE SKILLS:** Analyse and evaluate data and investigation methods; Construct evidence-based arguments and draw conclusions**Processing data about memory recall**

A study was conducted by Dr Campbell to investigate whether seeing images or the name of an object improved the ability to remember these objects. Dr Campbell hypothesised that visually seeing the objects would improve recall compared to viewing the object names. A simple between-subjects experiment was conducted where participants were split into two conditions: one group viewed images of 20 common household items, while the other group viewed the names of these same 20 items. Participants were given two minutes to memorise the objects and were then required to write down as many of the objects that they could recall in the following 60 seconds.

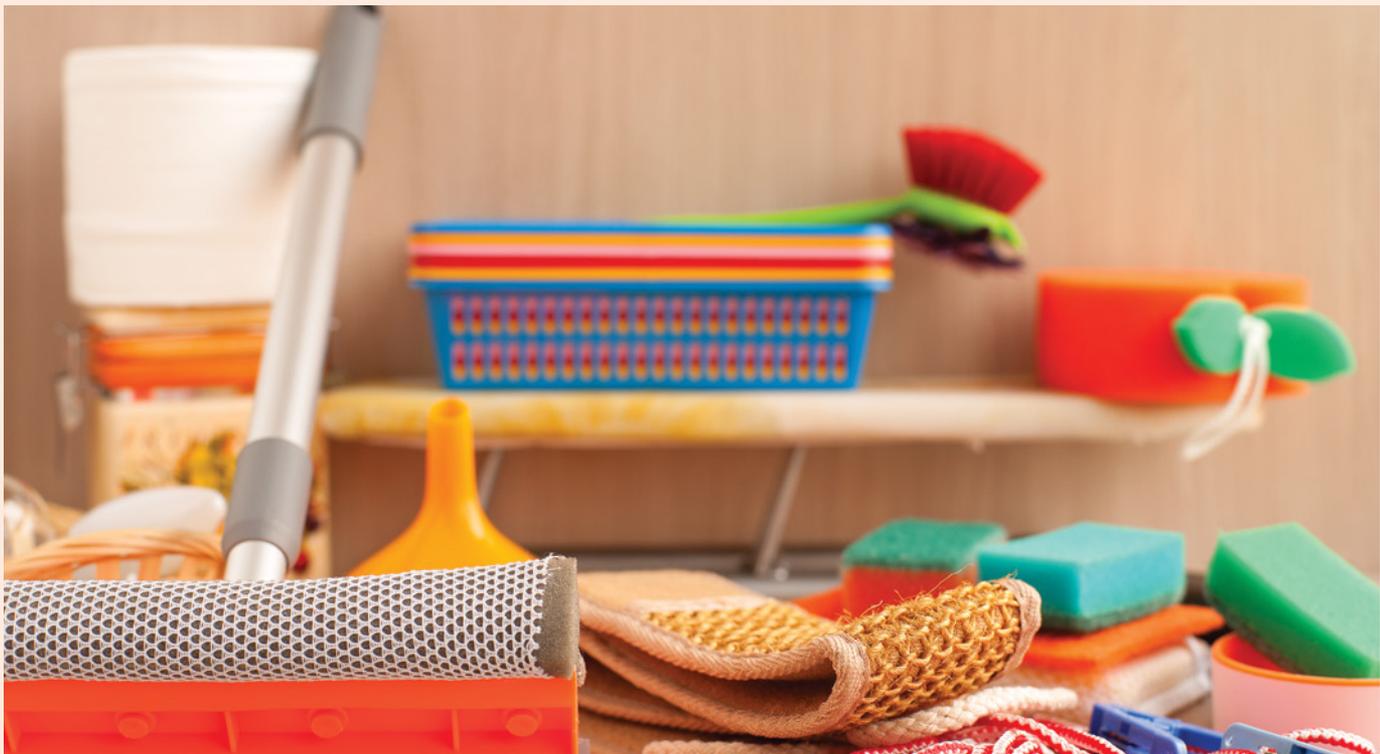
The results of the experiment are shown in Table 1 and Table 2.

TABLE 1 Number of objects recalled when shown visually or in written format

Group 1: Visual images (score out of 20)	Group 2: Written names (score out of 20)
15	8
16	10
14	12
16	9
17	4
12	11
19	12
16	6
5	8
18	7

TABLE 2 Standard deviations for the visual vs written objects conditions

Group 1: Visual images	Group 2: Written names
3.7	2.6

**FIGURE 3** Subjects were shown images of 20 common household items.

- 1 For each test condition, calculate the following measures of central tendency. Refer to Topic 1.6 in your Student Book to review how to calculate these values.

Measurement	Group 1: Visual images	Group 2: Written names
Mean	_____	_____
Median	_____	_____
Mode	_____	_____

- 2 Identify any outliers in the data from Table 1. Justify your choices.

- 3 Explain why the median would be a more appropriate measure of central tendency for group 1, rather than the mean.

- 4 Compare the standard deviations across the two groups and explain how this value influences the validity of the results.

- 5 Explain whether the data supports or refutes Dr Campbell's initial hypothesis.

INVESTIGATION INSPECTOR 5

KEY SCIENCE SKILLS: Plan and conduct investigations; Analyse and evaluate data and investigation methods; Analyse, evaluate and communicate scientific ideas

Evaluating methods to study memory techniques in written and oral cultures

Reser and colleagues (2021) conducted a study comparing the effectiveness of memory techniques among first-year Monash University medical students. Initially, all participants were given 20 words to memorise in 10 minutes. Then, students were asked to write down as many of the words as they could recall.

Participants were then randomly allocated into one of three groups:

- Group 1 received 30 minutes of instruction on using the memory palace technique (method of loci), a Western mnemonic device.
- Group 2 received 30 minutes of instruction from an Aboriginal educator, learning how to create a narrative by walking through a campus rock garden, where each word from the list was woven into a story that related to elements in the garden. To reinforce the narrative, students physically walked through the garden with the instructor and were encouraged to visualise this experience when recalling the words.
- Group 3 received no memory technique instruction.

All participants were given another 10 minutes to memorise the words and then had to recall them.

Both memory techniques were found to be effective in improving recall among medical students. The narrative method showed some advantages, particularly in reducing errors when recalling items in order.

1 This investigation has used a mixed design. Describe how between-subjects and within-subjects elements have been used.

2 The investigation used the same list of twenty words in all stages of the experiment. Explain how this may have impacted the validity of the study.

3 The study suggested that “memory techniques based on Indigenous knowledge can be beneficially incorporated into health professions education” (Reser et al., 2021). Describe one limitation of this conclusion and identify further evidence that would be required to overcome this limitation.

EVALUATING ETHICS 5

KEY SCIENCE SKILL: Comply with ethics and safety guidelines

Creating an informed consent sheet

Imagine that you are a researcher who is undertaking an experiment to explore whether writing down or highlighting words helps to improve recall. You will need to consider how you could design your experiment to test this aim and collect data.

One important ethical guideline that must be upheld in psychological research is informed consent procedures.



FIGURE 4 Think about the potential risks that an investigation about ways to improve memory recall could have.

The following description on informed consent is provided in the VCE Psychology Study Design:

Ensure participants understand the nature and purpose of the experiment, including potential risks (both physical and psychological), before agreeing to participate in the study. Voluntary written consent should be obtained by the experimenter and if participants are unable to give this consent, then a parent or legal guardian should provide this.

Source: *VCE Psychology Study Design 2023–2027*

Fill in the following template to create an informed consent sheet that could be given to potential participants to correctly uphold informed consent processes.

Study information (Provide a concise and clear overview of the study, including its purpose and duration.)

Voluntary participation and confidentiality (Outline how these ethical guidelines will be upheld for participants in your study.)

Potential risks and benefits (Disclose any known or potential risks as well as any potential benefits that may arise from the study.)

Contact information (Provide contact details of the researchers or a designated point of contact whom participants can reach out to for further information or to address any concerns or questions.)

Participant rights (Explicitly state any other ethical guidelines that have not been covered.)

Consent statement (Include a clear statement where participants indicate their voluntary agreement to participate by signing and dating.)

RESEARCH REVIEW 5

KEY SCIENCE SKILLS: Generate, collate and record data; Analyse and evaluate data and investigation methods; Construct evidence-based arguments and draw conclusions

Evaluating a test to measure short-term memory capacity

Access this website: <https://faculty.washington.edu/chudler/stm0.html>

Follow the instructions on the webpage to complete an online test of short-term memory capacity. Record your responses for each trial in the column labelled “The letters I remember” in the table below. Once you have completed the test, you can click to view the test answers and use this information to complete the remaining columns provided in the table to complete the questions.

Trial	The letters I remember	Number of letters correctly recalled	Letters correctly recalled (%)	Change between each trial (%)
1				N/A
2				
3				
4				
5				
6				

- Ask a peer to complete the same test and record their results. Compare your data with theirs and describe any similarities or differences.

- If you completed this exact same test multiple times yourself and obtained similar results, identify whether this would demonstrate repeatability or reproducibility. Justify your response.

- If the test could be completed multiple times but with different letters used each time, this could help to ensure that the results are robust. Explain what this means.

- Research has shown that, on average, people can hold five to nine individual pieces of information in their short-term memory at one time. Explain whether your results support their research. If not, suggest one possible explanation for your results.

Study tip

If the measurement value has increased, then the percentage change will be a positive number. If the measurement value has decreased, then the percentage change will be a negative number.

UNIT 3 PRACTICE EXAM QUESTIONS**Multiple choice (15 marks)**

- 1 Which of the following correctly identifies the role of a presynaptic neuron?
 - A It receives an electrical message.
 - B It stores action potentials.
 - C It releases a chemical message into the synapse.
 - D It releases an electrical message into the synapse.
- 2 What is one difference between LTP and LTD?
 - A LTD is long-lasting, whereas LTP is only temporary.
 - B LTP results in more efficient communication between neurons, whereas LTD weakens communication between synaptic connections.
 - C LTP involves inhibitory neurotransmitters, whereas LTD involves excitatory neurotransmitters.
 - D LTP results in less efficient communication between neurons, whereas LTD enhances communication between synaptic connections.
- 3 A researcher wants to study the acute stress response of a person who becomes scared by a loud siren. Which of the following physiological responses could they expect to observe?
 - A Adrenaline will be released and perspiration will increase.
 - B Pupils will constrict and the person's heart rate will elevate.
 - C Digestion will decrease and the person's bladder will contract.
 - D Digestion will increase and adrenaline will be produced.
- 4 Jack is unable to concentrate in class because he will be completing his driver's licence test that afternoon and he is worried that he will fail. According to Lazarus and Folkman's Transaction Model of Stress and Coping, which of the following primary appraisals is Jack most likely experiencing?
 - A Stressful challenge
 - B Stressful harm/loss
 - C Benign/positive
 - D Stressful threat
- 5 Dr Cao wishes to study the effect of different probiotic supplements on stress levels in adults. Which of the following scientific investigation methodologies would be most appropriate?
 - A Case study
 - B Literature review
 - C Controlled experiment
 - D Simulation
- 6 Penelope has been classically conditioned to flinch when she sees lightning during a thunderstorm. In this case:
 - A lightning is a CS that causes the CR of flinching to lightning.
 - B lightning is an UCS that causes the CR of flinching.
 - C lightning is an UCS that has repeatedly been paired with loud thunder (NS), causing Penelope to flinch in response.
 - D lightning is a NS that has been paired with the UCS of flinching multiple times during a thunderstorm.
- 7 Simon arrives late to football training, so his coach makes him run two laps of the oval. This consequence can be described as:
 - A negative punishment; Simon is receiving something undesired, which will weaken his behaviour of arriving late to training in the future.
 - B negative punishment; Simon is having something desired removed from him, which will weaken his behaviour of arriving late to training in the future.
 - C positive punishment; Simon is having something desired removed from him, which will weaken his behaviour of arriving late to training in the future.
 - D positive punishment; Simon is receiving something undesired, which will weaken his behaviour of arriving late to training in the future.

- 8** One key difference between observational learning and Aboriginal and Torres Strait Islander ways of knowing is:
- A** ways of knowing involves observing a model, while observational learning does not.
 - B** ways of knowing is more segmented, whereas observational learning is a more holistic approach to learning.
 - C** ways of knowing can be learnt through a variety of different formats, whereas observational learning always involves observing and replicating a model's behaviour.
 - D** ways of knowing involves storing a mental representation of a behaviour, whereas observational learning does not require this.
- 9** When a person imagines themselves getting a promotion at work in the future, which types of long-term memories do they draw on to imagine this possible future scenario?
- A** Semantic and procedural memories
 - B** Semantic and classically conditioned emotional memories
 - C** Episodic and classically conditioned emotional memories
 - D** Episodic and semantic memories
- 11** Clarissa hopes to examine her sensory memory. She finds a test online in which a series of letters flash onto her computer screen for 3 seconds, then disappear, and Clarissa is then prompted to write down as many letters as she can remember. After Clarissa completes the test for the first time, she is unsatisfied with the result, so she tries again.
- Which of the following could be a possible extraneous variable?
- A** The sets of letters used in the test are not randomised each time.
 - B** The webpage lags due to Clarissa's unstable internet connection.
 - C** The letters on the webpage are too small to see.
 - D** The test is only valid if completed once.
- 10** Which of the following correctly describes the types of memory Clarissa will be using in this scenario?
- A** Clarissa's sensory memory will initially receive the auditory information as her brother speaks, and use elaborative rehearsal. This information will transfer to her short-term memory where she will become consciously aware of what her brother is saying.
 - B** Clarissa's sensory memory will initially receive the auditory information as her brother speaks. As she pays attention to this information, it will transfer to her short-term memory, where she will become consciously aware of what her brother is saying.
 - C** Clarissa will retrieve information from her long-term memory about phones and transfer this to her sensory memory to be combined with the new information she hears as her brother tells the story.
 - D** Clarissa's sensory memory will initially receive the auditory information as her brother speaks, but she will lose this information due to the limited capacity of sensory memory if there are other sounds in the room.
- 12** When Nurul is asked to imagine an apple in her mind, she cannot visualise an image but can think of information such as "It is a round fruit that is typically red or green". Which of the following conditions does Nurul likely experience?
- A** Synaesthesia
 - B** Aphantasia
 - C** Amnesia
 - D** Short-term memory loss

Use the following information to answer questions 10 and 11.

Clarissa is listening to her brother tell a story about how he lost his phone at school.

Use the following information to answer questions 13 to 15.

A neuropsychologist, Hannah, is undertaking a case study on one of her patients, who has significant degeneration of both hippocampi.

- 13** Which of the following best describes why a case study is appropriate to study the effect of hippocampal damage on long-term memory?
- A** Long-term memory must be studied over a prolonged period of time, and this is not always viable.
 - B** It is unethical to induce hippocampal damage to an individual as part of an investigation.
 - C** Significant degeneration of both hippocampi is rare.
 - D** Using a case study helps Hannah adhere to the ethical concept of beneficence.

- 14** Which of the following is a limitation of this investigation methodology?
- A** Hannah will not be able to gather detailed qualitative data.
 - B** Hannah will not be able to gather primary data.
 - C** Hannah will not be able to make any predictions as she only has one participant.
 - D** Hannah will not be able to generalise her findings to the wider general population.
- 15** Table 1 shows the performance of Hannah's patient in three different memory-based tasks.

TABLE 1 Results from a recall test

Recall topic	Successful or unsuccessful
What they ate for breakfast	Unsuccessful
The date of their brother's birthday	Unsuccessful
How to tie a shoelace	Successful
How to write their full name	Successful
The ingredients required to bake a cake	Unsuccessful
What they should pack in their bag during the rainy season	Successful

Which of the following is a possible inference drawn from the data?

- A** Damage to the patient's hippocampi has resulted in poor retrieval of procedural memories.
- B** Damage to the patient's hippocampi has likely impacted their ability to consolidate explicit components of their memory, resulting in poor retrieval of explicit memories.
- C** The patient's ability to use their explicit memory is intact while their procedural memory has been impaired due to their hippocampi damage.
- D** The patient's amygdala is also damaged.

Short answer (30 marks)

1 Hirano is an international student who graduated from his university degree 6 months ago. He has been spending hours upon hours of his days over the past 4 months in front of his computer, often missing meals, as he searches for a job. He has not heard back from any employers. One day, he becomes sick with a high fever and goes to visit the doctor. His doctor diagnoses him with glandular fever, advises him to purchase some over-the-counter fever-reducing medications and get plenty of bed rest.

(11 marks)

a Identify one internal stressor and one external stressor and explain how each could be contributing to Hirano's level of stress.

(4 marks)

b Explain, with reference to Selye's General Adaptation Syndrome, why Hirano might have become sick with glandular fever.

(3 marks)

c After Hirano makes a full recovery, he hears back about a job he applied for, and schedules an interview. He begins to feel stressed about the interview. Explain how Hirano can demonstrate high levels of coping flexibility.

(2 marks)

d Hirano is successful at his job interview and is offered a role at the company. He is overjoyed to hear the news. Identify the neurotransmitter involved in promoting the lifting of Hirano's mood and describe one other function of this neurotransmitter.

(2 marks)

2 Rue is a Year 12 VCE Psychology student. Since Year 10, she has developed a habit of procrastinating when she receives an assignment in class. This leads to her waiting until the very last minute to complete the work and leaves her feeling very stressed as she crams her study. Rue wants to do well in VCE Psychology but has noticed the steady decline in her marks, which she realises has something to do with her procrastinating. She decides to develop a study plan for each new assignment she receives and is determined to follow the plans consistently. After 2 months of keeping to her study plan, Rue finds that her marks increase from a B average to an A.

(9 marks)

a With reference to the scenario, explain the role of LTD and LTP in adjusting Rue's habits.

(4 marks)

b Identify the type of conditioning that Rue is applying and justify your choice.

(2 marks)

c In addition to managing her time to complete assignments, Rue builds the regular review of key terms into her study plan. Using key terminology, explain how the key terms are transferred from sensory to long-term memory.

(3 marks)

3 Explain three key elements of Aboriginal and Torres Strait Islander approaches to learning.

(3 marks)

4 A researcher is investigating the influence of consuming fermented foods on stress levels. They conduct a between-subjects controlled experiment with three conditions. The conditions are outlined in Table 2.

TABLE 2 Conditions of the investigation

Condition	Servings of fermented food over 6 weeks
1	No fermented food
2	1 every week
3	3 every week

At the end of each 6-week period, the participants will self-report their perceived stress levels.

(7 marks)

a Explain one benefit of using a between-subjects design compared to a within-subjects design for this investigation.

(2 marks)

b Write an appropriate hypothesis for this investigation.

(3 marks)

c Outline one ethical or safety consideration that the researcher must make and describe an action they could take to address concerns related to it.

(2 marks)

How is mental wellbeing supported and maintained?



FIGURE 1 In Unit 4, you will look at how mental wellbeing can be defined and supported by protective biopsychosocial factors and cultural determinants.

WORD WIZARD

Draw a line to match each term with the correct definition.

A RAPID EYE MOVEMENT SLEEP

B SLEEP-WAKE PATTERN

C SUPRACHIASMATIC NUCLEUS

D MELATONIN

E CIRCADIAN RHYTHM
SLEEP DISORDER

F ZEITGEBER

G MENTAL WELLBEING

H SOCIAL AND EMOTIONAL
WELLBEING FRAMEWORK

I MENTAL WELLBEING CONTINUUM

J SPECIFIC PHOBIA

K COGNITIVE BEHAVIOURAL THERAPY

L SYSTEMATIC DESENSITISATION

M PSYCHOEDUCATION

N CULTURAL CONTINUITY

O SELF-DETERMINATION

- 1 a multidimensional and holistic framework that encapsulates all elements of being (body, mind and emotions, family and kinship, community, culture, country, spirituality and ancestors) and explores their interaction to affect and explain wellbeing from Aboriginal and Torres Strait Islander peoples' perspectives
- 2 a small structure in the brain that regulates the sleep-wake cycle and other biological rhythms; also known as the "body clock"
- 3 an environmental stimulus that helps set or reset the body clock
- 4 a person's overall mental state in terms of how content they are with themselves and their life
- 5 a type of sleep that is characterised by rapid eye movement beneath closed eyelids; also called paradoxical sleep
- 6 a type of anxiety disorder characterised by an intense and persistent fear that is triggered by facing or anticipating a specific stimulus
- 7 a tool used to identify and describe a person's mental wellbeing at any point in time
- 8 a sleep disorder that involves a misalignment of the sleep-wake cycle with circadian times
- 9 the right for people to determine their own political status and to direct their own economic, social and cultural development
- 10 an individual's sleeping schedule in which they alternate between hours of sleep and hours of wakefulness
- 11 the practice, preservation and transfer of cultural traditions and knowledge, which acts as a protective factor for social and emotional wellbeing
- 12 a hormone released from the pineal gland that influences alertness and causes drowsiness to promote the onset and maintenance of sleep
- 13 a behavioural therapy to treat a specific phobia; uses the principles of classical conditioning to counter-condition the phobic response
- 14 educating the person affected by a mental disorder and their support group so each person better understands the condition and treatment options
- 15 a psychological therapy based on the premise that our thoughts influence how we feel and behave; combines both cognitive and behavioural therapies

The demand for sleep

The stages of sleep

Sleep is considered an altered state of consciousness. Your level of awareness decreases as you naturally progress from being awake to being asleep. During sleep, you experience periods of non-rapid eye movement (NREM) sleep – which is further divided into three stages – as well as periods of rapid eye movement (REM) sleep. Each stage is characterised by different brain wave activity, eye movement and body movement. You transition through these stages of sleep in a cyclical manner. Because these cycles occur over a period of less than 24 hours, they are considered an ultradian rhythm.

Measuring sleep

To assess sleep objectively, various measures can be used, including electroencephalography (EEG), electro-oculography (EOG) and electromyography (EMG). An EEG shows your brain activity during different stages of sleep. EMG detects changes in muscle tone and an EOG is able to detect movement in the muscles controlling eye movement.

These objective measures are often complemented by subjective measures of sleep, such as sleep diaries and video monitoring.

Regulation of sleep-wake patterns

The body's internal timekeeper, known as the circadian rhythm or “body clock” governs when you feel tired and want to sleep over a 24-hour period. This sleep-wake cycle is controlled by the suprachiasmatic nucleus (SCN). When it is dark, the SCN signals to the pineal gland to secrete melatonin, a sleep-inducing hormone, to make you feel tired. During the day when it is light, the secretion of melatonin is reduced, promoting wakefulness and alertness.

Sleep across the life span

Sleep needs change considerably across the life span. Newborn babies require the greatest amount of sleep and a large proportion of REM sleep compared to other stages of the life span. As a person ages, their sleep needs and proportion of REM sleep will gradually decline.



CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
explain what a psychological construct is	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.1 Pages 252–260
explain what consciousness is	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.1 Pages 252–260
contrast the key features of normal and altered states of consciousness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.1 Pages 252–260
contrast objective and subjective reporting of sleep	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.2 Pages 261–268
explain how EEG, EMG and EOG work and what they measure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.2 Pages 261–268
explain how sleep diaries and video monitoring work and what they measure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.2 Pages 261–268
interpret and draw conclusions based on a combination of EEG, EMG, EOG, sleep diary and video monitoring data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.2 Pages 261–268
describe the strengths and limitations of objective and subjective reporting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.2 Pages 261–268
evaluate the methods used in specific sleep studies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.2 Pages 261–268
explain what a sleep–wake pattern is	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.3 Pages 269–274
contrast circadian and ultradian rhythms and provide examples of each	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.3 Pages 269–274
explain what an internal biological mechanism is	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.3 Pages 269–274
explain how the suprachiasmatic nucleus regulates circadian and ultradian rhythms, with reference to melatonin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.3 Pages 269–274
describe how total hours of sleep, sleep–wake patterns and proportions of REM and NREM sleep change with age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.4 Pages 275–279
explain why sleep changes with age	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 6.4 Pages 275–279

Source: Adapted from *VCE Psychology Study Design (2023–2027)* reproduced by permission © VCAA

GROUNDWORK 6

Multiple choice

- During which stage of sleep are a person’s muscles most relaxed?
 - N1 sleep
 - N2 sleep
 - N3 sleep
 - REM sleep

- 2 Which of the following statements about sleep is false?
 - A Sleep is considered a naturally occurring state of consciousness.
 - B During sleep, a person's eyes generally remain closed.
 - C During sleep, a person is less aware of their surroundings.
 - D Sleep is a physiological construct that can be directly measured.
- 3 If a baby has slept for 14 hours, which stage of sleep have they likely experienced the most?
 - A REM sleep
 - B N1 sleep
 - C N2 sleep
 - D N3 sleep
- 4 Which of the following processes occurs first?
 - A Light intensity is detected by the pineal gland.
 - B The SCN signals the release of melatonin.
 - C Melatonin is secreted by the pineal gland.
 - D Light intensity is detected by the SCN.
- 5 Dr Mara wants to confirm whether the participant in her sleep study is experiencing N3 or REM sleep. Which of the following could she investigate?
 - A Brain activity using EMG
 - B Eye movement using EOG
 - C Muscle movement using EEG
 - D Body movement using video monitoring

Short answer

- 6 Explain why sleep aligns to both ultradian and circadian rhythms.

- 7 Describe how brain wave patterns change as a person progresses from N1 sleep through to N3 sleep, in terms of amplitude and frequency.

- 8 Compare the use of EMG and EOG to measure sleep.

- 9 Roger is an 88-year-old man. Briefly describe what his sleep patterns may be like during this stage of the life span.

- 10 Explain how the SCN and the pineal gland interact to control the human sleep-wake cycle.

CASE CRACKER 6**KEY SCIENCE SKILL:** Analyse, evaluate and communicate scientific ideas**Exploring theories around the purpose of sleep**

Sleep is a fundamental aspect of human life; every single person needs sleep to survive. The amount of time humans spend sleeping is also considerably high. In fact, research suggests that a typical adult has spent approximately one-third of their life asleep. This indicates that sleep is vital; however, the exact reason as to why sleep is so important is still debated. There are a number of theories about the purpose of sleep.

The most accepted theory of sleep is the restorative theory. This states that sleep is essential for physical and mental restoration and recovery. During NREM sleep stages, the body repairs tissues, boosts the immune system and filters out waste. During REM sleep, mental functions are developed and restored. This theory is supported by ongoing research that suggests a connection between a lack of sleep and some health disorders, including brain disorders such as Alzheimer's disease.

Another theory is the evolutionary theory, which suggests that sleep patterns have evolved as a survival mechanism. It proposes that different animals sleep at different times and for different lengths depending on their vulnerability to predators. For example, animals with few predators like a lion can afford to sleep a lot, while other animals with many predators may only sleep for a few hours a day because they are vulnerable to being attacked when they are sleeping and not alert.

There are several other theories that have been formed based on research, including the information consolidation theory, which proposes that we sleep to process information that we have encountered during the day and form stable long-term memories. There is also the clean-up theory, which proposes that sleep provides time for the brain to clean itself each night.

While none of these theories alone provide a complete explanation of sleep, they collectively contribute to our understanding of sleep as a complex but essential aspect of human existence.



FIGURE 1 Sleep is an essential part of human existence.

- Based on your understanding of how sleep patterns change across the life span, discuss one piece of evidence that aligns with the restorative theory of sleep.
- According to the evolutionary theory, sleep has evolved to enhance survival. Based on this idea, suggest a reason why it is likely that humans typically sleep during the night instead of during the day.
- Based on the information consolidation theory, suggest a likely impact on a student staying up all night to study for a test and not sleeping at all before completing the test the next day.
- Describe one limitation of the clean-up theory of sleep that the restorative theory effectively addresses.

DATA DRILL 6

KEY SCIENCE SKILL: Analyse and evaluate data and investigation methods

Interpreting hypnograms

A hypnogram is a graph that depicts how long a person spends in each stage of sleep over a sleep episode. Inspect the two hypnograms below.

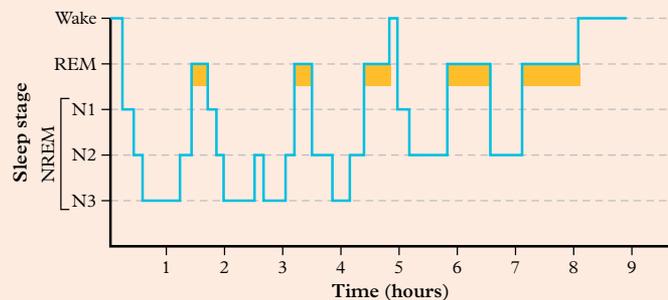


FIGURE 2 Hypnogram A depicts a sleep episode of adult 1.

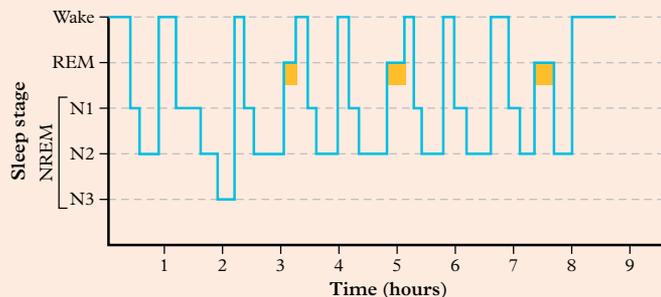


FIGURE 3 Hypnogram B depicts a sleep episode of adult 2.

- Identify the number of cycles of sleep occurring in hypnogram A.
- Describe how adult 1's sleep changes as time progresses, with reference to hypnogram A.
- Identify two features in hypnogram B that could be considered unusual for an adult.
- Identify the number of hours of sleep that adult 2 got.
- Infer how adult 2 would likely have felt the following day after experiencing the night's sleep shown in hypnogram B.

INVESTIGATION INSPECTOR 6

KEY SCIENCE SKILLS: Plan and conduct investigations; Analyse and evaluate data and investigation methods; Construct evidence-based arguments and draw conclusions

Evaluating an investigation on how sleep changes across the life span

Jamal is a VCE Psychology student who is holidaying with some family members, including his elderly grandmother, middle-aged parents, his seven-year-old brother Amil, and his baby sister Aisha.

The family is staying together in an Airbnb, and Jamal has realised that despite completing the same activities each day, each family member seems to have very different sleep habits. Some members of his family are going to bed very early, some stay up late and, similarly, there tends to be variation in their wake times.

Jamal decides that for his student-designed investigation, he will investigate how sleep needs change across the life span. To collect data for his investigation, he records the time that his family members get into bed each night and then also records the time they come out of their bedroom in the morning. He repeats this process for five days and after analysing the data, Jamal concludes that as people get older, the amount of sleep they require declines.



FIGURE 4 Jamal decides to study how sleep needs change across the life span.

- 1 Identify the investigation methodology that Jamal used.

- 2 Evaluate Jamal’s investigation methodology and data collection method, considering their strengths and limitations.

Investigation design	Strengths	Weaknesses
Investigation methodology		
Data collection method		

- 3 When evaluating an investigation, you also need to consider whether the data that has been collected meets the research aim and be able to make recommendations on ways to modify or extend an investigation.
 - a Determine the degree to which Jamal’s evidence supports the aim of his investigation and justify your answer.

 - b Describe one way that Jamal could have modified an element of his investigation to improve the accuracy of his results.

 - c Explain how Jamal could extend his investigation to obtain further evidence about whether sleep needs change as a person ages.

EVALUATING ETHICS 6

KEY SCIENCE SKILL: Comply with safety and ethical guidelines

Exploring ethics in sleep research

A psychologist is conducting research to evaluate the effectiveness of a one-day sleep training program that they have developed for adults over 65 years old who struggle to sleep through the night. The training program aims to educate older adults about why their sleep needs change as they age, and provide ways to implement strategies that can improve their sleep each night.

The psychologist receives informed consent and the offer to participate from 50 participants aged over 65. The participants are split into two groups: Group 1 does not receive the sleep training program, while Group 2 attends a full day of training. All participants record the quality of their sleep over the next 2 weeks in a sleep diary, which the psychologist then collects and analyses. At the completion of the study, participants in Group 1 are given the opportunity to join the sleep training program.



FIGURE 5 As many older adults struggle to sleep at night, psychologists continue to research new techniques to help improve their sleep quality.

- 1 Identify and explain which ethical concept was upheld when Group 1 was offered the opportunity to join the sleep training program at the completion of the study.

- 2 One participant became unwell on day 12 of the study and was taken to hospital. Explain what the researcher should do to uphold withdrawal rights for this participant.

- 3 Describe how respect for participants appears to have been upheld in this experiment.

- 4 Explain why it would not have been ethical to use deception in this experiment.

RESEARCH REVIEW 6

KEY SCIENCE SKILLS: Develop aims and questions, formulate hypotheses and make predictions; Plan and conduct investigations; Analyse, evaluate and communicate scientific ideas

Evaluating claims about the power of eggs in improving sleep

The following excerpt comes from an article published by Newshub, a New Zealand website, claiming that eggs have power to improve sleep.

Eggs: The unlikely sleep aid you may not have tried

With a whopping one-third of adults struggling to get a good night's sleep on a regular basis, sometimes it feels like you'll try anything to get some shut-eye.

However, it turns out the answer might be hiding in your fridge.

Something as simple as eating eggs at dinner time can be a natural sedative. Egg whites help the body prepare for bedtime by producing melatonin that bring on that sleepy feeling.

Jam-packed with 11 vitamins and minerals, eggs are also a rich source in the amino acid tryptophan, which helps you sleep better for longer by telling your brain to shut down for the night.

“Eggs are widely recognised as a high-quality protein source so simply including an egg with a meal can boost sleep duration and quality for all-round mental and physical health,” says Sharon Natoli, Australian dietician and author.

Quality sleep aids the repairing of tissues and reduces the risk of heart disease, high blood pressure, diabetes and high cholesterol as well. In daily life a good night of sleep improves learning, attention span and problem-solving making us ready to take on the world.

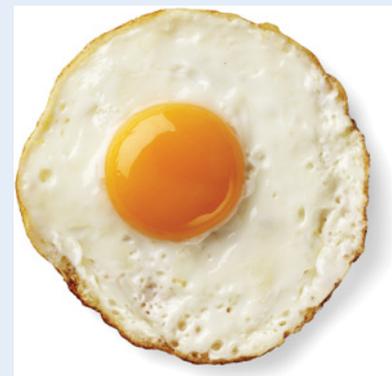


FIGURE 6 Could eggs be the secret to a great night of sleep?

Source: Newshub (2018)

1 Identify one claim that has been made in the article.

2 Critically evaluate the claim identified in question 1.

3 Outline an experiment you could conduct to test this claim. In your response, include what the independent and dependent variables will be and whether you would use a between-subjects, within-subjects or mixed design. Justify your choices.

4 Identify one potential extraneous variable that may influence your investigation and outline how you would control for this when designing the experiment.

Study tip

When asked to “critically evaluate” a concept or idea, consider both strengths and weaknesses, and use this analysis as evidence to decide whether the strengths or weaknesses outweigh the other.

The importance of sleep for mental wellbeing

Effects of sleep deprivation

There is a lot of research indicating that sleep is important for maintaining mental wellbeing. Insufficient quantity or quality of sleep can negatively impact your affective, behavioural and cognitive functions. Sleep deprivation can lead to effects resembling alcohol consumption, raising concerns about the potential dangers of sleep-deprived driving.

Circadian rhythm sleep disorders

When your sleep–wake cycle is consistently disrupted over a period of time, you may be diagnosed with a circadian rhythm sleep disorder.

- Advanced sleep phase disorder (ASPD) involves your internal body clock shifting earlier than conventional time, meaning that you will want to go to bed much earlier in the night and then awaken much earlier the next morning.
- Delayed sleep phase syndrome (DSPS) occurs when your internal body clock shifts later than normal, resulting in staying awake until the early hours of the morning and then wanting to sleep in much later the following day.
- If you work shifts, particularly rotational night shifts, you may be diagnosed with shift work sleep disorder (SWSD) if you struggle to adjust your sleeping and waking patterns to your required work schedule.

These sleep disorders can cause you to feel excessively tired during the day and have a negative impact on your mental wellbeing if left untreated. Luckily, bright light therapy can shift your circadian rhythm to align with your lifestyle requirements. By exposing yourself to an artificial light at a certain intensity and at the relevant times of day, you can inhibit the production of melatonin. When used over consecutive days, this results in you feeling more awake and slowly recalibrates your circadian rhythm.

Sleep hygiene and adaptation to zeitgebers

Sleep hygiene encompasses healthy practices like maintaining a regular bedtime routine and avoiding strenuous exercise before bed to promote good sleep quality and quantity. External environmental cues, known as zeitgebers, can also enhance sleep quality.

Light, the primary zeitgeber, regulates the circadian rhythm; therefore, reducing evening light exposure can improve sleep. Temperature also plays a role; trying to sleep in an environment that is very hot or very cold often disturbs sleep. Instead, maintaining a consistent, cool environment will promote sleep. Dietary choices throughout the day, such as consuming nutritious meals and avoiding sugary, fatty foods before bedtime, can further enhance sleep quality. You can take advantage of your body's ability to adapt to these zeitgebers to improve sleep and mental wellbeing, leaving you feeling refreshed and energised upon waking.

CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
define partial and complete sleep deprivation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.1 Pages 286–294
explain the effects of sleep deprivation on affective, behavioural and cognitive functioning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.1 Pages 286–294
compare sleep deprivation to alcohol consumption	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.1 Pages 286–294
describe factors causing circadian rhythm sleep disorders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.2 Pages 295–303
contrast delayed sleep phase syndrome (DSPS) and advanced sleep phase disorder (ASPD)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.2 Pages 295–303
describe the effects of DSPS and ASPD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.2 Pages 295–303
explain how shift work affects the sleep–wake cycle and alignment to the circadian rhythm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.2 Pages 295–303
describe the effects of shift work sleep disorder (SWSD)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.2 Pages 295–303
explain how bright light therapy is used to treat circadian rhythm sleep disorders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.2 Pages 295–303
define the term “sleep hygiene”	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.3 Pages 304–313
describe the characteristics of good sleep hygiene	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.3 Pages 304–313
define the term “zeitgebers”	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.3 Pages 304–313
explain how adaptation to zeitgebers can be used to improve sleep–wake patterns, including daylight and blue light, temperature, and eating and drinking patterns	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 7.3 Pages 304–313

Source: Adapted from *VCE Psychology Study Design (2023–2027)* reproduced by permission © VCAA

GROUNDWORK 7

Multiple choice

- Which of the following is a common cognitive effect of partial sleep deprivation?
 - Increased moodiness
 - Experiencing microsleeps
 - Shaking hands
 - Impaired concentration
- Total sleep deprivation refers to:
 - having some but not enough sleep over 24 hours.
 - having no sleep for 24 hours or longer.
 - having no sleep for 48 hours or longer.
 - sleeping in a sensory deprived environment.

- 3 Wendy does not typically feel tired until 3 a.m. and wants to sleep in until 11 a.m. Which of the following is Wendy most likely experiencing?
- A ASPD
 - B DSPS
 - C Shift work sleep disorder
 - D Sleep deprivation
- 4 Which of the following correctly describes the effect of bright light therapy?
- A It promotes the release of melatonin, making a person feel more tired.
 - B It promotes the release of melatonin, making a person feel more awake.
 - C It inhibits the release of melatonin, making a person feel more tired.
 - D It inhibits the release of melatonin, making a person feel more awake.
- 5 William has been having trouble getting to sleep for the past few days. Which of the following pieces of advice will most likely improve William's sleep?
- A Avoid reading in bed before sleep.
 - B Sleep in a cool bedroom with warm bedding.
 - C Exercise to tire yourself out before getting into bed.
 - D Drink a lot of water prior to sleeping.

Short answer

- 6 Describe one possible affective effect and one possible cognitive effect of one night of partial sleep deprivation.

- 7 If Suzie is experiencing ASPD, describe what time she will likely sleep and wake in comparison to someone not experiencing ASPD.

- 8 Explain why it would not be recommended to use bright light therapy in the evening before getting into bed and trying to go to sleep, with reference to internal biological mechanisms.

- 9 Define the term "zeitgeber".

- 10 Suggest one modification to a person's eating and drinking habits to improve their sleep-wake patterns.

CASE CRACKER 7

KEY SCIENCE SKILL: Analyse, evaluate and communicate scientific ideas

Exploring tips for healthy sleep

As sleep is such an essential aspect of human existence and greatly affects our wellbeing, information about ways to improve our sleep is quite readily available. One example is the infographic shown in Figure 1.



FIGURE 1 Infographics such as this one can be used to display key information about improving sleep in a visual manner.

- 1 Explain why sleeping in a cool and dark room is considered a tip for healthy sleep.

- 2 Explain why hard workouts are not recommended before sleeping.

- 3 Eating late in the evening is not recommended. Outline one reason for this advice.

- 4 Tamara works during the night and sleeps during the day. Identify one of the recommended tips in the infographic and explain how it may not apply to Tamara.

- 5 Explain one possible connection between sleep habits and mental wellbeing.

DATA DRILL 7**KEY SCIENCE SKILLS:** Analyse and evaluate data and investigation methods; Analyse, evaluate and communicate scientific ideas**Analysing sleep data**

Data was collected from three patients during their stay at a sleep laboratory. This is shown in Table 1.

TABLE 1 Comparison of sleep parameters across patients A, B and C

Sleep parameter	Patient A	Patient B	Patient C
Total time in bed (h:m)	9:20	8:20	6:40
Total time asleep (h:m)	4:30	7:45	5:10
Sleep efficiency index [^]	46%	91%	80%
Sleep latency (min.) [*]	64	8	16
Arousal index #	3	4	11
REM episodes	3	6	5
% of sleep time in each sleep stage			
NREM 1	12%	7%	14%
NREM 2	56%	41%	59%
NREM 3	22%	30%	9%
REM	10%	22%	18%

[^] Sleep efficiency index is calculated as total sleep time divided by total time in bed, expressed as a percentage.^{*} Sleep latency is the time taken to fall asleep after lights have been turned off.[#] Arousal index is the number of awakenings during the night of 3 seconds or longer.

1 Identify one similarity in sleep parameters that is shared between patient A and B but considerably different in patient C.

2 In question 1, you identified one difference between patients A and C. Contrast two other sleep parameters that differ between these two patients.

3 Describe the relationship between sleep efficiency index and REM episodes.

4 Identify the patient whose sleep episode appears to align most closely with typical adult sleep patterns. Justify your choice with two pieces of evidence.

5 Predict the potential affective, behavioural and cognitive effects that patient A might experience during the day following the recording of this sleep data.

INVESTIGATION INSPECTOR 7**KEY SCIENCE SKILLS:** Comply with safety and ethical guidelines; Analyse and evaluate data and investigation methods**Comparing the effects of sleep deprivation and alcohol consumption on driving performance**

Dr Martin, a psychologist, is conducting research to compare how alcohol consumption and sleep deprivation affect a person's driving performance. She conducts an experiment with 60 adults, half of whom sleep for 8 hours the night prior, then consume alcohol until they obtain a blood-alcohol content (BAC) of 0.05. The other half of the participants are required to stay awake for 24 hours prior to testing, but do not consume any alcohol. Dr Martin uses a driving simulator to test each participant's driving performance, recording their reaction times and ability to identify hazards.

- 1 Describe one ethical concept that Dr Martin needs to consider when researching the effects on consciousness of sleep deprivation as a comparison to the effects of a blood-alcohol content of 0.05.

- 2 Describe one measure that Dr Martin could take to ensure the safety of her participants.

- 3 Discuss the strengths and limitations of using driving simulators to research the impacts of sleep deprivation on driving performance.

- 4 To measure participants' BAC, Dr Martin uses breathalyser A, which has been incorrectly calibrated. Specifically, it records BAC measurements consistently 0.02% higher than they actually are. Identify the type of error that this introduces into the data.

- 5 Dr Martin changes to a different breathalyser, breathalyser B. However, this one appears to occasionally show some values higher than the real BAC and sometimes, values lower. Identify the type of error this introduces into the data.

- 6 Dr Martin does not have any other available breathalysers, so she continues using breathalyser B. Discuss how this will likely affect the level of certainty in her data.

- 7 After completing her investigation, Dr Martin becomes aware that three participants in the sleep-deprived condition consumed a coffee containing 250 mg of caffeine in the hour prior to completing their simulated driving test. Name the type of variable this is and explain its effect on Dr Martin's investigation.

EVALUATING ETHICS 7

KEY SCIENCE SKILL: Analyse, evaluate and communicate scientific ideas

Analysing the factors affecting research about melatonin-based sleep medication

In VCE Psychology, you are required to analyse the influence of social, economic, legal and political factors that are relevant to a selected issue.

1 Copy and complete the table by defining each of the factors. Need help? Go to Topic 1.9 of your Student Book.

Factor	Definition
Social	
Economic	
Legal	
Political	

In recent years, there has been an increased focus on improving sleep, and government agencies have been advocating for innovative new solutions to alleviate the burden that sleep disorders place on the public healthcare system. One approach is pharmaceutical products or medications. These products must undergo clinical trials, in which there are strict laws and regulations that organisations must adhere to including compliance with safety standards and ensuring patient data privacy.

A pharmaceutical company is in the process of developing a new melatonin-based medication that aims to assist those experiencing circadian rhythm sleep disorders. The company has been conducting high-cost clinical trials of the new medication and is exploring pricing strategies to ensure that the medication is accessible to patients but also profitable for the company. When considering how to market the new medication, the company needs to consider both public awareness and acceptance of circadian rhythm sleep disorders. Seeking treatment for a sleep disorder can involve stigma, so the company also needs to consider ways to address this in order to increase patient acceptance of the medication.

2 Summarise one social, economic, legal and political factor discussed in this case study that is relevant to the ethical concerns surrounding the development of a new medication.

a Social factor: _____

b Economic factor: _____

c Legal factor: _____

d Political factor: _____

RESEARCH REVIEW 7

KEY SCIENCE SKILL: Comply with safety and ethical guidelines

Assessing the risks involved in an investigation about caffeine and alcohol consumption and sleep patterns

Prior to conducting an experiment, it is necessary to undertake a risk assessment to make sure you are protecting the safety of everyone involved.

Researchers at a university wish to conduct an experiment to investigate the different effects of caffeine and alcohol consumption on an individual’s sleep patterns. Specifically, the experiment aims to investigate how these commonly consumed substances influence the quality and duration of sleep.

The researchers plan to use a within-subjects design. On the first night of testing, participants will consume two regular (caffeinated) coffees and then visit a sleep laboratory where their sleep will be monitored via EEG, EMG, EOG and video monitoring. On the second night of the study, participants will consume two standard drinks of red wine and undergo the same monitoring procedures again.

- 1 Complete the risk assessment for this proposed experiment.



FIGURE 2 The researchers wish to study the effect of caffeine and alcohol consumption on sleep.

Equipment required

Substances

Substance	Hazardous/Not hazardous	Warnings (allergies, side effects)	Protective measures
<hr/>	<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>	<hr/>

Participant safety

Note: In addition to psychological protection, you must ensure that you account for physiological harm.

Potential risk(s)	Control measure(s)
<hr/>	<hr/>

Defining mental wellbeing

Ways of considering mental wellbeing

You can consider mental wellbeing based on your levels of functioning in your daily life, and your levels of resilience and ability to adapt to changes. High levels of mental wellbeing typically involve effective functioning in your life, and the ability to engage in healthy relationships with others and express your feelings appropriately. At different times in your life, your mental wellbeing may decline and you may experience a temporary shift in some or all of these aspects.

Factors affecting mental wellbeing can originate within yourself (internal), such as personality and self-esteem, or from your surrounding environment (external), such as support from friendships and access to mental health care.

Fluctuations in mental wellbeing

Your level of mental wellbeing is placed on a continuum; it is never static or permanent. Instead, it can fluctuate over time as your life presents different challenges and opportunities. If challenges persist and you are struggling to cope, your mental wellbeing can remain low over a consistent period, and you may even experience a mental health problem or disorder. In these situations, it is important to seek advice from a health professional to find strategies or interventions that can help improve your mental wellbeing, so you can ideally transition up the mental wellbeing continuum again.

Stress and anxiety can both contribute to changes in your mental wellbeing. Everyone's experience will be different. Typically, short bursts of stress or anxiety may have minimal negative impacts on mental wellbeing; however, when you face consistent or recurring stress and/or anxiety, you may find that your mental wellbeing may decline on the continuum.

Phobia can also have a significant negative impact on your mental wellbeing if it interferes with your ability to function in your daily life. This may place you towards the lower end of the mental wellbeing continuum, but with intervention and treatments, you can learn to manage your phobia so it has minimal impact on your livelihood and you can begin to experience improved mental wellbeing. This emphasises the individual nature of mental wellbeing and how fluid it can be at times in our lives.

Social and emotional wellbeing (SEWB)

The SEWB framework is an approach to considering wellbeing that is unique to Aboriginal and Torres Strait Islander peoples. This framework is holistic and places the self at the centre of seven domains: connection to body, connection to mind and emotions, connection to family and kinship, connection to community, connection to culture, connection to Country, and connection to spirituality and ancestors. Strengthening connections to the interconnected domains helps to improve wellbeing. The SEWB framework also encompasses broader political, social, historical and cultural determinants that can influence wellbeing of communities of Aboriginal and Torres Strait Islander peoples.

While you may identify some similarities between the SEWB framework and the Western perspectives on mental wellbeing, each domain of the SEWB framework extends beyond conventional Western understandings of mental health and mental wellbeing.

CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
define “mental wellbeing”	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 8.1 Pages 330–337
explain how levels of functioning and resilience affect mental wellbeing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 8.1 Pages 330–337
evaluate the mental wellbeing of an individual based on their levels of functioning and resilience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 8.1 Pages 330–337
describe the social and emotional wellbeing (SEWB) framework	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 8.1 Pages 330–337
describe mental wellbeing as a continuum, using stress, anxiety and phobia as examples	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 8.2 Pages 338–347
contrast internal and external factors influencing mental wellbeing, and provide examples of both	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 8.2 Pages 338–347

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GROUNDWORK 8

Multiple choice

- In terms of mental wellbeing, resilience refers to:
 - the ability to confront people who challenge them.
 - the ability to acquire and use knowledge.
 - the ability to resist fluctuations in mental wellbeing.
 - the ability to cope with and “bounce back” from challenges.
- Which of the following is the most likely characteristic of a person with a high level of resilience?
 - Maintains positive relationships with others
 - Feels and expresses positive emotions instead of negative ones
 - Is flexible with their approaches to managing change
 - Is easily overwhelmed
- In the SEWB framework, which domain of wellbeing describes the ability to independently manage thoughts and feelings?
 - Connection to body
 - Connection to mind and emotions
 - Connection to spirituality and ancestors
 - Connection to culture
- One difference between experiencing stress and anxiety is:
 - stress is apprehension about the future, while anxiety is worry about a current stressor.
 - stress is only short-term, while anxiety is a long-term experience.
 - stress is not productive for wellbeing, while anxiety can increase productivity.
 - stress can be perceived as “good”, while anxiety is never pleasant.

- 5 A person who is experiencing high levels of mental wellbeing will likely demonstrate:
- A the ability to meet the demands of their everyday life.
 - B high social connectedness due to spending all of their time with friends.
 - C an inability to manage their emotions in different contexts.
 - D high levels of stress.

Short answer

- 6 Explain what a high level of functioning means, using an example.

- 7 The SEWB framework considers wellbeing as holistic in nature. Explain what this means.

- 8 Explain why two people who both experience anxiety may sit at different positions on the mental wellbeing continuum.

- 9 If a person experiences a phobia of the ocean, describe how this may impact their levels of functioning at different times in their life.

- 10 Provide an example of an external factor and an internal factor that may influence the mental wellbeing of a VCE student.

CASE CRACKER 8

KEY SCIENCE SKILL: Analyse, evaluate and communicate scientific ideas



Article

Keeping spirit strong through a holistic approach

Exploring Waminda's response to wellbeing during COVID-19 lockdowns

Waminda has become a pillar of support for the Aboriginal communities in the New South Wales south coast region. The organisation is guided by a board of management consisting of seven local Aboriginal women representatives.

A case study was published in 2020 by the Australian Government Department of Health describing the work that Waminda did in response to the COVID-19 lockdowns. Waminda distributed care packages to all community members, including basic care products, leisure and craft activities, ready-to-eat meals, and support for medical needs. Read the article (see the hotspot in your obook pro) and answer the following questions.



FIGURE 1 Waminda wellness packs included a variety of items, such as kids craft kits.

- 1 Explain how the SEWB framework describes wellbeing and how accessing the Waminda program may affect the wellbeing of Aboriginal and Torres Strait Islander peoples.

- 2 Select two domains of the SEWB framework and explain how connection to each of these domains is strengthened when Aboriginal and Torres Strait Islander peoples participate in the Waminda program.

- 3 Compare the approach of the Waminda program towards wellbeing with Western approaches to mental health and wellbeing.

DATA DRILL 8**KEY SCIENCE SKILLS:** Generate, collate and record data; Construct evidence-based arguments and draw conclusions**Presenting data on SEWB screening of Aboriginal and Torres Strait Islander peoples**

Understanding that SEWB is a key indicator of health outcomes for Aboriginal and Torres Strait Islander peoples, Langham and colleagues conducted a study between 2012 and 2014 to investigate the extent to which primary healthcare services (such as general practitioners, nurses, allied health professionals, pharmacists and dentists) conduct direct measurement or screening of SEWB when seeing Aboriginal and Torres Strait Islander clients.

They analysed 3407 client records across the Northern Territory, Queensland, South Australia and Western Australia. The results are shown in Table 1.

TABLE 1 Screening of clients for social and emotional wellbeing by jurisdiction January 2012 to December 2014

	Northern Territory	Queensland	South and Western Australia
Number of client records	1702	1340	365
% of client records audited			
Screened	37.1	13.7	24.9
Not screened	62.9	86.3	75.1

Source: Langham et al. (2017)

- Graph the “% of client records audited” data from Table 1.

- Describe the trends in the data.

- Suggest how the findings from Langham and colleagues’ analyses could be used to improve the SEWB of Aboriginal and Torres Strait Islander peoples.

**FIGURE 2** Whether it is a face-to-face consultation or telehealth, access to healthcare services directly affects wellbeing.

INVESTIGATION INSPECTOR 8

KEY SCIENCE SKILLS: Plan and conduct investigations; Analyse and evaluate data and investigation methods

Evaluating an investigation on the mental wellbeing of secondary school students

Dr Sill is a psychologist who provides mental wellbeing support for students at a high school in Melbourne. They wish to conduct research to assess the mental wellbeing of the students.



FIGURE 3 Dr Sill wishes to investigate the mental wellbeing of secondary school students in Melbourne.

- 1 Outline one way in which Dr Sill could obtain a random sample of students for their research.

- 2 Dr Sill believes that the year level a student is in may contribute to their levels of mental wellbeing. Outline what Dr Sill would need to do to obtain a stratified sample of students across all year levels (7 to 12).

- 3 Dr Sill also provides mental wellbeing support for students at a second high school in Melbourne and wants to compare the mental wellbeing of students at both schools. High school A has 300 students, whereas high school B has 2500 students.
 - a Identify the type of validity that broadening the study population will affect and explain how it will do so.

 - b If Dr Sill randomly selects a sample of 50 students from each school, assess whether this sample size is suitable to ensure the representation of each school's student population.

- 4 Dr Sill surveys 100 students from high school A to obtain data about their mental wellbeing. They then visit high school B and use the same survey to obtain data from 100 students. After analysing the results, Dr Sill discovers that the overall mental wellbeing of students from the two different high schools are similar to each other. Explain whether this suggests that Dr Sill's findings are reproducible or repeatable.

- 5 Explain why collecting data about mental wellbeing will likely result in an element of uncertainty in your data.

RESEARCH REVIEW 8

KEY SCIENCE SKILLS: Construct evidence-based arguments and draw conclusions; Analyse, evaluate and communicate scientific ideas

Evaluating secondary sources of information about anxiety

Anxiety is a state of arousal characterised by apprehension and worry. The apprehension is not necessarily caused by a particular stressor, but by a belief that something is wrong or something bad is going to happen.



FIGURE 4 Anxiety is never a pleasant feeling.

The following claim has been made: “You cannot cure anxiety”.

- 1 Conduct some research and find one source that supports this claim.
 - a Cite the source using APA style.

- b Comment on the quality of evidence that this source provides.

- c Provide a summary of whether this source can be considered credible or not and explain your reasoning.

- 2 Conduct some research and find one source that does not support this claim.
 - a Cite the source using APA style.
-

b Comment on the quality of evidence that this source provides.

c Provide a summary of whether this source can be considered credible or not and explain your reasoning.

EVALUATING ETHICS 8

KEY SCIENCE SKILL: Comply with safety and ethical guidelines

Evaluating the use of placebos in mental wellbeing research

When conducting research in the field of mental wellbeing, researchers often encounter ethical dilemmas. Consider a scenario where you have developed a new medication to minimise the symptoms of schizophrenia, a brain disorder characterised by thoughts and behaviours that may be considered out of touch with reality.

You have obtained approval to conduct a clinical trial using a placebo, a fake medication with no therapeutically active ingredients. In your clinical trial, you will divide your participants into two groups: the control group will receive a placebo, while the experimental condition will receive the trial medication. The purpose of the control group is to minimise the potential placebo effects, in which participants might report an improvement of their schizophrenia symptoms based on their belief in the new treatment. This will allow you to compare results from the control and experimental condition to determine if the new medication has been effective.

All participants will be required to stop any pre-existing medications they were using for the duration of the trial. Consequently, this means that participants in your control group will not receive any active medication throughout the trial, potentially affecting their mental wellbeing.

1 Considering the information provided, write a response to explain whether you believe it is ethical to use placebos in mental wellbeing research. You should refer to relevant ethical concepts and guidelines to support your response.



FIGURE 5 A placebo is a fake medication that contains no active ingredients.

Specific phobia

Specific phobia is a type of anxiety disorder characterised by persistent, irrational and intense fear of a particular object or event, that is usually not proportional to the actual threat that it poses.

Factors contributing to phobia

The development of a phobia is affected by multiple biological, psychological and social factors, which interact to affect mental wellbeing.

Biologically, an imbalance of neurotransmitters like gamma-aminobutyric acid (GABA) can predispose you to experiencing a phobia. Long-term potentiation can play a role, strengthening neural connections between a phobic stimulus and a fear response.

Psychologically, cognitive biases can exacerbate phobia. This includes biased memories or thinking catastrophically about your phobia, both of which reinforce fear.

Behavioural models can also contribute to phobia. Through classical conditioning, a neutral stimulus can become associated with a frightening event, leading to a conditioned fear response. Operant conditioning perpetuates phobia when you avoid your phobic stimuli, temporarily relieving fear but reinforcing this behaviour. Ultimately, this prevents you from overcoming your phobia.

Social factors, including environmental triggers, can initiate phobia, often stemming from a traumatic encounter with the phobic stimulus. Once a phobia develops, you may experience stigma or shame, preventing you from seeking treatment or causing you to hide your condition.

Evidence-based interventions for phobia

If you are experiencing a phobia, there are several scientifically researched and evidence-based interventions that can be used to improve your condition.

Biological interventions may involve the use of benzodiazepines (GABA agonists), which provide short-term relief from anxiety symptoms. This can be complemented with breathing retraining techniques to manage the physical symptoms of anxiety.

Psychological interventions target cognitive and emotional responses associated with phobia. Systematic desensitisation gradually exposes you to increasingly anxiety-provoking stimuli in combination with a relaxation technique to reduce your anxiety symptoms. Cognitive behavioural therapy (CBT) helps you to recognise and reframe unrealistic thoughts related to your phobia, promoting more positive thoughts and behavioural changes.

Social interventions, such as psychoeducation, seek to educate your family and friends about your phobia, equipping them to provide support through discouraging avoidance behaviours and challenging your unrealistic thoughts.

A combination of these interventions can effectively help you manage your phobia, leading to improvements in your mental wellbeing.

CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
define “specific phobia”	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 9.1 Pages 354–362
explain how biological factors, such as GABA dysfunction and LTP influence development of specific phobia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 9.1 Pages 354–362
explain how psychological factors, such as classical and operant conditional, and cognitive biases, influence the development of specific phobia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 9.1 Pages 354–362
explain how social factors, such as environmental triggers and stigma around seeking treatment, influence the development of specific phobia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 9.1 Pages 354–362
describe the role of GABA agonists in treating specific phobia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 9.2 Pages 363–366
describe the role of systematic desensitisation in treating specific phobia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 9.3 Pages 367–371
describe the role of CBT in treating specific phobia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 9.3 Pages 367–371
describe the role of psychoeducation in treating specific phobia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 9.4 Pages 372–375
compare the effectiveness of short- and long-term interventions for treating specific phobia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 9.4 Pages 372–375

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GROUNDWORK 9

Multiple choice

- In the context of phobia, GABA dysfunction involves:
 - an excess of GABA, i.e. increased inhibitory effects.
 - an excess of GABA, i.e. increased excitatory effects.
 - a lack of GABA, i.e. increased inhibitory effects.
 - a lack of GABA, i.e. increased excitatory effects.
- Classical conditioning often _____ a phobia, while operant conditioning can _____ a phobia.
 - precipitates; perpetuate
 - perpetuates; predispose
 - perpetuates; precipitate
 - precipitates; prevent.
- If a person feels a sense of shame or embarrassment about having a phobia and avoids seeking health care, this can be referred to as:
 - memory bias.
 - positive reinforcement.
 - anxiety.
 - stigma.

- 4 Cognitive behavioural therapy is based on the principle that:
- A thoughts and behaviours have a strong influence on how we feel.
 - B negative thoughts can be replaced with different ones.
 - C behaviours have the strongest influence on thoughts and feelings.
 - D you must change a person's behaviours before changing their thoughts.
- 5 Breathing retraining aims to:
- A encourage a person to take fast, shallow breaths.
 - B change the way a person breathes at all times.
 - C activate a person's sympathetic nervous system when feeling anxious.
 - D normalise the balance of oxygen and carbon dioxide in the body.

Short answer

- 6 In terms of operant conditioning, explain how avoidance behaviours can perpetuate a phobia.

- 7 Friyana has a phobia of heights. Explain how memory bias may contribute to Friyana's phobia.

- 8 Outline the first two steps of systematic desensitisation.

- 9 Describe one limitation of benzodiazepines as an intervention for phobia.

- 10 If a person is experiencing an intense anxiety response after being confronted with their phobic stimulus, describe one strategy they may use to help calm themselves.

CASE CRACKER 9

KEY SCIENCE SKILL: Analyse, evaluate and communicate scientific ideas

Exploring a strategy to treat asthaphobia

Consider the following information.

Patient information: Emma, 28-year-old working as a marketing professional

Presenting problem: Emma seeks psychological assessment and intervention for her long-standing struggle with asthaphobia, an intense and incapacitating fear of thunderstorms.

Background: Emma's asthaphobia appears to originate from her early childhood experiences, where she grew up in tropical northern Queensland. Repetitive exposure to frightening thunderstorms during her formative years may have sensitised her neural pathways to perceive them as more threatening than they objectively are. Emma has the tendency to remember these thunderstorms as more terrifying than they objectively were, and these vivid and exaggerated recollections of past storms fuel her apprehension of future ones.

During her childhood, when a storm approached, she was allowed to hide in her room, a seemingly comforting escape. However, this prevented her from acquiring the firsthand experience that thunderstorms were not as hazardous as she believed. Emma has expressed her reluctance to seek treatment due to the fear of being viewed negatively by her friends and colleagues.

Intervention and treatment plan: Given the complex nature of Emma's asthaphobia, a comprehensive treatment plan is recommended. To address the physiological aspects of her condition, Emma will undergo breathing retraining to teach her techniques for managing her physiological responses during thunderstorms. Cognitive behavioural therapy (CBT) is a highly effective approach for treating phobia. In Emma's case, CBT will focus on identifying and challenging her irrational thoughts and beliefs about thunderstorms. With the guidance of a therapist, she will learn to reframe her thinking patterns and develop healthier cognitive responses and behaviours to storms. Recognising the importance of a supportive environment, Emma's family and friends will be encouraged to participate in psychoeducation sessions.



FIGURE 1 Emma has asthaphobia, a fear of thunderstorms.

1 Explain how long-term potentiation may have contributed to Emma's phobia of thunderstorms.

2 Complete the following table by outlining how operant conditioning may have perpetuated Emma's phobia as a child.

Antecedent	Behaviour	Consequence	Effect on Emma's future behaviour
<hr/> <hr/> <hr/> <hr/>	Emma would hide in her room.	<hr/> <hr/> <hr/> <hr/>	<hr/> <hr/> <hr/> <hr/>

3 Identify a piece of evidence in the case study that suggests Emma experienced a sense of stigma, which may have prevented her seeking treatment for her phobia earlier in life.

4 Suggest one reason why breathing retraining may be an effective intervention for Emma's phobia.

5 Provide an example of a potential behavioural strategy that Emma might learn when she undergoes CBT for her phobia.

6 The treatment plan suggests that Emma's family and friends should undergo psychoeducation to better understand her condition. Describe how this may benefit Emma in managing her phobia.

DATA DRILL 9

KEY SCIENCE SKILLS: Generate, collate and record data; Analyse and evaluate data and investigation methods; Construct evidence-based arguments and draw conclusions

Analysing the relationships between phobia and gender, age and category

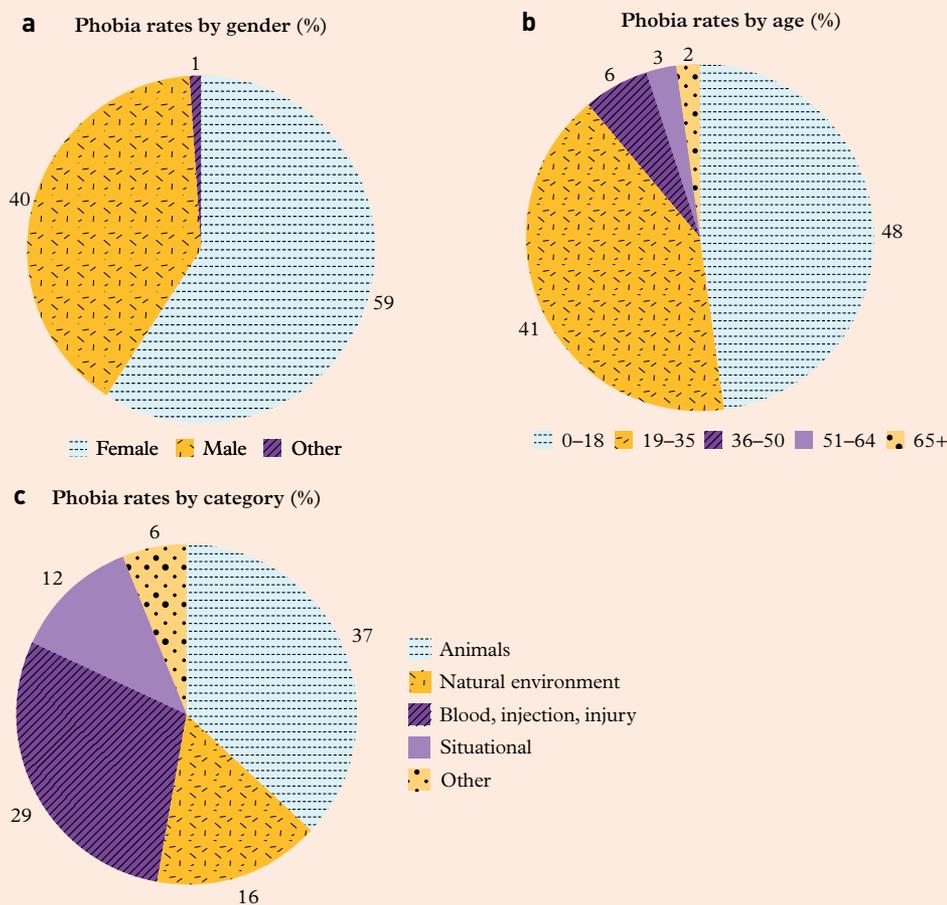


FIGURE 2 Phobia rates by **a** gender, **b** age and **c** category

- Identify which age group is most likely to be diagnosed with a phobia.

- Determine whether the following statements are true or false.
 - A female is twice as likely as a male to develop a phobia during her life. _____
 - An elderly person is less likely to develop a phobia than a child. _____
 - A higher percentage of people have a phobia of animals than the combined percentage of those with situational or natural environment phobia. _____
- Describe the relationship between the development of a phobia and age.

- Calculate the percentage change in the prevalence of phobia development between the age group of 19–35 years and the age group of 36–50 years.

- Based on the data provided, identify the gender and age group of an individual most commonly experiencing a phobia, and identify the category in which the phobia belongs.

INVESTIGATION INSPECTOR 9

KEY SCIENCE SKILLS: Develop aims and questions, formulate hypotheses and make predictions; Plan and conduct investigations; Analyse and evaluate data and investigation methods

Assessing an investigation to compare treatments for specific phobia

Dr Herrera is conducting an experiment to compare the effect of two treatments, benzodiazepines and systematic desensitisation, on reducing phobic symptoms. Initially, Dr Herrera recruits 75 participants with a phobia of injections and assesses the severity of their phobic symptoms using a self-reporting scale. All participants were found to have similar levels of anxiety symptoms before starting the experiment.

Dr Herrera then divides participants into three groups.

- Group A receives no treatment for their phobia.
- Group B undergoes five sessions of systematic desensitisation to address their injection phobia.
- Group C is administered a benzodiazepine as a treatment.



FIGURE 3 All participants in Dr Herrera's study have a fear of injections.

Following the treatment, all participants receive an injection and assess their anxiety symptoms using the same rating scale as in the initial assessment. This process is repeated two weeks later, with participants receiving another injection and self-reporting their anxiety symptoms.

- 1 Before conducting this experiment, Dr Herrera undertook a literature review. Describe what this process typically involves and its intended purpose.

- 2 Identify the type of research design that Dr Herrera has used in her controlled experiment and describe one benefit of using this design.

- 3 Identify the independent and dependent variables of this controlled experiment.

- 4 Explain the purpose of group A in this experiment.

5 Predict the results for each experimental condition immediately after the first injection and compare this with the predicted results for after the second injection two weeks later. Justify your response.

6 If Dr Herrera extended the study by administering injections to participants and collecting anxiety symptom reports every two weeks for an additional three months, explain how this would enhance the robustness of her results.

Study tip

The term “robust” is linked to both repeatability and reproducibility of an investigation. VCAA have released the following information: “Students should understand the purpose of repeating and reproducing investigations to ensure findings are robust. This means the results remain valid across a variety of conditions.”

EVALUATING ETHICS 9

KEY SCIENCE SKILL: Comply with safety and ethical guidelines

Upholding ethics while desensitising a phobia

A person who is experiencing a phobia may undergo systematic desensitisation as an intervention to help manage their condition. This involves graduated exposure to their phobic stimulus paired with a previously learnt relaxation technique.

While the therapy can be very effective for reducing a person’s anxiety symptoms, it can pose several ethical considerations that therapists must be mindful of, as this intervention can involve significant levels of distress for a patient.

1 Describe how a therapist could apply and consider the following ethical principles when facilitating systematic desensitisation with a patient.

a informed consent

b beneficence

c confidentiality

d withdrawal rights

2 Explain one relevant health and safety guideline that the therapist would need to adhere to during the systematic desensitisation process with a patient in a clinic.

RESEARCH REVIEW 9

KEY SCIENCE SKILL: Analyse, evaluate and communicate scientific ideas

Evaluating student responses to questions about phobia

When answering questions in VCE Psychology, you should always consider how many marks a question is worth, the command term(s) used and the context or scenario provided. This can help to make sure you address all parts of the question required to achieve full marks. Once you have written your response, always review your answer and improve if needed. Practise applying this skill using the following example questions.



FIGURE 4 Jamie has a fear of fire.

Scenario

Ever since his childhood, Jamie has experienced a severe phobia of fire. His phobia traces back to an incident when he was 10 years old. During a family vacation, Jamie's family was toasting marshmallows around a campfire and Jamie burnt his fingers multiple times, as he was too close to the flames. At one point, he dropped a marshmallow in the coals and picked it up, resulting in a severe burn to his fingers. The experience left him deeply shaken and terrified of fires. Now, as an adult, Jamie avoids any camping trips involving fire, which can cause him to be left out of family events.

Sample question 1: Describe how Jamie's phobia of fire was precipitated through classical conditioning. (3 marks)

Student answer: Before being conditioned, fire was a NS for Jamie as he was not scared of it. However, during conditioning, because he was burnt by the fire multiple times, Jamie felt scared. So now, after conditioning, Jamie feels fearful (CR) in response to seeing fire (CS).

Marking guide:

- 1 mark: Before conditioning: fire was a neutral stimulus leading to no relevant response.
- 1 mark: During conditioning: fire (NS) was repeatedly followed by getting burnt (UCS), leading Jamie to feel fearful of being burnt (UCR).
- 1 mark: After conditioning: fire became a conditioned stimulus that led Jamie to feel a conditioned response, an intense fear of fire.

1 Identify the number of marks this student response would score and justify your decision.

2 Rewrite the required answer to achieve full marks, in full sentences.

Sample question 2: With reference to the three-phase process of operant conditioning, explain how Jamie's phobia was perpetuated. (4 marks)

Student answer: When Jamie is invited to go camping with his family members, Jamie refuses to go to avoid campfires, which causes him to feel better.

Marking guide:

- 1 mark: Antecedent: Jamie is invited on a family camping trip.
- 1 mark: Behaviour: Jamie refuses to attend.
- 1 mark: Consequence: avoids his fear of fire.
- 1 mark: Negative reinforcement: encourages avoidance behaviour to be repeated in the future, prolonging his phobia.

Note: Students lose 1 mark if they have not referred to the ABC model of operant conditioning in their response.

3 Identify the number of marks this student response would score and justify your decision.

4 Rewrite the required answer to achieve full marks, in full sentences.

Maintenance of mental wellbeing

The maintenance of wellbeing relies on an understanding of the various protective factors.

The biopsychosocial approach

The biopsychosocial approach uses a holistic perspective to understand protective factors that promote positive mental wellbeing.

Biologically, maintaining a balanced, nutritious diet and staying adequately hydrated can have a positive impact on your cognition and mood. These factors provide your brain with the necessary resources to function optimally. Additionally, ensuring regular and adequate sleep is crucial, as it allows your brain and body to recover and recharge, promoting mental wellbeing.

From a psychological point of view, cognitive behavioural strategies, derived from cognitive behavioural therapy, are powerful tools to help you to challenge and reframe negative thinking patterns and behaviours. By adopting more positive thought patterns and behaviours, you can improve your mental wellbeing. Practising mindfulness meditation can also be beneficial, as it promotes a sense of calmness and reduces excessive worry about past or future stressors, which can negatively impact mental wellbeing.

Strong connections with others are also essential for maintaining mental wellbeing. Authentic and energising support from your friends, family and community helps during challenging times. Building a robust support network plays a crucial role in maintaining positive mental wellbeing.

Cultural determinants of wellbeing

Cultural determinants have a significant impact on the wellbeing of Aboriginal and Torres Strait Islander peoples. Strengthening cultural continuity through the sharing and passing on of cultural knowledge is a powerful protective factor. It enhances one's sense of identity and also connection to cultural traditions, which can maintain and promote wellbeing. Improving self-determination for Aboriginal and Torres Strait Islander peoples also has positive implications for wellbeing. Enhanced self-determination promotes a sense of agency, dignity and self-esteem, all of which contribute significantly to maintaining social and emotional wellbeing within Indigenous communities.

CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
describe the biopsychosocial approach to maintaining mental wellbeing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 10.1 Pages 384–389
provide examples of biological factors that are protective for maintaining mental wellbeing and explain how they help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 10.1 Pages 384–389
provide examples of psychological factors that are protective for maintaining mental wellbeing and explain how they help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 10.2 Pages 390–394
provide examples of social factors that are protective for maintaining mental wellbeing and explain how they help	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 10.3 Pages 395–398
provide examples of the cultural determinants of wellbeing for Aboriginal and Torres Strait Islander peoples	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 10.4 Pages 399–403
describe cultural continuity and explain its effect on the wellbeing of Aboriginal and Torres Strait Islander peoples	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 10.4 Pages 399–403
describe self-determination and its effect on the wellbeing of Aboriginal and Torres Strait Islander peoples	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 10.4 Pages 399–403

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GROUNDWORK 10

Multiple choice

- Consistently experiencing a good quality of sleep can improve mental wellbeing by:
 - dysregulating mood.
 - removing toxins from the muscles.
 - decreasing mental processes such as concentration.
 - enhancing mood and energy levels.
- Two psychological factors that can promote mental wellbeing are:
 - mindfulness meditation and social support.
 - adequate sleep and nutrition.
 - cognitive behavioural strategies and social support.
 - mindfulness meditation and cognitive behavioural strategies.
- Offering to buy groceries for a friend who is grieving the death of a loved one best demonstrates:
 - authentic social support.
 - emotional social support.
 - intangible social support.
 - involuntary social support.

- 4 The ongoing practice, preservation and transfer of cultural traditions, values and knowledge across generations is referred to as:
- A cultural determination.
 - B self-determination.
 - C cultural continuity.
 - D cultural preservation.
- 5 Which of the following examples best demonstrates self-determination for Aboriginal and Torres Strait Islander peoples?
- A The Australian Government increasing funding for education services
 - B Aboriginal-led healthcare services being available to community members
 - C Community Elders being able to pass on cultural knowledge to others in their community
 - D Reducing the stigma associated with mental health support

Short answer

- 6 Define the term “protective factor” in relation to mental wellbeing.

- 7 Explain why adequate hydration is important for mental wellbeing.

- 8 Language revival programs have been initiated in many Aboriginal communities to recover Indigenous languages and dialects that have almost been lost due to the ongoing effects of colonisation. Explain how these language revival programs may enhance cultural continuity in Aboriginal and Torres Strait Islander communities.

- 9 Explain one similarity between mindfulness meditation and cognitive behavioural strategies as protective factors for mental wellbeing.

- 10 Using an example, explain how family and community can offer different types of social support to a person who has become unemployed.

CASE CRACKER 10

KEY SCIENCE SKILLS: Analyse, evaluate and communicate scientific ideas

Exploring the significance of possum-skin cloaks among the Gunditjmara peoples of south-western Victoria

An article published by Museums Victoria in 2019, “The timeless and living art of possum-skin cloaks”, provides some information about the significance of possum-skin cloaks among the Gunditjmara community of south-western Victoria. Read the article (<https://museums victoria.com.au/article/the-timeless-and-living-art-of-possum-skin-cloaks/>) and answer the following questions.



FIGURE 1 Three Koori women – Treahna Hamm, Vicki Couzens and Lee Darroch – wearing traditional possum coats

- 1 Explain the process of crafting possum-skin cloaks.

- 2 Define the term “cultural continuity”.

- 3 Explain how crafting possum-skin cloaks demonstrates cultural continuity and why this is important for members of the Gunditjmara community.

- 4 Discuss how crafting possum-skin cloaks could benefit the social and emotional wellbeing of a person from the Gunditjmara community, with reference to two domains of the SEWB framework.

5 The article discusses Budj Bim, land located 60,000 kilometres north-west of Warrnambool in Victoria. “On Saturday, 6 July 2019, Budj Bim officially joined the Sydney Opera House and Great Barrier Reef on the UNESCO World Heritage list. In doing so, it became the 20th such site in Australia, second in Victoria and first in the country listed solely for its Aboriginal cultural importance. Today Gunditjmara rangers like Braydon Saunders manage parts of that Country again, reclaiming land his Ancestors never ceded.”

Explain how this demonstrates self-determination.

DATA DRILL 10

KEY SCIENCE SKILLS: Generate, collate and record data; Construct evidence-based arguments and draw conclusions

Analysing data on Victorian mental wellbeing support services

A Victorian government agency has collected data representing residents’ use of mental wellbeing services. Some of the key findings are depicted in Figure 2.

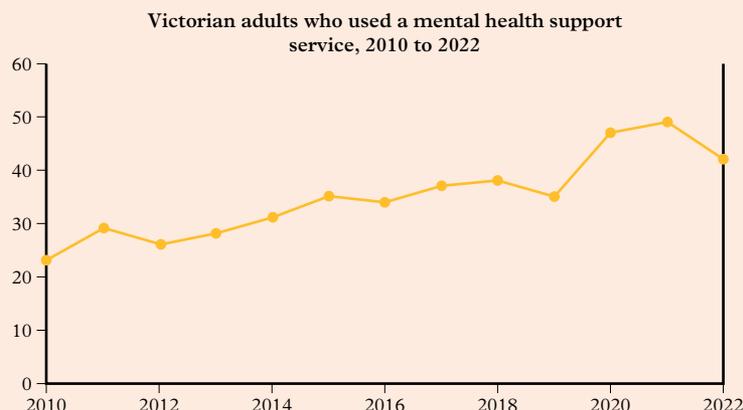


FIGURE 2 Percentage of adult Victorian residents who accessed a mental wellbeing support service between 2010 and 2022

1 Suggest appropriate labels for the graph’s axes.

x-axis: _____

y-axis: _____

2 Describe the trend in the data in Figure 2.

3 Infer one possible reason as to why the data significantly increased from 2019 to 2021.

4 Suggest one possible implication of the findings.

5 Write an appropriate conclusion based on the data.

INVESTIGATION INSPECTOR 10

KEY SCIENCE SKILLS: Develop aims and questions, formulate hypotheses and make predictions; Analyse and evaluate data and investigation methods; Construct evidence-based arguments and draw conclusions; Analyse, evaluate and communicate scientific ideas

Evaluating an investigation on the impact of mindfulness meditation on the mental wellbeing of primary school children

University researchers aim to investigate the impact of mindfulness meditation on enhancing the mental wellbeing of primary school children. They begin by obtaining a random sample of 30 children aged 5 to 7 years who attend a primary school in Melbourne. The researchers ensure that the parents of these children are fully informed about the research and obtain consent for their children’s participation.

On day 1, the researchers visit the school and conduct observations of the participants’ behaviours and interactions with their peers throughout the day. They identify and record these observations, categorising them as indicative of positive, neutral or negative mental wellbeing.

The researchers divide the children into two groups for days 2 to 4.

- Group A engages in a 20-minute guided mindfulness meditation session every morning.
- Group B serves as the control group and does not receive any specific treatment.

On day 5, the researchers observe the children’s behaviours and interactions with their peers, again, carefully documenting whether these behaviours indicate positive, neutral or negative signs of wellbeing. They then compare the results to establish whether the participants’ mental wellbeing improved because of the daily mindfulness meditation practice.



FIGURE 3 Young students practising mindfulness meditation to reach a state of relaxation by focusing on the present moment

1 Write a hypothesis for the investigation.

2 Using appropriate psychological terminology, evaluate this investigation. Your evaluation should consider the methodologies and procedures of the investigation and explain how this may impact the data obtained.

The ongoing debate centres on whether granting greater control over the healthcare system to Aboriginal and Torres Strait Islander communities through enhanced self-determination will lead to improved health outcomes. However, opposing viewpoints advocate for continued government and agency control.

- 1 Suggest two arguments in support of increasing Aboriginal and Torres Strait Islander peoples' control over their healthcare system.

Argument 1: _____

Argument 2: _____

- 2 Describe one relevant social factor that may affect access to mental wellbeing services for Aboriginal and Torres Strait Islander peoples.

- 3 Describe one relevant political factor that may affect access to wellbeing services for Aboriginal and Torres Strait Islander peoples.

RESEARCH REVIEW 10

KEY SCIENCE SKILLS: Analyse, evaluate and communicate scientific ideas

Evaluating an infographic about positive mental wellbeing

The infographic in Figure 5 shows some tips for positive mental wellbeing.

Three tips for improving your mental wellbeing



Only speak to a trained professional about your mental wellbeing.



Eating a balanced and nutritional diet can improve your mental wellbeing.



Spending too much time in bed is bad for your mental wellbeing.

FIGURE 5 Three tips for positive mental wellbeing

1 Critically evaluate each of the claims made in the infographic in Figure 5.

a Claim 1: Only speak to a trained professional about your mental wellbeing.

b Claim 2: Eating a balanced and nutritious diet can improve your mental wellbeing.

c Claim 3: Spending too much time in bed is bad for your mental wellbeing.

Student-designed investigation

This chapter provides a succinct guide on the steps you need to complete for your student investigation. The aim of the investigation is for you to either adapt a practical you have done in class or design your own. The task requires you to select a topic related to Units 3 and/or 4, collect primary data, and use this to draw an evidence-based conclusion. Your success depends on your ability to draw on key knowledge including investigation design, scientific evidence and science communication.

- 1 Designing your investigation:** You will develop a scientific investigation focused on understanding mental processes and psychological functioning. This involves formulating research questions or hypotheses, and developing research aims that contribute to the existing body of knowledge in psychology.
- 2 Conducting your investigation:** You will conduct an investigation, including the selection of appropriate investigation methodologies and methods, and ensure that data collection procedures are ethically sound and scientifically rigorous.
- 3 Analysing and evaluating scientific evidence:** You will analyse the data collected during your investigation, evaluate the quality of your procedures and results, as well as draw conclusions, consider implications and suggest improvements for future research.
- 4 Communicating your findings:** You will present your findings in the format of a scientific poster that adheres to conventions defined by VCAA. In your poster, you will organise content logically and convey complex information in a concise and accessible manner.

CHAPTER CHECKLIST

Before you start this chapter, you can use the “I can...” statements to assess your understanding of each key knowledge dot point for the chapter and rate yourself by ticking the appropriate box in the “rating” columns. This is also a useful revision tool to identify any gaps in your knowledge.

I can...	Confidently	Partially	Not really	Revision link in your Student Book
describe the role of scientific investigation in reducing uncertainty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.1 Pages 416–427
identify the psychological science concepts specific to the selected scientific investigation and their significance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.1 Pages 416–427
define key terms related to the scientific investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.1 Pages 416–427
select a scientific methodology relevant to the investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.1 Pages 416–427
design a method to generate qualitative and/or quantitative data relevant to the investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.1 Pages 416–427
evaluate the accuracy, precision, repeatability, reproducibility and validity of measurements in relation to the investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.1 Pages 416–427
evaluate the health, safety and ethical guidelines relevant to the investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.1 Pages 416–427
distinguish between an aim, hypothesis, model and theory	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.2 Pages 428–434
identify which findings are consistent with, or challenge, current scientific models or theories	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.2 Pages 428–434
outline the characteristics of primary data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.2 Pages 428–434
organise, analyse and evaluate generated primary data to identify patterns and relationships, including sources of error and uncertainty	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.2 Pages 428–434
use a logbook to authenticate generated primary data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.2 Pages 428–434
identify the limitations of investigation methodologies and methods, and of data generation and/or analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.2 Pages 428–434
use the conventions of scientific communication, including scientific terminology and representations, standard abbreviations and units of measurement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.3 Pages 435–437
present key findings and implications of the selected scientific investigation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Topic 11.3 Pages 435–437

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11.1

Investigation design

When designing an investigation, you will need to consider any psychological principles, ideas or theories that are relevant to your investigation. Exploring and defining these will serve as the foundation for formulating research questions and hypotheses.

Deciding what and how to investigate

You will determine the most appropriate investigation methodology to use, including selecting and justifying the use of independent, dependent and controlled variables. These are fundamental components of experimental design in psychology.

You might like to begin by writing two or three different research questions on different topics. Following this, brainstorm what your independent and dependent variables would be for each investigation. Doing this might allow you to see that one research question will be more manageable than the others. Your teacher will give you more information, but keep in mind that you will have a limited time frame to complete your investigation, so you want to choose a research question that is manageable in this time.

Conducting your investigation

To conduct a scientific investigation effectively, you will need to understand various techniques for generating primary, quantitative data. These techniques may include use of surveys, measurements, observations or assessments, depending on the research context.

While a controlled experiment might be the best way to conduct your investigation, it is not the only investigation methodology that you can use. You may also be interested in conducting a correlational study or a case study. For example, if you select the research question, “How does eating breakfast influence stress levels?”, it might be more appropriate to survey your participants about their existing breakfast eating habits and their perceived stress levels to determine any relationship between these variables, rather than conducting an experiment. This will be more time-efficient and if you use an online survey, you might be able to obtain many more responses, which will improve the analysis of your data.

If you decide to conduct a controlled experiment, consider which of the three designs you will use: between-subjects, within-subjects or a mixed design. You might like to draw a flowchart to show how you would design and conduct your research using each of the different designs. This will allow you to identify the most appropriate design to use. For example, in an experiment to test if the use of acronyms improves recall of a list of words, a between-subjects design with different participants in your control and experimental conditions might be better than a within-subjects design. This is because using the same participants in all conditions might be problematic as participants would already be familiar with the words when they participate in the second condition, potentially introducing an unwanted confounding variable to your investigation.

Throughout your investigation, you must also demonstrate safe and ethical conduct. You must ensure you uphold any relevant ethical concepts and guidelines to ensure the safety and wellbeing of anyone involved in your investigation. This includes protecting participants’ rights and undertaking a risk assessment to minimise any potential safety risks or harm.

Understanding the limitations to your investigation

All investigation methodologies have limitations, and you will need to evaluate your chosen methodology and procedures to acknowledge potential weaknesses and suggest areas of improvement for future research. You will also consider potential sources of error and uncertainty that can affect the quality of your findings, and assess the validity of the tools and methods used to collect your data. Anticipating how your design will affect the accuracy, precision, repeatability, reproducibility and validity of your results will not only reduce errors, but it will also improve the quality of your data. Understanding these is important because it ensures the data can be interpreted accurately in the context of the research.

INVESTIGATION INSPECTOR 11.1

KEY SCIENCE SKILLS: Develop aims and questions, formulate hypotheses and make predictions; Plan and conduct investigations; Comply with safety and ethical guidelines; Analyse and evaluate data and investigation methods; Analyse, evaluate and communicate scientific ideas

Planning an investigation about reward and learning

Chloe is a Year 12 Psychology student. For her Unit 4 student-designed investigation, she has decided to investigate the research question, “Does the use of a reward impact the speed of learning a new task?”

She has selected this research question because it relates to content she learnt in Unit 3 Area of Study 2: “How do people learn and remember?”



FIGURE 1 Chloe has decided to study the effect of reward on learning in students.

- 1 Define at least three key terms that are relevant to Chloe’s investigation. (Hint: Consider which learning model her investigation applies to.)

- 2 Chloe has decided to undertake a controlled experiment for her investigation. She will be able to obtain a random sample of 15 Year 7 students from her school as participants in her investigation. Provide one reason why it might be more appropriate for Chloe to use a within-subjects design for her investigation rather than a between-subjects design.

3 The following is an extract from Chloe's logbook:

To investigate my research question "Does the use of a reward impact the speed of learning a new task?" I plan on conducting a within-subjects experiment with 15 participants. I will tell the participants that I want to see how quickly they can learn to make an origami animal. In the first trial of my experiment, I will give all participants one piece of origami paper and a printed set of instructions. I will tell all participants that they need to follow the instructions to try to create the origami frog as quickly as possible. After everyone has finished, I will collect all the materials from the participants and give them all a new piece of paper and a different set of instructions on how to make an origami fish. This time I will tell the students that if they can complete the task in less than two minutes, then I will give them a chocolate as a reward for their efforts.

Based on Chloe's logbook entry, identify the following elements of her investigation:

- a** independent variable: _____
- b** dependent variable: _____
- c** controlled variables: _____

4 In trial 2, Chloe is going to get participants to follow a different set of instructions to make a different origami animal than they did in trial 1. Explain a likely extraneous variable that Chloe is minimising through this procedure.

5 Chloe wants to record how long it will take each of the participants to learn how to make the origami animals. She decides she will borrow a set of stopwatches from the science lab and ask each student to start the timer when they begin and stop it once they finish. Chloe will then collate all participant results. Describe the type of data Chloe will generate using this data collection method in her investigation.

6 Explain how each of the following types of errors might occur using the data collection method described in question 5.

- a** random errors: _____
- _____
- b** personal errors: _____
- _____
- c** systematic errors: _____
- _____

7 Identify three relevant ethical concepts and/or guidelines relevant to Chloe's investigation and explain how she could uphold each of these.

11.2

Scientific evidence

After obtaining primary data in your investigation, you will organise, analyse and assess your results to determine if there is evidence to support or refute your initial hypothesis. You will identify patterns and relationships within your data, helping you draw meaningful conclusions.

Documenting your data and evaluating errors

Keeping accurate records is crucial in scientific research. Throughout your investigation, you will learn to maintain a detailed logbook to document your research process and authenticate your work. In your logbook, keep records of any unexpected errors, problems or variables that might arise during your investigation; try to do this as soon as you can so you don't forget about them.

It is not uncommon for problems to arise when conducting a psychological investigation. These can sometimes be beneficial as it provides you with opportunities to analyse and evaluate their effect when you write your scientific report. For example, if you are conducting an investigation on memory with students in a class and the bell rings, causing a distraction, this may reduce students' performance on the task. This should therefore be noted in your logbook and discussed in your report when analysing your results.

Organising and analysing your data

When you have collected your raw data, it might be helpful to collate the results electronically; for example, you might create a table using Microsoft Excel. This is beneficial as you can also perform calculations of numerical data using this program. If your teacher allows, you can also easily generate a graph or results table to represent your data. You can then print copies to include in a physical logbook.

DATA DRILL 11.2

KEY SCIENCE SKILLS: Generate, collate and record data; Analyse and evaluate data and investigation methods; Construct evidence-based arguments and draw conclusions

Analysing and evaluating data and procedures in an investigation about reward and learning

Chloe has conducted her investigation according to the investigation design outlined in Topic 11.1 of her Student Book, and collated raw data from her participants, shown in Table 1.

TABLE 1 Record of times taken to fold an origami animal with and without a reward offered

Trial 1: Time taken to fold origami frog, without reward offered (min.sec)	Trial 2: Time taken to fold origami fish, with reward offered (min.sec)
2.59	1.57
2.10	1.45
1.35	0.58
2.53	1.55
2.45	2.02
2.33	2.14
2.58	2.24
1.57	1.41
2.19	1.27
4.55	1.55
2.37	2.04
2.09	1.58
2.52	2.06
2.47	2.11
2.49	1.07

- 1 Chloe has already calculated the mean time for each trial but also wants to calculate the median. Complete Table 2 by writing the median into the correct boxes. (Hint: Remember to order the data from smallest to largest for each trial to determine the median.)

TABLE 2 Calculated means and medians for the investigation

	Trial 1: Time taken to fold origami frog, without reward offered (min.sec)	Trial 2: Time taken to fold origami fish, with reward offered (min.sec)
Mean	2.41	1.51
Median		

- 2 Construct a graph of the mean and median.

- 3 Describe the data represented in the graph.

- 4 Comment on the precision of the results and if there appear to be any potential outliers.

- 5 Describe the internal and external validity of Chloe's investigation.

- 6 Explain one potential factor that may have contributed to uncertainty in Chloe's data.

11.3

Scientific communication

After completing your investigation, you need to apply the correct conventions of communicating scientific information to present your findings. This includes using specialised scientific terminology, standard abbreviations and symbols that are universally understood within the field.

Preparing your scientific poster

Unlike in Units 1 & 2, you will need to present the findings of your investigation in the format of a scientific poster. You will need to be able to condense complex information about your scientific investigation into a concise and visually appealing format. This involves effectively organising content, using appropriate headings and subheadings, and incorporating visual elements such as graphs, charts and images.

In your poster, you will extract and highlight the key findings of your scientific investigation. This involves identifying the most significant results and understanding the implications or real-world applications of your research. Communicating key information concisely is essential, as you have a maximum of 600 words to convey your ideas.

A 600-word limit is quite short, as a scientific poster provides an overview of the investigation only. Therefore, it is likely you will have to summarise sections from your logbook on your poster. Your teacher will give you further information about the key information required in each section. You might like to review the entries you have in your logbook and highlight the most important elements to include in your poster. You may need to condense whole paragraphs into one or two sentences, so try to identify the most important information only.

You should also include a copy of any supplementary materials that you used during your investigation as an appendix. For example, if you gave your participants a list of words to memorise, you should include a copy of this as an appendix. This does not count in the 600-word limit, but can be referred to in your poster. You will also need to acknowledge your references and collaborators to give appropriate credit to the work of others.

Ultimately, a scientific report is a formal document and this should be reflected in the language that you use. Some psychological terminology can have long names; the first time you use the term, you should write it out in full with an abbreviation in brackets. You can then use this abbreviation throughout your report. For example, Lazarus and Folkman's Transactional Model of Stress and Coping (LFTMSC).

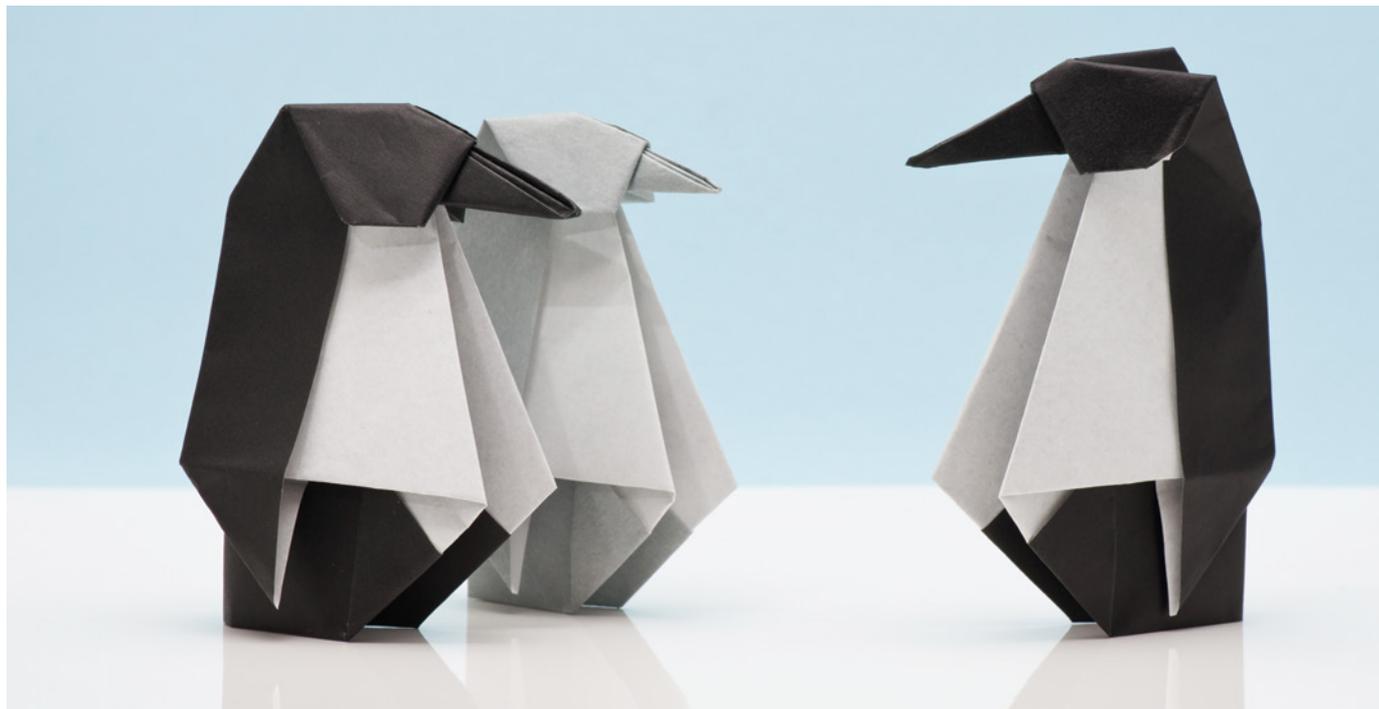


FIGURE 1 Practise your scientific communication skills by reading through a section of Chloe's report on the effect of reward on learning how to fold an origami animal.

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UNIT 4 PRACTICE EXAM QUESTIONS

Multiple choice (15 marks)

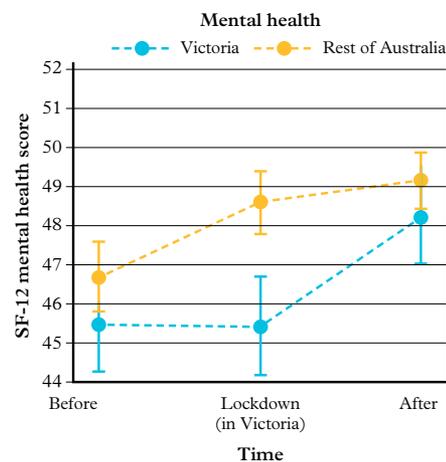
- A student wants to objectively measure sleep. Which of the following is true?
 - It is not possible to objectively measure sleep because the experience of sleep is unique to each individual.
 - Objective measurements of sleep can be completed in a sleep laboratory with instruments such as an EEG.
 - The student can use video monitoring and sleep diaries to objectively measure sleep.
 - By objectively measuring sleep, the student gains secondary data for their investigation.
- Which of the following EOG and EMG responses should you expect to detect when a subject is experiencing REM sleep?
 - EOG would detect low levels of activity and the EMG would also detect low levels of activity.
 - EOG would detect high levels of activity and the EMG would detect high-frequency, low-amplitude brainwaves.
 - EOG would detect high levels of activity and the EMG would detect low levels of activity.
 - EOG would detect low levels of activity and the EMG would detect high levels of activity.
- During adulthood, a person typically requires about _____ hours of sleep each night, with approximately _____ of this spent in NREM sleep.
 - 8; 80%
 - 6; 80%
 - 8; 20%
 - 9; 70%
- For a teenager experiencing delayed sleep phase syndrome (DSPS), which of the following issues would you expect them to experience?
 - Feeling energetic first thing in the morning with their energy levels declining later in the afternoon and evening
 - Feeling tired because they fall asleep very early at night and thus naturally wake up very early before school each day
 - Feeling tired as they make themselves stay awake very late at night completing schoolwork even though they feel tired and are ready to sleep earlier in the evening
 - Feeling tired as they must be up early for school each morning when they feel the need to sleep in later
- Which of the following zeitgebers has the most powerful influence on a person's circadian rhythm?
 - Room temperature
 - Hydration levels
 - Exposure to daylight
 - Eating and drinking patterns
- Kieran is an accountant who has been struggling to sleep for more than about 4 hours each night. Which of the following pairs correctly identify a potential impact on Kieran's cognitive and affective functioning because of his sleep habits?

	Cognitive functioning	Affective functioning
A	Difficulty performing mathematical calculations for client accounts	Increased irritability with work colleagues
B	Increased irritability with work colleagues	Difficulty performing mathematical calculations for client accounts
C	Impaired ability to concentrate during staff meetings	Feeling fatigued when driving home from work
D	Difficulty remembering key dates and timelines for work	Reduced social interactions with colleagues
- The government wants to increase drivers' awareness regarding the dangers of driving while sleep deprived. They seek the help of a Victorian traffic safety research organisation to provide some statistics to include in their brochures. Which of the following is true?
 - They do not need to complete a peer review of the research, since it is produced by a legitimate research organisation.
 - They should only use the statistics once they have been formally published in a scientific journal.
 - Since they asked the research organisation for the data, they do not need to reference the organisation.
 - They should consider using statistics from other sources to strengthen their argument.
- Peter has been working as a nurse in the emergency department of a hospital and reports that since beginning this job, he feels better equipped to deal with unexpected challenges when they arise. This demonstrates:
 - increased mental capacity.
 - increased levels of functioning.
 - increased resilience.
 - reduced anxiety levels.

- 9 Within the social and emotional wellbeing (SEWB) framework for Aboriginal and Torres Strait Islander peoples, the domains can best be described as:
- A a holistic approach to understanding wellbeing.
 - B exposure to social, political, cultural and historical determinants.
 - C the external factors that influence an individual's wellbeing.
 - D the elements of being that overlap and influence one another to affect wellbeing.
- 10 Samantha has an extreme fear of birds that causes her to continually worry that a bird may attack her. Therefore, she chooses to spend her free time indoors as she feels safer, even though she enjoys exercising outside and going to the beach. Where would Samantha fall on the mental wellbeing continuum and why?
- A Low level of mental wellbeing; Samantha is feeling stressed but this does not appear to have a significant impact on her daily life.
 - B Low level of mental wellbeing; Samantha's fear of birds is having a negative impact on her ability to function and is causing her significant distress.
 - C Intermediate level of mental wellbeing; Samantha's fear is negatively impacting her ability to function, causing her stress and she appears to display low resilience as she struggles to manage her fear.
 - D High levels of mental wellbeing; Samantha's fear is only of birds and not other animals or situations.
- 11 To treat his specific phobia, Ken is undergoing systematic desensitisation under the guidance of his therapist. During his first session, Ken experiences an anxiety response due to confronting his phobic stimulus. Which of the following is true?
- A Ken's anxiety response is expected, so he should be discouraged from withdrawing from the treatment.
 - B Regardless of expected responses, Ken has the right to withdraw from the treatment at any time.
 - C Ken's therapist has a duty of care and should make the final decision on whether or not Ken proceeds with the treatment.
 - D Even if Ken withdraws from the treatment, any information collected from his sessions can be used in a study.
- 12 In their scientific report, a researcher discusses the limitations of using benzodiazepines as an intervention for phobia. Which of the following is the most accurate and appropriate way to communicate this?
- A You should only use benzodiazepines to temporarily alleviate anxiety symptoms.
 - B Benzodiazepines permanently influence the activity of GABA in the nervous system.

- C Benzodiazepines temporarily reduce anxiety symptoms without treating the underlying cause of the phobia.
- D Benzodiazepines target both the underlying biological and psychological factors contributing to phobia, but not the social factors.

- 13 During systematic desensitisation, the phobic stimulus is paired with:
- A a negative stimulus.
 - B a positive stimulus.
 - C a negative response.
 - D a positive response.
- 14 Why is cultural continuity important for Aboriginal and Torres Strait Islander peoples' SEWB?
- A By preserving culture, individuals can develop a strong sense of identity, belonging and purpose.
 - B Giving communities control over issues that influence their own lives can improve their sense of identity, belonging and purpose.
 - C There is no other way to learn about one's culture.
 - D It is the basis of relationships, which is essential for wellbeing.
- 15 The figure shows the mental health score of 898 working-age Australians as measured by a 12-item Short-Form (SF-12) health survey, including before, during and after the 112-day COVID-19 lockdown in Victoria. "Before" responses were collected before 8 July 2020. "Lockdown" responses were collected between 8 July and 27 October 2020. "After" responses were collected after 27 October 2020.



Source: Griffiths et al. (2022)

- Which of the following is a valid conclusion or implication from the data?
- A The extended lockdown caused a further reduction in the mental health of Victorians.
 - B The mental health of all surveyed Australians was lower than pre-pandemic levels.
 - C Victorians demonstrated high levels of resilience after the lockdown ended.
 - D The rest of Australia bounced back more quickly due to fewer positive cases of COVID-19 infections.

Short answer (30 marks)

- 1 Yichen is feeling worried about beginning university next month. She has spoken to her friends about her concerns, and they have offered her advice on how to manage the workload. She has also visited the university's website to familiarise herself with the campus where she will be studying. Yichen will be juggling her university degree with her part-time job as a waitress at a restaurant, so she has been investigating the public transport options to get from university to her workplace.

Identify where Yichen would sit on the mental wellbeing continuum, with reference to two characteristics of mental wellbeing that Yichen is demonstrating.

(3 marks)

- 2 Dr Mango is conducting a correlational study to explore the nutritional intake of police officers and its influence on their mental wellbeing.

(6 marks)

a Provide two reasons why a correlational study is an appropriate methodology for this investigation.

(2 marks)

b Dr Mango's colleague, Dr Watermelon, suggests that a controlled experiment could also be appropriate for this investigation, but Dr Mango disagrees. Outline one reason why a controlled experiment may not be appropriate.

(1 mark)

After completing the investigation, Dr Mango determines that the majority of the police officers consumed a lack of nutritious meals while at work. Instead, they mainly consumed processed takeaway foods and snacks.

c Explain how inadequate nutritional intake can impact a person's mental wellbeing.

(2 marks)

d Suggest one strategy that the police officers could implement to improve their nutritional intake while at work.

(1 mark)

3 Dr Lina is a sleep researcher who is studying the effect of nightmares on mental wellbeing. During participants' stay at the sleep laboratory, she intends to ask them to keep a sleep diary, as well as record measurements such as brainwave activity, eye movements and limb movements.

(8 marks)

a Construct a hypothesis for Dr Lina's experiment.

(3 marks)

b Explain the benefit of using both objective and subjective data collection methods in Dr Lina's research.

(2 marks)

c Describe a potential affective impact that her participants may experience the following day if they experienced less than 5 hours of sleep as a result of nightmares.

(1 mark)

d During the debriefing following the completion of the study, one participant reaches out to Dr Lina with some questions. They explain that they often have nightmares about horses due to a phobia, which they developed after they were bucked off a horse during childhood. Ever since then, they refuse to go near horses and avoid any events where horses may be.

Outline how their phobia was perpetuated through operant conditioning.

(2 marks)

4 Kirra is a Tatungalong woman who was born and raised on Gunaikurnai land in Gippsland, Victoria. She is currently working in Sydney at a marketing agency and is the only Aboriginal person employed at her company. Kirra finds her work challenging but enjoyable; however, she feels a sense of loneliness as she misses her family and feels as though she is missing out on important cultural knowledge that is shared among her community.

With reference to two domains of the social and emotional wellbeing (SEWB) framework, discuss how Kirra could improve her mental wellbeing.

(4 marks)

5 Every year, Australia Post recruits casual workers to meet the demands of the holiday period. As the Australia Post sorting centre operates 24 hours a day, new employees are required to work rotational night shifts.

(9 marks)

a Explain why working rotational night shifts can cause significant disruptions to an individual's circadian rhythm.

(2 marks)

b Identify one zeitgeber and explain how a night-shift worker can use it to improve their sleep during the day, with reference to the relevant biological mechanisms.

(3 marks)

c Discuss how working rotational night shifts might affect the mental wellbeing of a university student working at Australia Post compared to an older adult.

(4 marks)

UNITS 3 & 4 PRACTICE EXAM QUESTIONS

Multiple choice (25 marks)

- 1 Fathima was feeling excited as she was just about to compete in her football grand final match in front of over one thousand spectators, including her family and friends. Which of the following responses likely occurred as part of her stress response?

A Decreased cortisol production
B Constriction of pupils
C Redistribution of blood flow to skeletal muscles
D Increased digestion

- 2 Feng has just heard that his brother has been injured in a car accident. He gets into a taxi and rushes to the hospital to be with his brother. Which of the following describes the stage of Selye's General Adaptation Syndrome (GAS) model that Feng is currently experiencing and the hormone that is dominant in his body?

	Stage of GAS	Dominant hormone
A	Alarm reaction	Adrenaline
B	Resistance	Adrenaline
C	Alarm reaction	Cortisol
D	Shock	Adrenaline

- 3 Which of the following correctly describes a function of dopamine and serotonin as neuromodulators in the nervous system?

	Role of dopamine	Role of serotonin
A	Coordinating fluid, voluntary muscular movement	Conscious perception of sensory information
B	Immune system regulation	Regulation of sleep-wake cycle
C	Reward-based learning	Regulation of sleep-wake cycle
D	Reward-based learning	Muscle contraction and movement

- 4 When GABA is released from a pre-synaptic neuron, what will it do?

A Bind to a complementary receptor on a post-synaptic neuron and pass on an excitatory effect.
B Bind to a complementary receptor on a post-synaptic neuron and pass on an inhibitory effect.
C Be reabsorbed into the vesicles of the post-synaptic neuron.
D Bind to a complementary receptor on a pre-synaptic neuron and pass on an inhibitory effect.

- 5 Caleb is learning his five times tables for the first time; however, he frequently makes mistakes as he practises this skill. What is likely occurring during Caleb's learning?

A High levels of GABA are being released by neurons in his brain, contributing to weakening of neural connections associated with the five times tables.
B High levels of glutamate are being released by neurons in his brain, contributing to the pruning of neural connections associated with the five times tables.
C High levels of GABA are being released by neurons in his brain, contributing to sprouting neural connections associated with the five times tables.
D High levels of glutamate are being released by neurons in his brain, contributing to stronger neural connections associated with the five times tables.

- 6 For Aboriginal and Torres Strait Islander peoples, learning can be connected to Country. What does this involve?

A Learning new information can only occur on the physical land where one's ancestors lived.
B Integrating knowledge, culture and a deep spiritual connection to one's ancestral lands enhances learning of new skills or information.
C Different parts of the land provide different resources that can contribute to learning new skills or information.
D Learning means how to manage the physical environment where one lives.

- 7 Pavlov conditioned a dog to salivate to the sound of a bell by repeatedly pairing the ringing of the bell with the presentation of dog food. Which of the following is true about his experiment?
- A The bell was previously a neutral stimulus that became an unconditioned stimulus after it was repeatedly paired with the dog food.
 - B Presentation of the dog food was an unconditioned stimulus that naturally caused an unconditioned salivation response from a dog.
 - C Salivation in response to the bell is an unconditioned response because this is a naturally occurring response from a dog.
 - D The bell became a conditioned stimulus, which led to the conditioned response of salivating in response to the dog food.
- 8 Martin enjoys playing chess and competes in many chess competitions. Which of the following options correctly identifies the brain regions responsible for Martin's memory of chess rules and his ability to execute the required moves during his turn in chess competitions?

	Brain region responsible for memory of chess rules	Brain region responsible for ability to execute chess move
A	Basal ganglia	Neocortex
B	Neocortex	Hippocampus
C	Neocortex	Basal ganglia
D	Amygdala	Basal ganglia

- 9 Huan is listening to his teacher's instructions on how to answer a practice exam question. Which of the following units would be the most appropriate to measure the time that Huan's teacher's words remain in his sensory memory?
- A Minutes
 - B Years
 - C Hours
 - D Seconds

Use the following information to answer questions 10 to 12.

Roger is a 30-year-old man who has decided to participate in a sleep study at a sleep laboratory to learn more about his sleep quality. He has been asleep for the past 6 hours.

- 10 If he is now experiencing his final sleep cycle for the night, which stage of sleep will he likely spend the longest in during this cycle?
- A N1
 - B N2
 - C N3
 - D REM
- 11 What is an expected result from video monitoring and EOG during this stage of sleep?

	Video monitoring	EOG
A	Immobile body	Low-frequency, high-amplitude waves
B	Hypnic jerk	Decreased activity
C	Occasional twitching of limbs	High-frequency, low-amplitude waves
D	Immobile body	Increased activity

- 12 At the end of Roger's sleep episode, the lights are switched on in the laboratory. When high levels of light are detected, the information is received by light-sensitive cells in Roger's retina and then:
- A transmitted to the SCN, which will send inhibitory neural messages to the pineal gland to prevent the release of melatonin.
 - B transmitted to the SCN, which will send excitatory neural messages to the pineal gland to promote the release of melatonin.
 - C transmitted to the pineal gland, which will send excitatory neural messages to the SCN to promote the release of melatonin.
 - D transmitted to the pineal gland, which will send inhibitory neural messages to the SCN to prevent the release of melatonin.

Use the following information to answer questions 13 and 14. Individuals who work in underground mines often spend most of their day in dark conditions before leaving work and returning home at night, when it is dark outside.

- 13** Which of the following is most likely to occur?
- A** A lack of exposure to daylight may interfere with the individual's ultradian rhythm, resulting in them having difficulty falling asleep and waking up during conventional hours.
 - B** A lack of exposure to daylight may interfere with the individual's circadian rhythm, resulting in the de-synchronisation of their sleeping and waking patterns.
 - C** A lack of exposure to daylight during their shift may result in an individual feeling more alert and awake during these working hours than they would in lighter conditions.
 - D** A lack of exposure to daylight may interfere with the individual's circadian rhythm, resulting in them feeling more alert throughout the day at work.
- 14** Which of the following sleep hygiene strategies would be most beneficial to help them maintain a typical sleep-wake cycle?
- A** Minimise exposure to bright light when they wake up and go to work.
 - B** Eat a larger meal when they have finished their shift, rather than in the morning.
 - C** Ensure that they sleep in a cool room with warm bedding.
 - D** Have a cold shower before getting into bed to lower their body temperature.
- 15** A similarity between stress and anxiety is that:
- A** both occur in response to a known stimulus.
 - B** both can contribute to declines in mental wellbeing if they are ongoing or recurring.
 - C** both involve apprehension about a possible future event.
 - D** both involve a fear response that is proportionate to the stressor.

Use the following information to answer questions 16 to 18.

Nayana has a phobia of roller coasters. She has decided to do some research online for different treatment strategies to address her phobia.

- 16** Nayana learns that systematic desensitisation involves the development of a fear hierarchy. Which of the following would most likely be scored 90 on Nayana's fear hierarchy?
- A** Stepping onto a roller coaster ride
 - B** Seeing a picture of a roller coaster
 - C** Hearing a friend describe a roller coaster ride
 - D** Reading about the mechanics of a roller coaster
- 17** Nayana also reads about CBT. A cognitive-behavioural strategy that she could implement if she is feeling anxious is:
- A** watching distressing news on TV to try to desensitise herself to anxiety.
 - B** avoiding any situation that triggers feelings of anxiety.
 - C** consuming large amounts of caffeine to remain alert and reduce anxiety.
 - D** practising reframing her anxious thoughts to more balanced ones.
- 18** Before Nayana decides which strategy to try, it is most appropriate that she:
- A** solely trusts the opinion of a professional.
 - B** collects as many sources of information she can to support her decision.
 - C** conducts thorough research into all of her options and understands their strengths and weaknesses.
 - D** consults a friend for advice.
- 19** Esther is a 9-year-old Dja Dja Wurrung girl from the Eastern Kulin, Port Phillip region of central Victoria. Over the summer, she spends a lot of time with her peers on the weekends, learning about the environment from the local leaders. This represents a strong connection to:
- A** Country.
 - B** community.
 - C** spirit, spirituality and ancestors.
 - D** family and kinship.

20 A team of researchers conducted a study to evaluate the impact of a new learning program on academic performance of high school students. While the overall findings indicate that the intervention led to improved performance, the study also revealed significant variability in individual student outcomes. Some students' academic performance improved a lot, while others experienced no improvement or even a decline. What does this indicate?

- A** Confounding variables have caused a systematic change in the dependent variable.
- B** Systematic errors have occurred when recording students' academic performance.
- C** A level of uncertainty is present in the study.
- D** The study has a high level of internal validity as the researchers can attribute changes in the dependent variable to the effects of their learning program.

Use the following information to answer questions 21 to 25.

In an investigation examining the impact of background noise on memory retention, participants are randomly assigned to either a quiet room or a noisy room while studying. All participants were then asked to complete a memory test one hour later.

21 Which investigation methodology has been used?

- A** a controlled experiment with a between-subjects design
- B** a controlled experiment with a within-subjects design
- C** a correlational experiment with a mixed design
- D** a controlled experiment with a mixed design

22 After collecting the results, the researchers find that some participants in the quiet room were exposed to loud noises due to nearby construction work, which affected their concentration. What is present in the investigation?

- A** Confounding variable
- B** Controlled variable
- C** Systematic error
- D** Personal error

23 When obtaining a sample for the investigation, which of the following would have been considered?

- A** A narrow inclusion criteria, to improve the external validity of the results
- B** The sample size, making sure it is not too large and, therefore, manageable by the researchers
- C** The population characteristics, to make sure they adequately reflect the sample
- D** Recruitment of participants using the most affordable strategies, to reduce spending and minimise money wasted

24 Which of the following demonstrates that the researchers have upheld the ethical concept of integrity?

- A** Honestly reporting their findings even if they are not as expected
- B** Ensuring that all participants are debriefed at the completion of their investigation
- C** Respecting each participant's right to voluntarily agree to participate in their investigation
- D** Ensuring that there is no unfair burden placed on some of the participants and not others

25 At the completion of the study, the researchers assess the validity of the study. They conclude that the study:

- A** lacked internal validity, as confounding variables had occurred, but could be considered externally valid as a representative sample had been obtained.
- B** lacked internal validity, as confounding variables had occurred; therefore, could not be considered externally valid.
- C** was internally valid as its findings applied to similar individuals in different settings and was externally valid as they had another researcher review and agree with the findings.
- D** was valid as the results were robust.

Short answer (50 marks)

1 Davina has been constantly under the pump in her new job as an accountant. Her team has taken on many new projects; however, they do not have enough staff to support the workload. Due to the endless cycles of pressing deadlines, Davina is under a lot of stress.

(11 marks)

a With reference to the scenario, compare acute and chronic stress, providing examples of each.

(4 marks)

b Davina has enrolled in a series of online yoga classes to help her de-stress. She logs on during the first session, watches the instructor on the screen, and copies the yoga poses she sees. Identify the two subdivisions of the nervous system that interact to allow Davina to participate in the online yoga class, and describe their roles.

(4 marks)

c When Davina speaks to her friends about her stress, they suggest that, in addition to yoga, she tries to eat more healthily. One of them claims, “There’s a very strong connection between the digestive system and brain”. Explain how the exchange of information within the gut–brain axis (GBA) can influence Davina when she is experiencing stress

(3 marks)

2 Dr Ng is conducting an experiment to determine the effectiveness of mnemonics on memory recall. They obtain 50 participants who are randomly allocated into three conditions. All participants are given a list of 15 words to remember. In condition A, participants are not given a mnemonic device; in condition B, they are provided with an acronym; and in condition C, they are taught how to use the method of loci to help them remember the same list of 15 words. All participants are given 5 minutes to memorise the words and then asked to recall any words that they can remember.

(8 marks)

a Explain why an acronym is a mnemonic device.

(2 marks)

b Predict the results of this investigation and justify your answer.

(3 marks)

c Explain the impact of Alzheimer’s disease on a participant’s performance on the memory test, with reference to one brain region impacted by the disease.

(3 marks)

3 Jeremy has observed his neighbour skateboarding down their driveway regularly and now wants to be able to skateboard himself.

(7 marks)

a Outline how Jeremy could use observational learning to pick up skateboarding, with reference to the phases of retention and reproduction.

(4 marks)

b At first, Jeremy practises standing on the skateboard with one foot always on the ground. After this, he begins to practise balancing with both feet on the board. Explain how long-term depression contributes to Jeremy learning how to skateboard.

(3 marks)

4 A psychologist wants to conduct research to determine how the sleeping patterns of naval officers are influenced by travelling at sea for extended periods of time.

(16 marks)

a Explain how the researcher could carry out fieldwork for this investigation.

(2 marks)

b The psychologist has access to an EOG for their research. Explain what an EOG is and describe one benefit and one limitation of using this method to record sleep data.

(3 marks)

c The psychologist discovers that the naval officers' sleeping quarters are very warm as they do not have adequate air ventilation. With reference to temperature as a zeitgeber, explain one likely effect of these conditions on the sleeping and waking patterns of the naval officers.

(3 marks)

d The naval officers work rotational shifts at sea, consisting of three day shifts working from 9 a.m. to 3 p.m., three night shifts working from 11 p.m. to 5 a.m., followed by one day off. Explain why naval officers are susceptible to experiencing a circadian phase disorder due to their shiftwork, with reference to key biological structures and processes.

(2 marks)

e Occasionally, as part of their training drills, naval officers must remain awake for an entire 24-hour period. They are subjected to a series of demanding cognitive tasks during this time. Predict the expected difference in their performance on these tasks at the start of the training session compared to the end, considering the impact of sleep deprivation on their functioning.

(2 marks)

f After the psychologist completes their investigation, they conclude that travelling at sea for extended periods of time has a negative impact on the sleep–wake cycles of naval officers. Explain how the psychologist could determine if their results are repeatable and reproducible.

(4 marks)

5 Kalti is a proud Aboriginal man who is a leader among his community in the Northern Territory. He works closely with youth in the area, supporting their wellbeing and helping to develop their sense of identity by sharing important cultural knowledge and running community activities. This includes ensuring that the next generation have access to social support to build positive relationships with others in their community, so they feel proud of their heritage.

(5 marks)

a Explain two cultural determinants that are likely having an impact on Kalti’s wellbeing.

(4 marks)

b Provide an example of authentic social support that could benefit Kalti’s community.

(1 mark)

6 Cris develops a phobia of flying after he experiences being onboard an aeroplane that had to make an emergency landing due to a fault in one of its engines. Cris found this experience very frightening and has since refused to fly. Explain how CBT could be used to manage Cris’s phobia of flying.

(3 marks)

CHAPTER

12

Investigations

To complete VCE Psychology, you will need to complete at least 10 hours of practical work for each of Units 3 and 4, plus at least 10 hours for Unit 4 Area of Study 3. Practical work can cover a range of scientific investigation methodologies, such as controlled experiments, modelling, case studies, classification and identification, literature reviews, fieldwork, correlational studies, simulations, and product, process or system development. All investigations that are undertaken as part of your course, as well as School-assessed Coursework (SACs), should be written in a logbook that will be monitored and submitted to teachers. Before undertaking an investigation for the first time, ethical concerns should be considered, including the importance of sociocultural, economic, political and legal factors that may arise from science-related decision-making.



SAFETY IN THE LABORATORY

This chapter will highlight key safety concerns for each investigation, though there are some general safety concerns to be considered before completing any practical work.

- Do not eat or drink in the lab.
- Always be aware of your peers and act in a way that will not cause harm.
- Wear a lab coat, safety glasses, close-toed shoes and gloves when appropriate.
- Review the school's safety procedures and location of the eyewash, shower, spill kits and first aid kits.
- Handle all materials with care and consult your teacher to help conduct risk assessments for all hazards involved with materials or procedures.
- Always check that electrical equipment is not damaged and that there are no exposed wires before use.
- Conduct fieldwork in groups, and complete a full risk assessment before any excursion.

It is the responsibility of the teacher and school to conduct a risk assessment before any investigation covered in this book.



KEEPING A LOGBOOK

You are required to maintain a logbook of practical work for recording, authentication and assessment purposes. Make sure that you clearly document your observations for each investigation and record all of your responses to the questions in your logbook.

FIGURE 1 In Unit 3, you may conduct an investigation on memory using memory tests.

2.1**INVESTIGATION:
SIMULATION**

Does activation of the sympathetic and parasympathetic nervous systems lead to a change in heart rate?

**Investigation worksheet 2.1**

Does activation of the sympathetic and parasympathetic nervous systems lead to a change in heart rate?

**Risk assessment 2.1**

Does activation of the sympathetic and parasympathetic nervous systems lead to a change in heart rate?

Context

There are two branches of the autonomic nervous system: the sympathetic nervous system and the parasympathetic nervous system. The sympathetic nervous system prepares the body for action and regulates the flight-or-fight-or-freeze response. The parasympathetic nervous system calms the body after action and restores it to its normal state.

When you are faced with a threatening or stressful situation, your sympathetic nervous system automatically prepares your body for action. It makes the heart beat faster, opens up airways, dilates pupils and releases hormones such as adrenaline to energise the body, among other things. Once the threat has passed, the parasympathetic nervous system returns the body to its normal state of functioning. In this investigation, you will simulate the effect of riding a roller coaster to activate the sympathetic and parasympathetic nervous systems and determine what effect this activation has on heart rate.



FIGURE 1 Riding a roller coaster is an activity that triggers our sympathetic and parasympathetic nervous systems.

Aim

To determine whether the activation of the sympathetic and parasympathetic nervous systems leads to a change in heart rate.

Materials

- Mobile phone
- Virtual roller coaster app (e.g. Roller Coaster VR Theme Park) downloaded and installed on a mobile phone
- VR goggles or headset to hold the mobile phone
- Stopwatch



FIGURE 2 For this investigation, you will need a VR headset to hold the mobile phone.

Method

- 1 As a class, form into two groups. Group 1 will be the researchers and Group 2 will be the participants.
- 2 Pair up with someone from the opposite group so that your pair consists of one researcher and one participant.
- 3 Ensure that your pair has access to a VR headset/goggles and a phone with the virtual roller coaster app downloaded and installed.
- 4 In your pair, the researcher records the participant's resting heart rate via pulse by placing two fingers on their wrist and counting how many beats occur for one minute (use a stopwatch to count one minute).
- 5 The participant begins the virtual reality roller coaster ride and the researcher starts the stopwatch.

- 6 Record the participant's heart rate (via pulse) after one minute as they continue to watch the roller coaster simulation. Place this information into the results table.
- 7 Record the participant's heart rate (via pulse) immediately after the ride concludes.
- 8 Record the participant's heart rate five minutes after the ride concludes.

Results

- 1 Record heart rate in the following table.

Heart rate intervals	Participant 1
Resting heart rate	
Heart rate during roller coaster ride	
Heart rate immediately after ride concludes	
Heart rate 5 minutes after ride concludes	

- 2 Calculate mean heart rate for all participants in the class.

Heart rate intervals	Mean
Resting heart rate	
Heart rate during roller coaster ride	
Heart rate immediately after ride concludes	
Heart rate 5 minutes after ride concludes	

Discussion

- 1 Identify the name of the nervous system branch that is responsible for accelerating heart rate and explain the role of this branch.

- 2 Identify the name of the nervous system branch that is responsible for decelerating heart rate and explain the role of this branch.
- 3 Discuss why heart rate increases to prepare the body for action and how this relates to riding a roller coaster.
- 4 Explain how changes in heart rate can be used to determine activation of the sympathetic and parasympathetic nervous systems.
- 5 Discuss, using examples from the data, whether the results support the role of the sympathetic nervous system in preparing the body for action.
- 6 Discuss, using examples from the data, whether results support the role of the parasympathetic nervous system in returning the body to its normal state.
- 7 Assess one benefit and one limitation of using a roller coaster simulator over the real thing.

Conclusion

Provide a paragraph to summarise the aim of the experiment, your results and the key inferences that can be drawn from the experiment in relation to the role of the autonomic nervous system in controlling involuntary responses such as heart rate. Ensure you use data as evidence to support conclusions.

2.3

INVESTIGATION:
MODELLING

How can neural transmission across a synapse be modelled?



Investigation worksheet 2.3

How can neural transmission across a synapse be modelled?



Risk assessment 2.3

How can neural transmission across a synapse be modelled?

Context

A synapse is the site where neural communication occurs. Neurons send information from one neuron to the next neuron in the form of a chain. Each neuron passes the information across the synapse to the next neuron until the message has been delivered. The presynaptic neuron sends a message via neurotransmitters released at the axon terminals and the postsynaptic neuron receives the message via the dendrites. Dendrites then send the message along the soma to be released again to continue the chain.

Aim

To model how neural transmission occurs across a synapse.

Materials

- Coloured playdough
- Camera

Method

- 1 Use playdough to build the first stage of synaptic transmission. This should include the synapse, presynaptic neuron with vesicles full of neurotransmitters and postsynaptic neuron (Figure 1). After you have built stage 1, take a photo of it and save it.

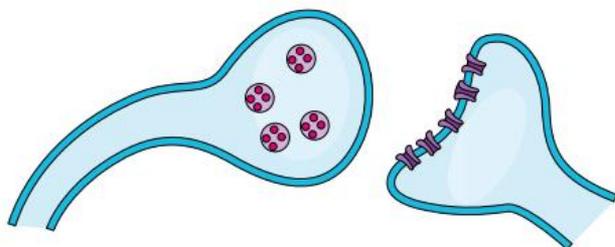


FIGURE 1 Your model of stage 1 should look something like this.

- 2 Use playdough to build the second stage of synaptic transmission. This should include the opening of the vesicles to release neurotransmitters into the synaptic cleft (Figure 2). After you have built stage 2, take a photo of it and save it.

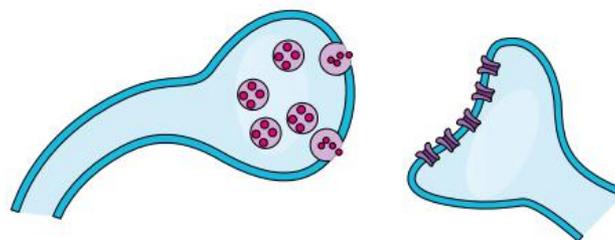


FIGURE 2 Your model of stage 2 should look something like this.

- 3 Use playdough to build the third stage of synaptic transmission. This should include neurotransmitters released into the synaptic cleft and binding to receptors on the postsynaptic neuron (Figure 3). After you have built stage 3, take a photo of it and save it.

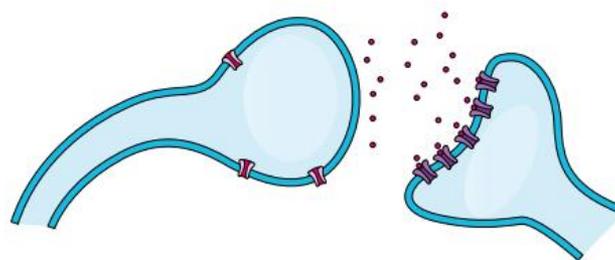


FIGURE 3 Your model of stage 3 should look something like this.

Discussion

- 1 Place a photo of each stage in your logbook, a Word document or PowerPoint slides and describe what is happening at each stage.

- 2 Annotate stages 1 to 3 so that each of the following are clearly labelled.
 - Vesicles
 - Neurotransmitters
 - Presynaptic neuron
 - Postsynaptic neuron
 - Synaptic cleft
 - Receptor
- 3 Describe what will happen to the postsynaptic neuron after the neurotransmitters bind to it.
- 4 Using your model as a guide, write a detailed summary of how neural transmission occurs across a synapse.
- 5 Identify one benefit of using modelling as an investigation methodology to examine how neural transmission occurs.
- 6 Propose how you could use playdough and/or other materials to model processes of synaptic plasticity such as long-term potentiation and long-term depression.
- 7 Propose how you could use playdough and/or other materials to model neuromodulation. Discuss how this process differs from the process of neurotransmission you have modelled today.

3.1

INVESTIGATION:
PRODUCT, PROCESS OR
SYSTEM DEVELOPMENT

How can we teach primary school students about the flight-or-fight-or-freeze response?



Investigation worksheet 3.1

How can we teach primary school students about the flight-or-fight-or-freeze response?

Context

In Years 5 and 6, Victorian primary school students learn about how living things have structural features and adaptations that help them to survive in their environment. The flight-or-fight-or-freeze response is one such example of an adaptive response our body undergoes when confronted by a threat or stressor to increase our chances of survival. In this investigation, you will design an engaging product or experience to teach Years 5 and 6 students about the flight-or-fight-or-freeze response.



FIGURE 1 The flight-or-fight-or-freeze response helps us respond to threats such as predators.

Aim

To design an engaging product or experience to teach Years 5 and 6 students about the flight-or-fight-or-freeze response.

Method

- 1 Revise and summarise the main ideas behind the flight-or-fight-or-freeze response. To design an effective educational product or experience, it is important that you have a strong foundation of knowledge about the concept you are trying to teach or communicate. This allows you to adapt the ideas behind the concept into a manner that suits your audience.
- 2 Research your target audience. To ensure your product or experience is engaging, you need to have a strong understanding of your audience, including their education level, likes and dislikes and what they are interested in. Knowing your audience will help you to determine what level of information to share with them and the mode of delivery for doing so (e.g. an artwork, a comic, a play, a story, a song, an animation). You may wish to research the following either through using the internet or by interviewing individuals from your target audience:
 - How much do Years 5 and 6 students know about the flight-or-fight-or-freeze response and stress?
 - What sort of media formats do Years 5 and 6 students engage with?
 - What are Years 5 and 6 students interested in outside of school?
- 3 Select a format for your product or experience. Now that you have a better understanding of your audience, you should select a format for your educational product that will help engage them. You should also select a format that plays to your strengths; for example, if you are interested in drama, you may like to create a short play, or if you are interested in music, you could create a short song. Playing to your strengths can improve the quality of the product or experience you produce.
- 4 Determine which ideas or concepts about the flight-or-fight-or-freeze response you will incorporate into your product or experience and brainstorm how you could do this.
- 5 Create the prototype for your product or experience. Depending on the format you have selected, you may need to use art, software or musical instruments or even recruit other people to perform with you.

- 6 Show your prototype to at least three other individuals and collect their feedback on its strengths and weaknesses.
- 7 Develop your final product by modifying the prototype based on the feedback you received to enhance the strengths of your product.
- 8 Create a test to evaluate the effectiveness of your product or experience. Now that you have designed your product, you need to create a test to determine whether it was successful in addressing its purpose (to educate Years 5 and 6 students about the flight-or-fight-or-freeze response). For example, you could supply students with a short test to see how well they have learnt or interview students to see how well they have retained the information your product shares.

- 9 Demonstrate your educational product or experience to a Years 5 or 6 class and evaluate its effectiveness using your tests (optional).

Discussion

- 1 What were the strengths and limitations of your final product or experience?
- 2 If you had more time and resources to redesign your product or experience, what would you change or improve about the product or design process?
- 3 Discuss how you might adapt your product to make it suitable for:
 - a a younger class (Prep and Year 1).
 - b an older class (Year 10).

3.4

INVESTIGATION:
LITERATURE REVIEW

Can diets rich in healthy bacteria and probiotics be used to treat stress-induced gastrointestinal damage?



Investigation worksheet 3.4

Can diets rich in healthy bacteria and probiotics be used to treat stress-induced gastrointestinal damage?

Context

The gut microbiome is made up of around 100 trillion microorganisms, including bacteria, fungi, protozoa and viruses. Emerging research has revealed the importance of the gut microbiome working with intestinal cells to assist in a range of critical functions. This includes functions related to our stress response. Chronic stress can damage the gut microbiome and lead to dysbiosis, irritable bowel syndrome, leaky gut syndrome and other gastrointestinal issues. This raises the question of whether diets rich in healthy bacteria and probiotics can reduce damage in the gut caused by chronic stress.

Aim

To investigate whether diets rich in healthy bacteria and probiotics can be used to treat stress-induced gastrointestinal damage.



FIGURE 1 A variety of foods containing probiotics

Method

1 Look for secondary sources of information in places such as the internet, books, scientific

magazines, videos, podcasts, or an interview with an expert.

- 2 Use the CRAAP method to evaluate the reliability of your sources. This method is outlined in Topic 11.1.
- 3 Make notes about what you have learnt. You can organise your information in different ways. Examples of how to organise information can be found in Topic 11.1.
- 4 Prepare a written report that answers the following questions.
 - a What are probiotics and healthy gut bacteria and why are they important for gastrointestinal health?
 - b What is the gut–brain axis?
 - c How does chronic stress affect gastrointestinal health?
 - d How do healthy gut bacteria and probiotics affect the damage caused to the gastroenteric system by chronic stress? What evidence/data exists to support this?
 - e If probiotics and healthy gut bacteria can be used to treat stress-induced gastrointestinal damage, how can individuals with stress-induced gastrointestinal damage incorporate healthy bacteria and probiotics into their diet?
- 5 Make sure to record the details of all the sources you use, including the title of the source, who it was written by, when it was written, page numbers or URLs and the date you accessed it. You will need this information to put together a bibliography.

4.1

INVESTIGATION:
MODELLING

How can we model the process of observational learning in practice?



Investigation worksheet 4.1

How can we model the process of observational learning in practice?



Video

How to make a paper origami heart

Context

Observational learning is a model of social-cognitive learning in which individuals learn by watching the behaviours of others. In observational learning, the learner watches a model, retains the information and attempts to reproduce the behaviour, providing they are motivated to do so. Reinforcement is a key part of this type of learning because it determines whether a behaviour will occur again. Behaviours that are reinforced are more likely to be repeated. As observational learning is a social form of learning, watching the consequences given to the model will inform whether the learner themselves will reproduce a behaviour that has been observed.

The five stages of observational learning determine whether learning has occurred. These stages are attention, retention, reproduction, motivation and reinforcement.

In this investigation, you will model the process of observational learning by monitoring someone as they attempt to learn how to make a paper heart by watching a video tutorial.

Aim

To model the process of observational learning by watching someone attempt to learn a new skill after viewing a video.

Materials

- One square piece of plain paper (15 cm × 15 cm)
- Access to YouTube tutorial clip “How to make a paper origami heart” (you can access this from the hotspot in your *obook pro*)
- Pen and paper for recording participant observations

Method

- 1 Select one participant to be your learner in the investigation. Ensure relevant informed consent

forms and procedures are followed before commencing.

- 2 Have the participant watch the entire video tutorial.
- 3 Provide the participant with one square piece of plain paper (15 cm × 15 cm) and instruct them to make a paper origami heart.
- 4 Take notes on the participant’s behaviour that you observe as they watch the video and subsequently make the heart.

Results

- 1 Use recorded observations of the participant’s behaviour to comment on what could be seen as they moved through each stage of observational learning: attention, retention, reproduction, motivation, reinforcement.

Discussion

- 1 Did the learner successfully acquire a new skill and learn how to make a paper origami heart? Justify your response.
- 2 Are the recorded observations a form of quantitative or qualitative data? Justify your response.
- 3 Describe which recorded observations support each stage of observational learning.
- 4 Explain, with reference to the results, why observational learning is a form of social-cognitive learning.
- 5 Discuss the implications of these findings on how people learn through observation.

Conclusion

Write a paragraph to summarise how new skills are acquired through observational learning and how the five stages of observational learning are important in the learning process.

4.2

INVESTIGATION:
SIMULATION

How do different circumstances affect the time in which a conditioned response is learnt?



Investigation worksheet 4.2

How do different circumstances affect the time in which a conditioned response is learnt?

Simulator
Pavlov's dog

Context

Classical conditioning is a behaviourist approach to learning that occurs through the repeated association of two or more stimuli. Learning is said to have occurred when an involuntary response is produced to a stimulus that previously did not induce that behaviour.

In this investigation, you will use a simulation to investigate the conditions required for classical conditioning to take place.

Aim

To investigate how different circumstances affect the time in which a conditioned response is learnt

Materials

- Internet access and a computer
- Access to the classical conditioning simulator “Pavlov’s dog” (you can access this from the hotspot in your obook pro)
- Headphones (to listen to the sounds in the simulation)

Method

Part A

- 1 Open the “Pavlov’s dog” simulator and press “Play”. Once the simulator has loaded on the screen, click on the dog to enter the conditioning environment.
- 2 Click on the horn (Figure 1) so the dog is alert, and then quickly click and drag a sausage to the bowl for the dog to eat. Repeat this step until all the sausages are gone. Make sure the dog is asleep again before you click on the horn for pairing.



FIGURE 1 Clicking the horn to alert the dog

- 3 Click on the horn so the dog is alert, and then quickly drag a piece of ham to the bowl for the dog to eat. Repeat this step until all the pieces of ham are gone or until the dog begins to salivate at the sound of the horn before being presented with food. Record the number of pairings it took to condition the response.

Part B

- 1 Reset the simulator.
- 2 Click on the bell so the dog is alert, and then quickly drag a sausage or piece of ham to the bowl for the dog to eat.
- 3 Click on the drum so the dog is alert, and then quickly drag a sausage or piece of ham to the bowl for the dog to eat.
- 4 Click on the horn so the dog is alert, and then quickly drag a sausage or piece of ham to the bowl for the dog to eat.
- 5 Repeat steps 2 to 4 in order until all the meat is consumed or until the dog becomes conditioned to the sound of the horn, bell or drum. Record the number of pairings it took to condition the response.

Part C

- 1 Reset the simulator.
- 2 Click on the horn so the dog is alert, and then quickly drag a sausage or piece of ham to the bowl for the dog to eat.
- 3 Click on the horn so the dog is alert, and then quickly drag a banana to the bowl.
- 4 Repeat steps 2 and 3 in order until all the bananas are gone, and then continue to repeat step 2 until all the meat is gone. Record the number of pairings it took to condition the response.

Discussion

- 1 Identify each of the following from Part A.
 - a Neutral stimulus (NS)
 - b Unconditioned stimulus (UCS)
 - c Conditioned stimulus (CS)
 - d Unconditioned response (UCR)
 - e Conditioned response (CR)
- 2 Are the NS and CS the same across all conditioning simulations (Parts A to C)? Describe how they are alike and how they are different.
- 3 Explain why it was important to feed the dog very quickly after it heard the noise of the horn.
- 4 Which conditioning simulation (Part A, B or C) required the least number of pairings to elicit a CR? Discuss what factors may have contributed to the other two conditioning simulations requiring more pairings to result in a CR.
- 5 Discuss why it is unlikely that the dog could be conditioned to salivate at the sound of a horn if it was only fed bananas at each pairing.
- 6 Identify two benefits of using a simulation to observe how a CR can be learnt.

Conclusion

Summarise the process of classical conditioning using the NS, UCS, CS, UCR and CR from Part A.

4.3

INVESTIGATION:
CASE STUDY

Can pigeons learn to operate military weapons?



Case study 4.3

Can pigeons learn to operate military weapons?

Context

In this activity, you will strengthen your knowledge of operant conditioning by applying your understanding to the following case study.

The case

During the Second World War in the 1940s, the United States encountered difficulties in achieving precise targeting of bombs. These challenges prompted American psychologist B.F. Skinner to explore innovative approaches to improve the accuracy of targeting. Having already made significant advancements in operant conditioning by training animals to perform tasks in exchange for rewards, Skinner predicted that pigeons could be trained to guide bombs towards ground targets. This initiated “Project Pigeon”, an experiment in which Skinner applied operant conditioning principles to determine whether pigeons could be trained to improve bomb targeting capabilities.

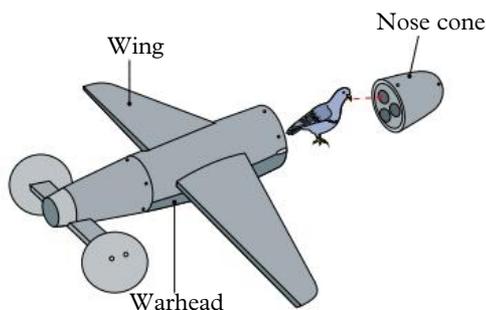


FIGURE 1 The proposed pigeon-guided missiles

Skinner experimented with pigeons by harnessing their pecking movements and their ability to repeat behaviours that have been positively reinforced. Through principles of operant conditioning, Skinner trained pigeons to recognise images of an outline of a target and to peck it with their beaks when they saw this target displayed on a screen. Skinner created a nose cone for missiles containing screens. Three pigeons were placed in

the nose cone and their pecking movements on the image of the target guided the missile. While the pigeons tapped on the image of the target, the nose of the missile continued to face the target. The pigeons were rewarded with food when pecking the target and therefore continued to peck and repeat this behaviour.



FIGURE 2 Skinner trained pigeons to peck at targets presented on screen.

Skinner found that once the pigeons had been successfully conditioned to tap on the target they rarely, if ever, missed the target. Unfortunately, the government pulled the project in October 1948 to focus on other projects. Project Pigeon was revived by the Navy in 1948 and renamed Project Orcon.

Source: Adapted from Stromberg (2011)

Discussion

- 1 Identify the hypothesis of Skinner’s Project Pigeon experiment.
- 2 According to the three-phase model of operant conditioning, identify the antecedent, behaviour and consequence in Project Pigeon.
- 3 In terms of reinforcement, explain why Skinner gave the pigeons food when they pecked correctly at the target.
- 4 Determine the type of data that could be collected during Project Pigeon and discuss how this data supports the hypothesis.
- 5 Identify two limitations of Project Pigeon and suggest possible improvements.
- 6 Discuss whether you believe Skinner’s Pigeon Project would pass an ethical review board today.

Conclusion

Write a statement to summarise the findings of Project Pigeon and how these findings relate to principles of operant conditioning.

5.4A

INVESTIGATION:
CONTROLLED EXPERIMENT

Can the method of loci improve memorisation of visual information?



Investigation worksheet 5.4A

Can the method of loci improve memorisation of visual information?



Resource

Image stimulus printout

Context

Memory mnemonics have been shown to improve the encoding, storage and retrieval of information from memory. Both research and anecdotal observations of participants who compete in memory competitions have provided evidence of mnemonics being used to increase the amount of information that is held in memory – individuals have been able to remember a significant number of cards, random letters and number combinations and words.

The use of mnemonics has tended to focus on the encoding, storage and retrieval of semantic and episodic information, with limited research on how mnemonics can improve memory for other forms of information. In this investigation, you will investigate whether mnemonics can be used to improve the encoding, storage and retrieval of visual, symbolic information from memory.

Aim

To determine if the method of loci mnemonic can be used to improve memory for visual information.

Materials

- Coloured marker pens or pencils
- Paper
- Stopwatch
- Copies of the Image Stimulus (see the hotspot resource in your obook pro)

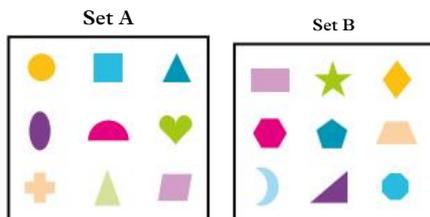


FIGURE 1 Card sets A and B contain visual stimuli.

Method

- 1 Using a random sampling procedure, select at least twenty participants. Ensure all participants provide informed consent before starting the experiment.
- 2 Provide each participant with set A of the Image Stimulus. Allow them to view it for two minutes before removing it from sight. Have participants wait for a minute in silence. Then, provide them with coloured marker pens or pencils and a blank sheet of paper and instruct them to draw all images from set A from memory. Record how many shapes each person drew correctly (shapes must be in the correct colour and position to be awarded a mark).
- 3 After collecting results, provide a coaching session to all participants on how to generate a mind palace by applying the method of loci. Encourage participants to mentally create a familiar environment and to practise moving through this environment at least once an hour for the rest of the day.
- 4 On the following day, show all participants set B for two minutes and instruct participants to apply the method of loci to remember the shapes. Have participants wait for a minute in silence. Then, remove the cards and instruct them to draw all the images.
- 5 After all the participants have completed their drawings, record the results for each participant.
- 6 After the experiment, debrief all participants and analyse the data to obtain descriptive statistics.

Results

- 1 Calculate the total scores for all sets of the Image Stimulus for each participant.
- 2 Calculate the mean and median scores for each condition (control and experimental).
- 3 Calculate the percentage increase or decrease from the control condition to the experimental condition.

Discussion

- 1 Identify the independent and dependent variables of this investigation.
- 2 Summarise what the results of the experiment showed. Make direct reference to your results, including mean scores and percentage change of the mean.

- 3 Propose reasons why the method of loci was successful or not successful in improving memory for visual information.
- 4 Identify two issues or factors that may have affected your results and explain their potential impact.
- 5 Propose two improvements to the experiment to address the potential issues you identified in the previous question.

Conclusion

Write a conclusion to summarise the aim of the experiment, results and key inferences that can be drawn from the experiment in relation to memory mnemonics.

5.4B**INVESTIGATION:
CASE STUDY****How does Aboriginal peoples' use of Songlines improve memory?****Investigation worksheet 5.4B**

How does Aboriginal peoples' use of Songlines improve memory?

**Video**

The science of memory

**Video**

Songlines

Context

A Songline is a sequence of short sung narratives associated with specific locations that are linked by a physically walked, or imagined, path through Country. Songlines contain a variety of information to help individuals navigate through life and connect to Country. The stories, characters, culture and links that tie locations together in Songlines improve their ability to be recalled and preserved across generations. In this case study, you will watch two video clips from the television series “The First Inventors” to investigate how Aboriginal peoples' use of Songlines improves memory.

Aim

To investigate how Aboriginal peoples' use of Songlines improves memory.

Questions

Questions 1 to 4 relate to Video 1: “The Science of Memory” (available in your obook pro).

- 1 Identify which memory techniques Lynn Kelly used to become an Australian Memory Champion.
- 2 Lynn describes that tying characters to locations helps to improve memory. Explain why this could improve the encoding of information.

- 3 Identify one similarity between the memory technique applied to the task and the method of loci.
- 4 Outline how different parts of the brain would be activated during the memory task to encode and recall memory of the countries.

Questions 5 to 12 relate to Video 2: “Songlines” (available in your obook pro).

- 5 Identify the name of the chemical that can be released through storytelling and describe what effect this chemical has on information.
- 6 Describe what Songlines are.
- 7 Identify the different sorts of information that can be stored in a Songline.
- 8 Identify the number of kilometres the Songline described by Yidumduma Bill Harney spans.
- 9 Describe what causes the fork in the river in the Songline.
- 10 Describe why the rock face is known as Yimirr.
- 11 Describe what the landmark in the final destination of the Songline resembles.
- 12 Explain why Songlines are important for preserving cultural knowledge.

6.2A

INVESTIGATION: FIELDWORK

Does the time taken to fall asleep affect the duration of the first sleep cycle?



Investigation worksheet 6.2A

Does the time taken to fall asleep affect the duration of the first sleep cycle?



Risk assessment 6.2A

Does the time taken to fall asleep affect the duration of the first sleep cycle?

Context

On average, you experience four or five sleep cycles during one night of sleep. Each sleep cycle consists of a combination of the four stages of sleep: N1 sleep, N2 sleep, N3 sleep and REM sleep. In the first cycle of sleep, you typically enter N1 sleep first. You then transition through to N2 and N3 sleep, before REM sleep. The end of REM sleep typically marks the end of the first cycle, but sometimes, you may experience a short period of wake before your second sleep cycle.

Normal waking consciousness and the four stages of sleep are differentiated by brain activity (wave amplitude and frequency), eye movement and muscle movement. These characteristics can be measured by techniques such as EEG, EOG and EMG. In this investigation, you will visit a sleep laboratory (or use EEG, EOG and/or EMG kits available to your class) to study the relationship between time taken to fall asleep and the duration of the first sleep cycle.

Aim

To investigate the relationship between time taken to fall asleep and duration of the first sleep cycle.

Method

- 1 Visit a sleep laboratory or use EEG, EOG and/or EMG kits available to your class.
- 2 Select 10 participants to participate in the sleep study.
- 3 Measure physiological changes using EEG, EOG and/or EMG during 120 minutes of sleep. Lights out occurs at 0 minutes and participants are woken at 120 minutes.

- 4 Obtain the EEG, EOG and/or EMG readouts for the sleep study. Note: Additional readouts may be provided and could help to make identification of sleep stage easier. This could include heart rate, breathing rate, body temperature and blood oxygen level.

Questions

- 1 Identify whether EEG, EOG and EMG are subjective or objective measurements of sleep. Justify your answer.
- 2 Annotate the EEG, EOG and EMG data – and any additional readouts provided – to show where each stage of sleep starts and ends. Use Figure 7 in Topic 6.2 and Worked example 6.2 to help you identify the sleep stages. This work could be completed in a group with the ten sets of data distributed across multiple students.
- 3 Construct a hypnogram for each participant.
- 4 Determine the time taken for participants to fall asleep and the duration of the first sleep cycle. Present this data in an appropriate way.
- 5 Describe the relationship between the time taken to fall asleep and the duration of the first sleep cycle.
- 6 Suggest a reason for the results.
- 7 Outline one limitation of the method and describe how the investigation could be adapted or extended to address this.

6.2BINVESTIGATION:
CORRELATIONAL STUDY**What factors are affecting the sleep of adolescents?**

Investigation worksheet 6.2B

What factors are affecting the sleep of adolescents?



Resource

Sleep diary

Context

The amount of sleep that adolescents require is not always the same as the amount they get. There are several reasons for this.

- Adolescents often do not feel the urge to sleep until later in the evening, compared to people in other age groups.
- Especially if they are studying VCE, adolescents can be under a range of pressures such as homework, school time, part-time or casual work and social commitments that interfere with their ability to sleep the ideal amount of time.

The lack of appropriate sleep affects adolescents in ways beyond feeling tired the next day.

In this investigation, you will use sleep diaries, a subjective reporting tool, to explore the total sleep that adolescents experience, the factors that contribute to their sleep patterns and the effects of their sleep patterns.



FIGURE 1 Adolescents typically do not get as much sleep as they require.

Aim

To determine the sleep patterns of adolescents, the factors that contribute to these patterns, and the consequences of these sleep patterns.

Materials

- Copies of the sleep diary (see the hotspot in your obook pro) Note: these can be printed or distributed electronically.
- Pen to record responses

Method

- 1 Using a sampling procedure of your choice, generate a sample of at least 15 participants. This ensures you have enough participants to provide enough data in the event of missed or inaccurate responses. Ensure informed consent forms are completed and procedures are followed before commencing the investigation.
- 2 Distribute the sleep diary to each participant in hard copy and/or electronic format. All participants are to complete the sleep diary over the same 7 days. For example, all participants can commence it on Thursday morning and conclude on Wednesday morning the following week. To complete the sleep diary, participants are to write or type their responses to the listed questions.
- 3 Instruct participants to be as honest and as detailed as possible in their responses.
- 4 Collate all completed sleep diaries by Wednesday afternoon. Do not include any incomplete diaries, nor provide extension of time for the diaries to be completed.
- 5 On completion of the study, debrief all participants.

Results

- 1 Construct a hypothesis for the investigation.
- 2 Calculate the means for the following parameters.
 - a Bedtime
 - b Approximate time they fell asleep
 - c Wake times
 - d Total hours of sleep for each day
- 3 For each of the parameters in Question 2, identify the median.
- 4 Construct an appropriate graph to represent the means and median times/durations you calculated.
- 5 Summarise the following data by organising it in an appropriate table or graph.
 - a Quality of sleep for each day
 - b Productivity rating for each day
- 6 Summarise the factors that disturbed sleep onset and waking for each day.
- 7 Summarise the mood states for each day.

- 8 Summarise any other observations worth noting.

Discussion

- 1 Determine whether your hypothesis was supported or refuted. In your answer, refer to the qualitative and quantitative data you have generated.
- 2 Discuss the factors that contributed to sleep onset and wake times, as well as to total sleep duration.
- 3 Outline any correlations between sleep patterns and participant mood and productivity.
- 4 Identify two factors that may have affected your results and describe the impact they may have had.
- 5 Propose two improvements to the investigation design to address the issues you identified in Question 4.

Conclusion

Summarise the results of your investigation.

7.3AINVESTIGATION:
CLASSIFICATION
AND IDENTIFICATION**How can the sleep of new shift workers be improved?****Investigation worksheet 7.3A**

How can the sleep of new shift workers be improved?

Context

To meet the demands of our everyday lives, good sleep hygiene is required. This helps us to consistently obtain an appropriate quantity and quality of sleep, which we know contributes to good levels of affective, behavioural and cognitive functioning. In this investigation, you will assess four unique cases. Each individual is starting a new job that requires shift work. You will evaluate each individual, then identify and classify elements of their functioning before and after commencing their new job. You will also identify strategies that they could implement to successfully perform their responsibilities at work.

Person 1		Person 2	
	<p>Age: 19 years old</p> <p>Location: Victoria, Australia</p> <p>Background: Is studying at university part-time, Monday to Wednesday, and has been seeking casual work</p> <p>Requirements of new job: 9 p.m. to 6 a.m. shifts, Friday to Sunday</p> <p>Important notes: Generally, gets to bed by 11.30 p.m. each weeknight and wakes up at 7 a.m. regardless of whether they have class. Tends to go to sleep later (by 1 a.m.) and sleep in (until 9 a.m.) on weekends</p>		<p>Age: 53 years old</p> <p>Location: Victoria, Australia</p> <p>Background: Recently quit her job at a local café where she worked 8 a.m. to 2 p.m., Monday to Friday</p> <p>Requirements of new job: 9 p.m. to 6 a.m. shifts, Tuesday to Friday</p> <p>Important notes: Is suffering from Advanced Phase Sleep Disorder, in which she feels sleepy by 9 p.m. and consistently wakes by 4 a.m.</p>
Person 3		Person 4	
	<p>Age: 31 years old</p> <p>Location: Victoria, Australia</p> <p>Background: A nurse looking to transition out of her rotating shifts, which she has been working for the last two years</p> <p>Requirements of new job: 9 p.m. to 6 a.m. shifts, Monday to Saturday</p> <p>Important notes: Consistently sleeps five hours a night</p>		<p>Age: 26 years old</p> <p>Location: Reykjavik, Iceland</p> <p>Background: Has just completed postgraduate study</p> <p>Requirements of new job: 9 p.m. to 6 a.m. shifts, Monday to Thursday</p> <p>Important notes: Does not have any existing sleep disorder and sleeps the required amounts per night. Will be starting her job just before the winter solstice, where the daylight hours occur between 11 a.m. and 4 p.m.</p>

Aim

To identify and classify elements of functioning related to starting shift work, and identify strategies that individuals could implement to function optimally at work

Questions

- 1 Compare affective, behavioural and cognitive functioning, using examples.
- 2 Identify the average amount of sleep that each individual should get based on their stage of the life span.
- 3 Evaluate the alignment of each individual's sleep–wake cycles with the day–night circadian rhythm, before they commence their new job.
- 4 Describe the ability of each individual to meet the demands of their everyday life before they commence their new job. In your response, provide examples of affective, behavioural and cognitive functioning.
- 5 Predict the affective, behavioural and cognitive effects that each individual may experience on day 1 at their job, assuming that they have not made any changes to their sleep.
- 6 Discuss the challenges each individual may have adjusting their sleep to meet the requirements of their new work.
- 7 Discuss the sleep hygiene strategies that each individual could implement to support the adjustment of their sleep–wake cycles. In your answer, identify the most appropriate strategy and its relevant zeitgeber, and explain how the strategy would help, with reference to the role of the suprachiasmatic nucleus.

7.3B

INVESTIGATION:
PRODUCT, PROCESS OR
SYSTEM DEVELOPMENT

How can you improve sleep hygiene by modifying your diet?



Investigation worksheet 7.3B

How can you improve sleep hygiene by modifying your diet?

Context

During school days (Monday to Friday), you might find yourself keeping to a regular sleep schedule. However, it is not unusual for this consistent routine to change on the weekends, when you do not need to wake up early for school and you do not have set times for recess and lunch. If you find yourself still awake past 11 p.m. on a Sunday night, this could affect your mental wellbeing at school on Monday.

In Chapter 7, you learnt that **what** you eat and drink, **how much** you eat and drink, and **when** you eat and drink can affect your sleep. Your eating and drinking patterns are an important zeitgeber to improve sleep hygiene. You can take advantage of your body's ability to adapt to changes in eating and drinking patterns to take control of your sleep-wake cycles. This could be an important strategy to help get you back on track for Monday.



FIGURE 1 You might find yourself having late-night snacks or meals more often during the weekend.

In this investigation, you will apply your understanding to propose a weekend diet for improving sleep quality and quantity. You will then design a controlled experiment to test the effectiveness of the diet. Note: You are required only to design the experiment, not to conduct it.

Aim

To propose a weekend diet for improving sleep quality and quantity, and design a controlled experiment to test its effectiveness.

Method

Part A: Designing your weekend diet

- 1 Consider your current eating and drinking patterns and sleep-wake patterns during the weekend (Saturday and Sunday). Explain how your eating and drinking patterns may be influencing your sleep.

To supplement your answer, conduct some research to determine the nutritional content of the foods and drinks you consume. Topic 7.3 is a good starting point for information on how different nutrients affect your sleep.
- 2 Identify the amount of sleep you should be getting and justify your response, with reference to mental wellbeing.
- 3 Describe how you could modify your eating and drinking patterns to improve your quantity and quality of sleep. For each modification, provide a justification that references the SCN and melatonin.
- 4 Map your proposed eating and drinking pattern to a schedule, such as the one shown in Figure 2.

EATING AND DRINKING PLAN

	Sat /	Sun /
00:00		
01:00		
02:00		
03:00		
04:00		
05:00		
06:00		
07:00		
08:00		
09:00		
10:00		
11:00		
12:00		
13:00		
14:00		
15:00		
16:00		
17:00		
18:00		
19:00		
20:00		
21:00		
22:00		
23:00		
24:00		

FIGURE 2 A schedule template

Part B: Designing a controlled experiment to test your weekend diet

- 1 Construct a hypothesis and aim for your investigation.
- 2 List the materials required for your investigation.
- 3 Identify the factors you would need to consider when selecting participants. Use this information to outline any criteria for participant selection.
- 4 Determine whether a within-subjects or between-subjects investigation design would be more appropriate for your investigation. Justify your response.
- 5 Outline a method for your investigation.
- 6 Discuss any safety and ethical issues you would need to consider before commencing your investigation.
- 7 Construct a table that you could use to record your results.
- 8 Discuss the limitations of your weekend diet.

8.2A**INVESTIGATION:
FIELDWORK****Is there a correlation between stress and perceived mental wellbeing in the workplace?****Investigation worksheet 8.2A**

Is there a correlation between stress and perceived mental wellbeing in the workplace?

**Resource**

Perceived Stress Scale

**Resource**

Mental Wellbeing Score sheet

Context

Some work environments and jobs are associated with particularly high levels of stress. Examples of careers that are often perceived as more stressful include construction work, paramedicine, financial management and mental health counselling.

People working in these roles and others may experience higher levels of stress, but does this necessarily mean that they have a low level of mental wellbeing?

In this investigation, you will visit workers in an industrial setting and collect data about their levels of stress and mental wellbeing. You will use the Perceived Stress Scale (PSS), which is designed to assess a person's perception of how stressed they have felt over the past month.

Aim

To investigate the relationship between the level of perceived stress and mental wellbeing in the workplace

Materials

- Perceived Stress Scale (see the hotspot in your obook pro). Note: These can be printed or distributed electronically
- Mental Wellbeing Score sheet (see the hotspot in your obook pro). Note: These can be printed or distributed electronically
- Pen to record responses
- Calculator to add up scores



FIGURE 1 Train drivers may experience a high level of work-related stress.

Method

- 1 Devise a hypothesis for your investigation.
- 2 Recruit at least five participants for your correlational study.
- 3 Supply each participant with a copy of the PSS and inform them of their participant rights.
- 4 Ask each participant to circle the number that best describes their experience with stress over the last month, using the following rating scale:

Never = 0
Almost never = 1
Sometimes = 2
Fairly often = 3
Very often = 4

- 5 On a separate form, ask each participant to rate their mental wellbeing from 0 (very low) to 4 (very high).

Results

- 1 Calculate the final PSS scores.
 - a First, reverse the scores for questions 4, 5, 7 and 8 only. For each of these questions, change the 0 to a 4, the 1 to a 3, the 3 to a 1, and the 4 to a 0 (2 remains the same). Write these next to the relevant rows. The scores for all other questions remain the same.
 - b Add up the final scores for each item to get totals.
- 2 Create a scatterplot of your results. Plot the mental wellbeing score on the y -axis and the perceived stress score on the x -axis.

Discussion

- 1 Explain where you would expect individuals with the following levels of stress to sit on the mental wellbeing continuum.
 - a Low stress (PSS of 0 to 13)
 - b Moderate stress (PSS of 14 to 26)
 - c High stress (PSS of 27 to 40).
- 2 Explain whether your results supported your hypothesis.
- 3 Explain how a person's understanding of mental wellbeing could influence their perceived mental wellbeing.
- 4 Discuss how a person's position on the mental wellbeing continuum could influence their perceived stress levels.
- 5 The PSS measures a person's subjective perception of stress. Research one objective measure of stress and outline the strengths and limitations of this measure compared to the PSS.

Inquiry: Does the correlation between stress and perceived mental wellbeing differ across industries?

- 1 Write a hypothesis for your investigation.
- 2 Identify the independent variable that you will need to change to test your hypothesis.
- 3 Describe the changes you will need to make to the original method.
- 4 Discuss the expected results of the investigation.

Conclusion

Write a statement to summarise your findings.

8.2BINVESTIGATION:
LITERATURE REVIEW:**How has the COVID-19 pandemic affected the mental wellbeing of students?****Investigation worksheet 8.2B**

How has the COVID-19 pandemic affected the mental wellbeing of students?

Context

As the COVID-19 pandemic unfolded, we all had to change how we lived our lives. This included everything from our hygiene practices, how we learn at school, how we interact with our loved ones, and even what kinds of recreational activities we can participate in. Throughout the pandemic, these changes had significant impacts on mental wellbeing. Even in the “new normal” we live in today, there are long-lasting effects on how we carry out our lives and, potentially, on our mental wellbeing. In this investigation, you will research the impacts of the COVID-19 pandemic on the mental wellbeing of students.

Aim

To investigate the impacts of the COVID-19 pandemic on the mental wellbeing of students

Method

- 1 Look for secondary sources of information. These can include the internet, books, scientific magazines, videos, podcasts or interviews with an expert.
- 2 Use the CRAAP method to evaluate the reliability of your sources. This method is outlined in Topic 11.1.
- 3 Make notes about what you have learnt. You can organise your information in different ways. Examples can be found in Topic 11.1.

- 4 Prepare a written report that answers the following questions.
 - a How is mental wellbeing defined and measured?
 - b What were the levels of mental wellbeing of students before the pandemic?
 - c How did the mental wellbeing of students change during the pandemic?
 - d Are there long-term effects on mental wellbeing after the pandemic?
 - e What were the most important factors affecting the mental wellbeing of high school students pre-pandemic and did these change during the pandemic? If so, how?
 - f Compare how students who started Year 7 during the pandemic and students who started Year 7 before the pandemic have been affected.
 - g Were/are school students in different states of Australia affected differently by the pandemic?

You can add any questions you are interested in investigating, but check with your teacher if you want to make significant changes to the research question being answered.

- 5 Make sure you record the details of all of the sources you use, including the title of the source, who it was written by, when it was written, page numbers or URLs and the date you accessed it. You will need this information to put together a bibliography.

9.4A

INVESTIGATION: CASE STUDY

How does exposure to a phobic stimulus aid in the treatment of specific phobia?



Investigation worksheet 9.4A

How does exposure to a phobic stimulus aid in the treatment of specific phobia?



Video

Arachnophobia documentary

Context

Specific phobia is a category of anxiety disorder characterised by an intense irrational fear of a stimulus. Arachnophobia is a type of specific phobia that describes when individuals have an intense fear of spiders. Specific phobia can interfere with daily functioning when active avoidance of a phobic stimulus becomes a burden or prevents healthy interactions. In this case study, you will watch the arachnophobia episode of the television program “Extreme Phobias” to investigate how exposure to a phobic stimulus can aid the treatment of a specific phobia.



FIGURE 1 Arachnophobia is a specific phobia of spiders.

Aim

To investigate how exposure to a phobic stimulus aids in the treatment of specific phobia

Materials

- Arachnophobia documentary (available in your obook pro)
- Headphones

Discussion

- 1 Describe two symptoms that an individual with arachnophobia may experience when exposed to a spider.
- 2 Describe the purpose of the first task (collecting a spider from the shed).
- 3 Provide one example of how arachnophobia has interfered with the normal daily functioning of one of the participants.
- 4 Describe how Jackie’s fear of spiders started.
- 5 Sarah Beth tried to avoid the second task of rehoming spiders. Discuss how avoiding a phobic stressor can work to maintain a phobia.
- 6 Describe how Sarah Beth felt after completing the second task.
- 7 Discuss why it was important that tasks gradually increased in difficulty rather than starting with the most difficult (or fear-inducing) task.

9.4B**INVESTIGATION:
CLASSIFICATION
AND IDENTIFICATION:****How can identification of biopsychosocial factors be used to inform the treatment of a specific phobia?****Investigation worksheet 9.4B**

How can identification of biopsychosocial factors be used to inform the treatment of a specific phobia?

Context

Specific phobias are intense, irrational fears that significantly affect an individual's daily functioning and mental wellbeing. The development and maintenance of a specific phobia can often be attributed to a combination of biological, psychological and social factors. In this activity, you will read through a case study of a specific phobia and identify the biopsychosocial factors that may have contributed to and/or perpetuated the phobia. You will then evaluate how identifying these factors can be used to inform the treatment of a specific phobia.

The case

Rici, a 27-year-old male, has a specific phobia of sharks (galeophobia). Rici's fear of sharks began after witnessing a traumatic incident during childhood. While on a beach holiday in South Australia, Rici witnessed his older brother be attacked by a great white shark. His brother survived the incident but lost his left hand in the attack. Witnessing the event caused Rici to form an association between sharks and significant danger. Now, when Rici sees or even thinks about sharks, it triggers an intense fear response.



FIGURE 1 Rici's fear of sharks (galeophobia) began after witnessing his brother being attacked by a great white shark.

Rici's mother, Sarah, was present during the incident. Though not afflicted with a specific phobia herself, Sarah developed a heightened sense of fear and anxiety surrounding sharks. Sarah's fears have been conveyed to Rici through her ongoing discussions about the incident,

emphasising the perceived danger and reinforcing negative thoughts about sharks. Additionally, following a recent neurologist appointment, Rici received a diagnosis of GABA dysfunction, a condition characterised by an imbalance of gamma-aminobutyric acid in the brain.

Rici has felt very insecure about his phobia for years, often worrying that if he shared his thoughts about sharks with a professional he might be perceived as paranoid or a "freak". Recently, Rici has been actively seeking treatment for his phobia. He is sick of his specific phobia causing him daily anxiety, preventing him from going to the beach, swimming and watching movies, and he wants to try to overcome his fear so he can improve his mental wellbeing.

Aim

To identify the biopsychosocial factors that may have contributed to the development or maintenance of a specific phobia and evaluate how these factors can be used to inform treatment.

Discussion

- 1 Identify and explain the biological factor(s) that have contributed to the development and/or maintenance of Rici's specific phobia.
- 2 Identify and explain the psychological factor(s) that have contributed to the development and/or maintenance of Rici's specific phobia.
- 3 Identify and explain the social factor(s) that have contributed to the development and/or maintenance of Rici's specific phobia.
- 4 Use your understanding of biological, psychological and social interventions for specific phobia to discuss (in detail) how a combination of treatments could help Rici overcome his specific phobia. In your discussion, make sure to address each biological, psychological and social factor identified in questions 1 to 3.

10.1

INVESTIGATION: CORRELATIONAL STUDY

Is there a relationship between daily water intake and perceived levels of mental wellbeing?



Investigation worksheet 10.1

Is there a relationship between daily water intake and perceived levels of mental wellbeing?



Resource

Mental wellbeing survey

Context

Adequate hydration is necessary for our brains and bodies to function at their best. Dehydration (insufficient water intake) can have several negative side effects, including cognitive decline, fatigue and dizziness. In this correlational study, you will investigate whether a relationship exists between average daily water intake and perceived levels of mental wellbeing.

Aim

To investigate whether a relationship exists between average daily water intake and perceived levels of mental wellbeing

Materials

- Ten printed copies of the water intake and mental wellbeing survey (available in your eBook pro)
- Access to a computer with graphing software (e.g. Microsoft Excel)

Method

- 1 Select ten participants to survey over the course of four days.
- 2 Provide each participant with a survey sheet and instruct them to complete the survey before bed each night for the course of one week.
- 3 After four days, collect the participant surveys.

Results

- 1 Calculate each participant's average daily water intake and perceived level of mental wellbeing score.
- 2 Collate participant scores into one table. Make sure to deidentify participants.
- 3 Use Microsoft Excel or another graphing program to plot a correlation graph between participants' average daily water intake and average perceived mental wellbeing scores, and provide a correlation coefficient.

Discussion

- 1 Interpret the correlation coefficient to describe the strength and direction of the relationship between daily water intake and mental wellbeing.
- 2 Data collected in this correlational study relied on self-reporting. Identify one strength and one limitation of self-reports.
- 3 Explain why it was important that participants completed the survey at the end of the day rather than at the start of the day.
- 4 Identify two implications of your findings.
- 5 Did the results of this investigation establish a causal relationship between daily water intake and perceived mental wellbeing? Discuss why or why not.

10.2

INVESTIGATION:
CONTROLLED
EXPERIMENT

Does mindfulness meditation improve relaxation?



Investigation worksheet 10.2

Does mindfulness meditation improve relaxation?



Video

Mindfulness meditation

Context

Practising mindfulness meditation has positive impacts on mental wellbeing in both the short and long term. Mindfulness meditation is often used to bring our awareness to the present and induce a state of calmness and relaxation. Some schools have started incorporating mindfulness meditation as part of their class time to reduce stress and increase relaxation.

Aim

To investigate whether practising mindfulness meditation improves relaxation in high school students



FIGURE 1 Some high school students practising mindfulness meditation together

Materials

- Comfortable place to sit or lie down
- Device to play meditation mindfulness video (available in your obook pro)
- Pen to record responses
- Calculator to calculate descriptive statistics

Method

- 1 Use the following table to record your individual results, where 1 = not relaxed at all and 10 = extremely relaxed.

Condition 1: Self-rated relaxation level before completing mindfulness meditation										Condition 2: Self-rated relaxation level after completing mindfulness meditation									
1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10

- 2 In the first column of the table, circle the number that best represents how relaxed you feel at the present moment (before completing the mindfulness meditation).
- 3 Complete the mindfulness meditation. Ensure you are seated comfortably in a quiet space when doing so.
- 4 In the second column of the table, circle the number that best represents how relaxed you feel at the present moment (after completing the mindfulness meditation).

Results

- 1 Collate the class results. Use the table provided to record the class's raw data as well as the mean, median and mode for each condition.

	Condition 1 (before completing mindfulness meditation)	Condition 2 (after completing mindfulness meditation)
Class raw data		
Mean		
Median		
Mode		

- 2 Choose one measure of central tendency calculated from the results above and use it to graph a comparison between the two conditions. Ensure your graph is labelled appropriately.

Discussion

- 1 Identify the independent and dependent variables for this study.
- 2 Write a hypothesis for this study.
- 3 Was your hypothesis supported? Suggest possible reasons for your answer.
- 4 Identify two extraneous variables that could have been present in your study and outline their likely effects on the DV.

Conclusion

Write a statement to summarise your findings.

Inquiry: What if we practised mindfulness meditation for longer?

- 1 Suggest three possible IV conditions for this investigation.
- 2 Suggest whether a between-subjects or within-subjects design would be best for this investigation. Justify your choice.
- 3 Write a hypothesis for this investigation that includes all three conditions.
- 4 With reference to psychological theory, justify your hypothesis.

Answers

Chapter 1

RESEARCH REVIEW 1.1

Student answers will vary, but these are some example responses:

Research scenario 1

Research question	Will receiving praise improve children's schoolwork productivity?
Aim	To investigate whether receiving praise influences the amount of schoolwork children complete
Independent variable	Receiving praise after completing a piece of work or receiving no praise for completing work
Dependent variable	The number of pieces of work completed
Hypothesis	If children receive praise for completing schoolwork, then they are likely to work more productively and complete more schoolwork than those who don't receive praise.

Research scenario 2

Research question	Can concentration levels be influenced by vitamin C consumption?
Aim	To investigate whether the amount of vitamin C in a person's diet impacts their ability to concentrate
Independent variable	Consuming a diet that is high in vitamin C (for one week) or consuming a diet that is low in vitamin C (for one week)
Dependent variable	Average performance on an online focus test
Hypothesis	If the amount of vitamin C in a person's diet increases, then their ability to concentrate will improve.

INVESTIGATION INSPECTOR 1.2

1

Investigation design	Description	Advantages and disadvantages
Between-subjects	Each group only experiences one condition of the experiment.	Advantage: Can be done all at once, making it time-efficient Disadvantage: Requires a larger sample size to ensure a spread of participant variables that reflects the population
Within-subjects	Each participant in the sample is tested under all conditions of the experiment.	Advantage: Eliminates individual participant differences Disadvantage: Takes a longer amount of time to complete than other designs

Mixed design	Combines elements of a within-subjects and between-subjects designs. This design is often used when there is more than one independent variable that can affect the dependent variable.	Advantage: Can provide more detailed data as more than one independent variable can be investigated within the research Disadvantage: Can be very complex and findings may be difficult to interpret
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- Student answers will vary, but should correctly identify control conditions and experimental conditions. For example, the control condition could be no meditation and the experimental condition could be 15 minutes of meditation. For the investigation that uses a mixed design, a second independent variable can be tested, such as the timing of the meditation (morning versus afternoon).

EVALUATING ETHICS 1.3

1

Ethical guideline	Description
Confidentiality	Participants must not be identified in any way in terms of test results, their involvement in the study or any other personal data. Data needs to be stored and disposed of using secure procedures.
Voluntary participation	Participants have the right to refuse to take part in a study. There must not be any pressure to take part in a study, nor should the participants be tricked into taking part.
Informed consent	Participants must be given information about a study, including any risks involved, and understand the nature of the study before they agree to take part. If they are unable to do so themselves, their guardian must be given the information before agreeing to take part on their behalf.
Withdrawal rights	Participants have the right to leave a study at any stage, regardless of the possible effects on the results.
Deception	The provision of false or incomplete information for the purpose of misleading research participants. This is only permitted if the results would be confounded if the participants had such information before taking part in the study.
Debriefing	After completion of the study, participants are told the aim, results and conclusions of the study. Any erroneous beliefs must be corrected, and counselling offered to participants.

2 Student answers will vary, but these are some example responses.

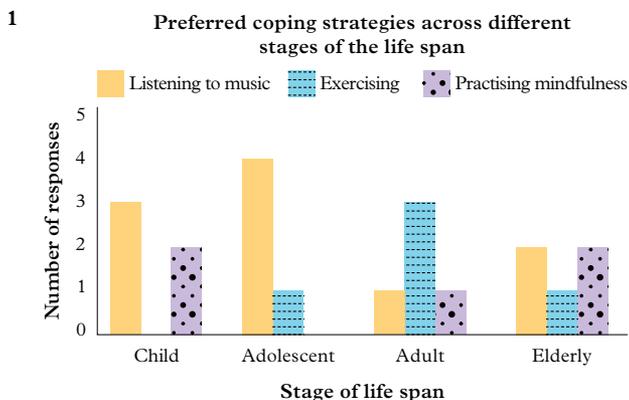
Scenario 1

- a Voluntary participation; Confidentiality
- b Students should not have any penalty (report marks reduced) if they decide not to participate; Remove student names or any other identifying features before publishing results.

Scenario 2

- a Informed consent; Debriefing
- b Provide parents with a letter with details of the research, outline the procedures and potential risks, and ask them to sign if they want their child to participate; At the end of the research, the findings should be shared with the parents of the participants and any questions should be answered, with counselling offered if required.

DATA DRILL 1.4



- 2 Student answers will vary, but should suggest that a graph visually represents any trends or patterns in the data that can be difficult to interpret from a data table.
- 3 There are no clear patterns or trends represented in the data, as the preferred coping strategy fluctuates at different stages of the life span.

DATA DRILL 1.5

- 1 Sound meter A. Across the four consecutive measurements, the values are closer to the true value (30–32 dBA versus 31 dBA) than sound meter B (33 dBA versus 31 dBA).
- 2 Precision is a measure of how close the values in a dataset are to each other. Therefore, sound meter B has recorded more precise measurements, as all four readings recorded the same noise level (33 dBA).
- 3 Systematic errors cause readings of a measurement to differ from the true value by a consistent amount or proportion each time. This affects the accuracy of results. In this case, sound meter B consistently records the noise level to be 2 dBA higher than the true value, demonstrating that a systematic error has occurred.

CASE CRACKER 1.6

- 1 a opinion: a person or organisation’s judgments or views about a topic; may not always be based on evidence, experience or fact
- b anecdote: a personal observation collected in a casual non-systematic manner, used to support a view or judgment; this information is often biased
- c evidence: information or data on a topic that has been systematically collected; this information can help draw conclusions
- d scientific idea: an idea that has been acquired, refined or supported by the scientific method
- e non-scientific idea: an idea that has been established by techniques that do not follow the scientific method and are not supported by the scientific method

2 Source 1: This is evidence. Scientific research has been undertaken to gather data that has led to a conclusion being established.

Source 2: This is opinion. This is someone’s point of view and while it may be informed by some scientific ideas, there is no clear reference to any scientific evidence supporting the claim.

Source 3: This is anecdote. This is a person’s recount of their own experience, which is subjective and may be biased as they may lack scientific evidence to support their ideas.

RESEARCH REVIEW 1.7

Student answers will vary depending on their selected resource, but should follow conventions outlined by the APA style guide, 7th edition.

Unit 3 Word Wizard

A 10	B 11	C 1	D 5
E 7	F 12	G 14	H 9
I 4	J 15	K 8	L 6
M 13	N 3	O 2	

Chapter 2

GROUNDWORK 2

- 1 C
- 2 A
- 3 D
- 4 C
- 5 C
- 6 Student answers will vary, but should describe the differences between conscious and unconscious responses. A sample response: A conscious response involves awareness and is usually voluntary and goal-directed, whereas an unconscious response does not involve awareness and is usually automatic and not voluntary.
- 7 Student answers will vary, but should describe similarities and differences between neurotransmitters and neuromodulators. A sample response: A similarity of both neurotransmitters and neuromodulators is that they are both chemicals that are released from an axon terminal of a neuron. A difference is that neurotransmitters can only communicate with a single postsynaptic neuron, whereas neuromodulators can communicate with many different postsynaptic neurons at once.
- 8 Student answers will vary, but should outline the steps involved in a spinal reflex. A sample response: Sensory information is detected and transmitted via sensory neurons to the spinal cord. An interneuron in the spinal cord will intercept the message and send an immediate motor response back via motor neurons to move away from the dangerous object. The message will still transfer to the brain and pain will be perceived after the movement has already occurred.
- 9 Student answers will vary, but should outline the steps involved in neural transmission, using GABA as an example. A sample response: GABA will be released into the synaptic gap from the axon terminal of the presynaptic neuron. GABA will then move across the synapse and bind to the specific/complementary receptor site on the postsynaptic neuron, passing on an inhibitory effect, making the postsynaptic neuron less likely to fire an action potential.
- 10 Student answers will vary, but should match long-term potentiation with learning the new technique, and long-term depression with forgetting the original technique. A sample response: Long-term potentiation occurs as the chef practises the new cooking technique. This strengthens the connection between neurons within this neural pathway. Over time, as the original cooking technique is no longer being used, long-term depression will occur, weakening the connections between neurons in this neural pathway.

CASE CRACKER 2

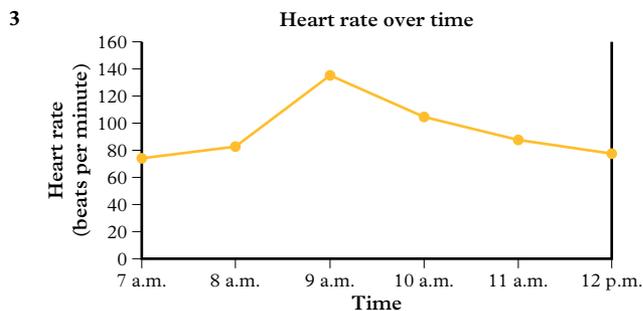
- 1 Student answers will vary, but should recognise that “progressive” refers to something that occurs gradually over time and that “neurodegenerative” refers to damage to or death of neurons. A sample

response: A progressive neurodegenerative disease is a disease that causes neurons to die, which worsens over time.

- Neuromodulator. Dopamine also plays a role in reward-based learning, feelings of pleasure and motivation.
- Student answers will vary, but should identify the central nervous system and somatic nervous system (part of the peripheral nervous system). A sample response: The central nervous system is involved as the brain makes the decision to walk. Different regions of the brain are involved in coordination of the movements. The somatic nervous system is also involved as it allows the voluntary movement of the skeletal muscles needed to walk, such as those in the legs and feet.
- Student answers will vary, but should identify that serotonin imbalances can lead to the development of mood disorders, such as depression, and that this could play a role in Parkinson's disease. A sample response: Experiencing depression may be linked to an imbalance of serotonin. If Parkinson's disease causes lower levels of serotonin to be produced, this can result in low mood, a symptom of depression.

DATA DRILL 2

- independent variable: time; dependent variable: heart rate (beats per minute)
- Quantitative. The heart beat recorded every minute is a numerical measurement.



- It is likely that Nhi's sympathetic nervous system was activated at 9 a.m. as there is a considerable increase in heart rate, which occurs when the sympathetic nervous system is dominant, to prepare the body for flight or fight.

INVESTIGATION INSPECTOR 2

- Student answers will vary, but should consist of a prediction of the results. A sample hypothesis: Participants' shooting accuracy will increase after practising this skill for five days compared to their accuracy before practising the skill.
- Gareth has not obtained a representative sample for his research. He has a small sample size of 12 and he has not used random or stratified sampling. He likely has a biased sample as he has selected his own friends.
- Gareth has used a within-subjects design as the same participants are experiencing the control condition (without practising shooting) and the experimental condition (after practising shooting for five days).
- Student answers will vary, but should identify one variable other than the independent variable that may potentially cause an unwanted effect on the dependent variable. For example, Gareth should have considered if any of his participants were already experienced basketball players who train or play basketball at times outside of his research, as this would likely influence their shooting accuracy.
- Reproducibility involves repeating research under changed conditions. Gareth would need to conduct his research again but change at least one element. This could involve using a different research design or conducting the research at a different location, etc.

EVALUATING ETHICS 2

- Beneficence refers to ensuring that the benefits or potential information gained from the research outweighs any potential harm it could cause.
 - Integrity refers to conducting research to enhance knowledge and understanding and ensuring that results are reported honestly and openly.
 - Non-maleficence refers to ensuring no harm is inflicted on participants. If any form of harm is caused through the research, this must be minimal and outweighed by the benefits that the research produces.
- To uphold beneficence, Dr London will need to show that the information and knowledge that can be gained about brain plasticity will be helpful and meaningful, and will outweigh any potential risks that the participants will face.
 - To demonstrate integrity, Dr London should correctly follow the scientific method throughout their research, report their findings truthfully and share this in the public domain, even if the results are not what they expected.
 - To ensure non-maleficence, Dr London needs to minimise any potential psychological distress for participants. They should monitor their wellbeing throughout the research and provide psychological support to any participants, if required.

RESEARCH REVIEW 2

- This question is unclear. Where is synaptic plasticity occurring? Are we concerned about the total amount of plasticity? Or how quickly it occurs? How can this be measured?
 - How does the rate of synaptic plasticity in the brain change as a person ages?
- This question is quite broad, so it would be simpler to focus on one aspect.
 - What effect do lower levels of serotonin have on a person's mood?

Chapter 3

GROUNDWORK 3

- D
- D
- B
- C
- B
- Both adrenaline and cortisol are hormones released in the body during times of stress. Adrenaline takes effect very quickly, while cortisol takes longer.
- Kipo is likely to primarily appraise the break-in as stressful and as a harm/loss situation, as his valuables may have been stolen.
- Dom would be in the exhaustion phase, as he is experiencing a significant illness. This signifies that his body's physical resources are depleted and he can no longer sustain resistance to his stress.
- Gut dysbiosis involves an imbalance between healthy and unhealthy microbiota in the gut. Factors identified by students will vary, but an example is experiencing chronic stress.
- When a person displays high coping flexibility, they recognise that a coping strategy is ineffective and change to use another strategy. If this new strategy is effective for the stressor, this demonstrates context-specific effectiveness.

CASE CRACKER 3

- Sympathetic nervous system
- Cortisol helps to energise the body by inducing the release of glucose. It also helps to reduce inflammation in the body.

- 3 In primary appraisal, the athlete would likely evaluate the upcoming competition as a personally relevant stressor and view it as stressful and a challenge. During secondary appraisal, they may view their coping resources as adequate if they have a coach or an adequate training schedule to help them prepare, reducing the stress they experience.
- 4 Student answers may vary, but suggested approach strategies should directly deal with the source of the stress, while suggested avoidance strategies should indirectly deal with the source of the stress.

DATA DRILL 3

- 1 Correlational study; Dr Hubert has examined how the two variables of sleep and stress are related to one another. This is not a controlled experiment because no variables are being manipulated.
- 2 Negative correlation; as hours of sleep increases, level of stress decreases.
- 3 There appears to be one outlier: the person who slept for 3 hours and scored their level of stress as 0. This is significantly different from the other scores. An outlier reduces the validity of the research as it creates greater variability in the data, which can influence statistical analysis and calculations, such as the mean and standard deviation.
- 4 A strength of using a Likert scale is that it generates numerical/quantitative data about stress that is easy to analyse. A limitation is that it forces a person to choose one of the available options without being able to provide a detailed response about what factors may have contributed to their stress levels that day.
- 5 Student answers will vary, but should suggest using a more objective measurement of stress. A sample response: Dr Hubert could use a physiological measure such as a heart rate monitor to determine stress levels. This can reduce uncertainty as it is an objective measure, so is less likely to be biased compared to a person's subjective rating of stress.

INVESTIGATION INSPECTOR 3

- 1 Subjective primary data; the test score relied on the individual's own thoughts and feelings.
- 2 Student answers will vary, but should describe the benefits and limitations of subjective data collection. A benefit of a self-report method could include that it allows the collection of data based on a person's own beliefs and experiences that an objective measure may not be able to record. A limitation of a self-report method could be that every person may interpret and respond to the questions in a different way, reducing the validity of the data.
- 3 Case study; it could allow you to gain detailed information about factors influencing a person's levels of stress over one month.
- 4 Low precision; there is a lot of variation between the scores.

EVALUATING ETHICS 3

- 1 Student answers will vary as individuals will have different opinions on whether it is ethically justified to create germ-free animals for use in research. Relevant factors that may be addressed include public perception and attitudes (social), research funding (economic), animal welfare laws (legal) or government regulations (political). The argument should be structured with an introduction, explanation and a summary statement.

RESEARCH REVIEW 3

- 1 To investigate whether practising daily mindfulness techniques influences students' stress levels
- 2 The independent variable will be using or not using daily mindfulness techniques. For a between-subjects design, Avanihika could split her participants into two groups. Her control condition will not use any daily mindfulness techniques, whereas her experimental condition will practise daily mindfulness techniques.
- 3 The dependent variable is the stress levels, which she could measure by asking students to complete a perceived stress survey, or by recording

an appropriate physiological measure related to stress, such as heart rate.

- 4 Student answers will vary, but should identify anything other than daily mindfulness that could potentially influence the students' stress levels.
- 5 Student answers will vary, but should outline how the variables described in question 4 can be made consistent across all testing conditions.

Chapter 4

GROUNDWORK 4

- 1 C 2 A 3 C 4 D 5 B
- 6 Multimodal refers to multiple different formats in which learning takes place.
- 7 Classical conditioning involves the association of a neutral stimulus (music) with an unconditioned stimulus (ice cream) to create a conditioned response (excitement). On the other hand, operant conditioning involves the association of a behaviour with a consequence, which is not the case in the example.
- 8 For Margaret, the antecedent is seeing vegetables on her dinner plate. Margaret's behaviour is to eat the vegetables and, as a consequence, she is allowed to eat dessert.
- 9 Neda must have the physical and mental skills necessary to follow the steps to braid her own hair (reproduce the behaviour). She must also have a desire to want to do so (motivation).
- 10 Student answers will vary, but should outline similarities and differences. A sample response: Both can involve learning from others. A difference is that Aboriginal and Torres Strait Islander ways of knowing are connected to Country, while this does not apply to observational learning.

CASE CRACKER 4

- 1 The car company is initially a neutral stimulus, which is paired with people looking happy and having fun (UCS) in the ad, leading the viewer to feel positive emotions towards the ad (UCR). After conditioning, the car company becomes a conditioned stimulus that leads the viewer to feel positive feelings towards the car company (CR).
- 2 As the accident looks very severe, this may cause viewers to feel disturbed or upset, and discourage them from unsafe driving behaviours. However, since we do not know the cause of the accident, it may be difficult to relate to or draw a personal connection to the scene. To make the advertisement more effective, observational learning can be incorporated by showing a younger person observing a parent's unsafe driving behaviours, and then showing the younger person reproducing the behaviour.
- 3 Road safety ads often show a driver breaking road rules and experiencing negative consequences, such as crashing their car and injuring themselves due to speeding. Viewers observe these consequences in the ad and are therefore more likely to avoid breaking road rules themselves to avoid experiencing the same negative consequences.

DATA DRILL 4

- 1 Male scores are 15.8 in the aggressive condition compared with 2 in the non-aggressive condition. These results suggest that male children will model the behaviours that they see.
- 2 Overall, it can be concluded that females are more verbally aggressive than males, but same-sex models appear to play a role because the female score drops from 17.2 when observing a female model, down to 3.0 when observing a male model. Male scores increase from 5.9 when watching the female model to 11.2 when watching the male model.
- 3 The statistics suggest that children are far more likely to imitate same-sex role models than models of a different sex.

INVESTIGATION INSPECTOR 4

- 1 This is a controlled experiment with a between-subjects design.
- 2 Student answers will vary, but should outline a strength and limitation. A sample response: A strength is that they have obtained a large sample size with 200 participants. A weakness is that it does not appear that stratified or random sampling was used and the participants are all within a small age range of 5 to 9 years, which impacts the external validity of the research.
- 3 Student answers will vary. Possible answers include using a within-subjects design to eliminate participant differences or investigating other sounds than just a buzzer.

EVALUATING ETHICS 4

- 1 Debriefing should have occurred where Albert's fear would be reversed, and counselling offered to him and his mother.
- 2 Non-maleficence involves not inflicting harm in research. This was breached as Albert was visibly upset throughout the research and left with ongoing psychological distress.
- 3 Student answers will vary. A sample response: The Little Albert experiment did provide useful information about how fears can be conditioned, which has been beneficial to the discipline of psychology. However, the negative attention that the investigation received because of the unethical treatment of Little Albert has partially damaged the reputation of psychology.

RESEARCH REVIEW 4

Student answers may vary, but examples are shown in the table.

Methodology	Description	How it can be utilised to research operant conditioning
Case study	Investigating a specific event, activity or problem	Study how some parents use chores as a consequence to deter their children from misbehaving.
Classification and identification	Arranging objects or events into groups and recognising criteria that belong to a particular group	Classify the types of consequences that teachers use in their class as either positive or negative reinforcements or punishments.
Controlled experiment	Investigating a causal relationship between an independent variable and a dependent variable in a controlled environment	Manipulate an independent variables such as some dogs get treats while learning to sit, while others do not, and compare if this influences the dependent variable, how fast they learn to sit on command.
Correlational study	Investigating the relationship that exists between variables	Study if there is a relationship between receiving bonuses, and work and job satisfaction.

Fieldwork	Visiting a specific location to study a topic or phenomena	Visit an office workplace and observe the types of reinforcements or punishments employed by managers and the effect this has on their workers' behaviours.
Literature review	Researching, gathering and interpreting secondary sources to answer a research question	Research scientific sources to find whether the demerit point system influences driver behaviour.
Modelling	Physically, conceptually or mathematically simulating a concept or system	Create a visual model to represent the three phases of operant conditioning.
Product, process or system development	Designing an object, process or system to meet a need	Design a machine that rewards people when they clean up litter.
Simulation	Using an existing model to investigate a scientific phenomenon by manipulating variables in the simulation	Using technology, simulate how much money the government could save on healthcare if they rewarded adults for engaging in daily exercise and physical activity.

Chapter 5

GROUNDWORK 5

- 1 B 2 D 3 A 4 B 5 A
- 6 "Rehearsal" refers to manipulating information to keep it in short-term memory for longer or assist in transferring information into long-term memory.
- 7 The neocortex stores explicit long-term memories while the amygdala is involved in processing the implicit emotional components of a memory.
- 8 They would rely on semantic facts/information that they already know about New York as they imagine themselves there. For example, they might picture themselves visiting Times Square, which they know is in NYC.
- 9 Neurofibrillary tangles involve abnormal build-up of proteins inside neurons, while amyloid plaques involve protein building up outside of neurons.
- 10 Both songlines and the method of loci rely on geographical cues to assist memory retrieval.

CASE CRACKER 5

- 1 Researching SAM involves an in-depth analysis with a small number of people and can generate rich qualitative and quantitative data, which are features of a case study. It does not involve manipulation of an independent variable or an experimental versus control condition used in a controlled experiment.
- 2 People with SAM are likely to have increased functionality in their hippocampus or regions of their neocortex, as both of these regions are involved in autobiographical long-term memories.

- 3 Discovering the neurological distinctions in the brain of people with SAM may allow researchers to develop new medications or treatments to assist in neurological disorders that affect memory, such as Alzheimer's disease.

Consent statement: I, _____, have read and understood all of the information provided to me in this form and agree to volunteer to participate in this research.

Signature: _____ Date: _____

DATA DRILL 5

Measurement	Group 1: Visual images	Group 2: Written names
Mean	14.8	8.7
Median	16	8.5
Mode	16	8 and 12

- 1 The score of 5 in group 1 appears to be an outlier as it is greatly different from all the other results in that group.
- 2 Due to the outlier, the mean will be skewed, whereas the median of a data set is not affected by an outlier, making it a better measure of central tendency.
- 3 The standard deviation for group 1 is higher than for group 2, indicating that the data is more spread from the mean. This can reduce the validity of the research as the higher spread of scores may indicate that factors other than the independent variable have influenced the dependent variable of the investigation.
- 4 The data supports the hypothesis that seeing the objects would improve recall as the mean, median and mode are all higher for group 1 than for group 2. This indicates superior recall after seeing the objects.

INVESTIGATION INSPECTOR 5

- 1 The between-subjects element is that participants were allocated into the three different experimental conditions, allowing comparison of the different memory training techniques. The within-subjects element is that all the participants completed the same memory test twice, allowing the researcher to compare how each individual's results changed within the research.
- 2 Student answers will vary, but should identify an error introduced by using the same list of 20 words and describing the effect on the validity of the study. A sample response: This may have introduced an order effect as participants may have performed better on the second memory test, not because of the independent variable (the memory technique training) but because they were already familiar with the word list. This would reduce the internal validity because it interferes with the ability to determine a cause-and-effect relationship between the independent variable and the dependent variable.
- 3 Student answers will vary, but should outline a limitation and provide a way to overcome it. A sample response: This conclusion is limited to a very specific, biased sample as only first-year medical students were studied. To overcome this, the research could be repeated on a more diverse sample including participants with different education and cultures, including Aboriginal and Torres Strait Islander peoples as participants.

EVALUATING ETHICS 5

Study information: Student answers will vary, but should provide an overview of the purpose of the study and how long it goes for.

Voluntary participation and confidentiality: Participants understand they have the choice to participate or not and if they do participate, all of their personal details will be kept private.

Potential risks and benefits: Student answers will vary, but potential risks may include participants feeling stressed because they may feel pressure to perform well on the recall test. Potential benefits include participants learning new ways to enhance their own memory.

Contact information: Student answers will vary, but could provide fictional contact details for the researchers or key contact persons.

Participant rights: Participants have the right to withdraw from the experiment at any stage, there will be no deception, and there will be a debriefing on completion of the investigation. This work must not be reproduced, stored, transmitted or circulated in any other form.

RESEARCH REVIEW 5

- 1 Student answers will vary, but should identify any similarities or differences. Students may find a similar trend, with the percentage per trial increasing as they move down the table.
- 2 This would demonstrate repeatability if all conditions remained the same (such as the environment where you complete the test). If some conditions were varied, then this would better demonstrate reproducibility, which occurs when consistent results are obtained under changed conditions.
- 3 Robust results would indicate that the test accurately measures a person's memory ability without being significantly affected by the specific letters used in the test.
- 4 Student answers will vary depending on their results, but should compare the number of letters recalled with the five to nine objects limit that Atkinson and Shiffrin have identified. If students were able to hold more than five to nine pieces of information in their short-term memory during the test, it is likely they used chunking to group the letters together (or some other strategy, which enhances the storage capacity of short-term memory).

Unit 3 Practice exam questions

Multiple choice

- | | | | |
|------|------|------|------|
| 1 C | 2 B | 3 A | 4 D |
| 5 C | 6 A | 7 D | 8 C |
| 9 D | 10 B | 11 A | 12 B |
| 13 B | 14 D | 15 B | |

Short answer

- 1 a An internal stressor could be Hirano's physical health. (1 mark) Because he is spending so much time in front of the computer and missing meals, this could contribute to his mood and overall sense of wellbeing, leading to stress. (1 mark) An external stressor could be the financial worries associated with being unemployed. (1 mark) Because he has so far been unsuccessful with his job search, the financial pressure could lead to feelings of stress. (1 mark)
- b Hirano is likely to have experienced prolonged release of cortisol due to chronic stress in the resistance stage of Selye's General Adaptation Syndrome. (1 mark) This reduces the functioning of Hirano's immune system. (1 mark) Therefore, Hirano becomes vulnerable to serious illnesses or disease, such as glandular fever, as he reaches the exhaustion stage. (1 mark)
- c Hirano must first recognise that his initial coping strategies to deal with his stress about the upcoming job interview are ineffective. (1 mark) Hirano will therefore need to try a different type of coping strategy to manage his stress. (1 mark)
- d Serotonin. (1 mark) Functions described may vary, but could include coordination of complex processes and behaviours, mood/emotional regulation, sleep regulation, appetite and digestion, and pain perception. (1 mark)
- 2 a LTD is the long-lasting weakening of synaptic connections between neurons due to low-level stimulation. (1 mark) In the scenario, Rue would be weakening the neural pathways as she unlearns the habit of procrastinating. (1 mark) LTP is the long-lasting strengthening of synaptic connections between neurons due to repeated stimulation. (1 mark) Rue would be reinforcing and strengthening the neural pathways in her brain related to effective time management. (1 mark)
- b Operant conditioning. (1 mark) Rue's improvement in her Psychology grade acts as positive reinforcement for her to stick with her study plan. (1 mark)

- c** The information about the key terms is initially received in Rue's sensory memory. (1 mark) Then, she will pay attention to the definitions she reads, allowing them to be transferred to her short-term memory. (1 mark) By regularly reviewing the key terms, i.e. rehearsal, the information will be encoded to be stored in Rue's long-term memory. (1 mark)
- 3** Learning depends on relationships between the learner and others in their community. (1 mark) Learning can take place in different formats. (1 mark) Information has been learnt through connections to Country, including from the land, ancestors and sky. (1 mark)
- 4 a** Using a between-subjects design is more time-efficient as all conditions can be studied at the same time. (1 mark) A within-subjects design is more time-consuming as each condition will need to be run individually. (1 mark)
- b** Student answers may vary, but should include the independent variable (the amount of fermented foods consumed) (1 mark), the dependent variable (the reported stress levels) (1 mark) and provide a direction of the predicted/expected effect of the IV on the DV (1 mark). A sample response: It is hypothesised that increased consumption of fermented foods will reduce perceived levels of stress compared to not consuming fermented foods.
- c** Student answers will vary; some sample responses:
 Safety consideration: Food allergies. (1 mark) The researchers could screen the participants for food allergies prior to participation in the study, or they could allow participants flexibility in choosing foods they will consume rather than giving them a set menu. (1 mark)
 Ethical consideration: Informed consent procedures. (1 mark) The researchers must seek written consent from participants to confirm that they understand the nature and purpose of the experiment before agreeing to participate. This includes any potential risks. (1 mark)

Unit 4 Word Wizard

- | | | | |
|-------------|-------------|-------------|-------------|
| A 5 | B 10 | C 2 | D 12 |
| E 8 | F 3 | G 4 | H 1 |
| I 7 | J 6 | K 15 | L 13 |
| M 14 | N 11 | O 9 | |

Chapter 6

GROUNDWORK 6

- 1** C **2** D **3** A **4** D **5** B
- 6** Sleep is an ultradian rhythm because it involves the cycling through four stages (NREM stages 1 to 3 and REM sleep) over periods of time less than 24 hours. Sleep is also a circadian rhythm because we experience one major episode of sleep (one sleep-wake cycle) approximately every 24 hours.
- 7** Brain waves increase in amplitude and decrease in frequency from N1 to N3 sleep.
- 8** Both EMG and EOG use electrodes to detect, amplify and record electrical activity of muscles; however, an EOG specifically measures the activity in the muscles that control eye movements, while an EMG can be placed on other skeletal muscles.
- 9** As an older adult, Roger will typically wake up multiple times throughout his sleep and experience limited quantities of N3 sleep.
- 10** The SCN interprets the amount of light received through the eyes and communicates with the pineal gland to influence the secretion of melatonin. This impacts a person's level of alertness.

CASE CRACKER 6

- 1** Student answers will vary, but should draw a link between a stage of the life span and the stage of development of mental functions. A sample response: The restorative theory proposes the REM sleep develops mental functions, which aligns with infants having a high proportion of REM sleep as their brains are developing.
- 2** Student answers will vary, but should relate to the evolutionary theory. A sample response: Humans are placed fairly high on the food chain, so, like lions, we can afford to sleep a lot and during the night.
- 3** Student answers will vary, but should describe the student's ability to consolidate information. A sample response: The student would likely have difficulty remembering a lot of the information they studied.
- 4** Student answers will vary. The clean-up theory only states that sleep cleans the brain, while the restorative theory proposes that during NREM sleep, other parts of the body are also cleaned/repaired.

DATA DRILL 6

- 1** Five cycles
- 2** As the night progresses, adult 1 experiences less N3 sleep and longer periods of REM.
- 3** Adult 2 only experiences one instance of N3 and many instances of wake after sleep onset (WASO).
- 4** Student answers may vary, but an answer of 5 to 6 hours is acceptable.
- 5** Due to a lack of N3 sleep and many instances of WASO, adult 2 would likely feel physically fatigued and lethargic, and experience excessive daytime sleepiness. This could also affect their functioning.

INVESTIGATION INSPECTOR 6

- 1** Correlational study
- 2** Student answers will vary, but an example is shown:

Investigation design	Strengths	Weaknesses
Investigation methodology	<ul style="list-style-type: none"> Observation of sleep behaviours is more natural since variables have not been manipulated. Can help determine how strong or weak the relationship between two variables is. 	<ul style="list-style-type: none"> No cause-and-effect relationship tested Small sample limits the external validity of the investigation
Data collection method	Observation of bed and awakening times is quick and easy.	May lack accuracy as Jamal is not objectively measuring sleep onset time or awakening times.

- 3 a** Student answers will vary. A sample response: Jamal's evidence partially supports his aim, as he has investigated how sleep changes across the life span but has measured sleep habits/patterns, not specifically the sleep needs of his family members.
- b** Student answers will vary, but should suggest a way to improve the accuracy of Jamal's results. A sample response: Jamal could have used a sleep tracking device such as a smartwatch or phone app to gain more accurate data about his family members' sleep times.
- c** Student answers will vary, but should suggest a way to extend the investigation, i.e. broaden the scope. A sample response: Jamal could use a larger sample or a standardised sleep scale to determine whether each person's sleep needs were being met.

EVALUATING ETHICS 6

- 1 Beneficence was upheld as all participants were able to receive the potential benefits of the sleep training program.
- 2 The researcher should allow the participant to leave the study and remove any of their data from the study, if they choose. When appropriate, the researcher should follow up with debriefing later.
- 3 Respect appears to be upheld as informed consent and voluntary participation have occurred, meaning that the researcher allowed participants to make their own choice to participate.
- 4 Deception should only be used in research if necessary and, in this scenario, was not required to achieve the research aim. If participants were deceived in this study, it may have caused undue psychological distress.

RESEARCH REVIEW 6

- 1 Eating eggs at dinner time can be a natural sedative.
- 2 Eating eggs at dinner may be beneficial for sleep as they promote the release of melatonin; however, the article provides little scientific evidence to back up this claim.
- 3 IV: eating eggs for dinner versus not eating eggs for dinner; DV: sleep quality/quantity.
Student responses will vary, but should provide a justification for their design.
- 4 Student answers will vary, but should identify an extraneous variable that could affect the dependent variable and provide a suggestion for how to control the variable.

Chapter 7

GROUNDWORK 7

- 1 D 2 B 3 B 4 D 5 B
- 6 Student answers will vary, but should relate to a change in emotional and mental functioning. Examples include amplified emotional responses (affective functioning) and reduced cognitive processing speed (cognitive effect).
- 7 Suzie will typically go to sleep significantly earlier at night than others (e.g. 8 p.m.) and will wake up much earlier than others (e.g. 4 a.m.).
- 8 Bright light therapy causes the SCN to signal to the pineal gland to inhibit the release of melatonin, which makes you feel tired. Therefore, using this therapy before going to bed would not be recommended as you would feel more alert.
- 9 A zeitgeber is an external cue or stimulus that helps synchronise our body's processes to a circadian rhythm.
- 10 Student answers will vary, but could include any of the following: have a balanced diet, avoid caffeine before bedtime, have dinner 4 to 6 hours before bedtime, or if you are hungry after this time, have a snack that is low in sugar and carbohydrates.

CASE CRACKER 7

- 1 A cool room allows the body temperature to decrease slightly, promoting the onset of drowsiness. A dark room promotes melatonin production, which increases sleepiness.
- 2 Hard workouts before bed will make a person feel energised and heightens their physiological state, so they will find it hard to wind down quickly and sleep.
- 3 Your body needs to work to digest the food you eat. If you eat late at night, this will affect your body's ability to relax and fall asleep.
- 4 Instead of having an evening routine, Tamara would need a morning routine that she could complete when arriving home after her nightshift and before she gets ready to sleep.

- 5 Student answers will vary, but should link positive or negative sleep habits to positive or negative effects on mental wellbeing. A sample response: If a person has poor sleep habits and regularly does not get their required hours of sleep, this can have a negative impact on mental wellbeing, such as affecting their emotional responses.

DATA DRILL 7

- 1 Patients A and B have a similar arousal index, but this is considerably different from patient C.
- 2 Patient C has a much higher sleep efficiency index than patient A. Patient A's sleep latency is much higher than patient C's.
- 3 There is a positive correlation; as REM episodes increase, sleep efficiency index improves.
- 4 Patient B sleeps for 7 hours and 45 minutes, which is typical for an adult. They experienced six REM episodes, which indicates that they have experienced six cycles of sleep; this is typical for an adult.
- 5 Student answers will vary, but examples include amplified emotional responses (affective), microsleeps (behavioural) and struggling to concentrate on tasks (cognitive).

INVESTIGATION INSPECTOR 7

- 1 Student answers will vary. A sample response: non-maleficence; Dr Martin needs to ensure the participants are not harmed from the sleep deprivation or alcohol consumption.
- 2 Student answers will vary. A sample response: Dr Martin could organise transport home for her participants after the research so that they do not need to drive while sleep-deprived or under the influence of alcohol.
- 3 Student answers will vary. A sample response:
Strengths: protects the safety of participants, creates standardised traffic conditions
Limitations: artificial environment may influence participant driving behaviours, cannot perfectly replicate the conditions of real-life driving.
- 4 Systematic error
- 5 Random error
- 6 This will reduce the certainty in Dr Martin's data. Specifically, the inconsistencies in measuring BAC will reduce the precision of the data, making it challenging to accurately assess the impact of alcohol consumption on participants' BAC levels.
- 7 Confounding variable; caffeine consumption becomes mixed up with the independent variable, providing an alternative explanation for changes in driving performance (dependent variable). This affects Dr Martin's ability to draw a valid conclusion.

EVALUATING ETHICS 7

- 1

Factor	Definition
Social	Refers to the ways in which society and culture shape psychological research and issues
Economic	Refers to the financial resources relevant to psychological research and issues
Legal	Refers to the laws and regulations that impact psychological research and issues
Political	Refers to the influence of politics and government on psychological research and issues
- 2 Student answers may vary. Some sample responses:
 - a stigma associated with sleep disorders and accessing treatment
 - b pricing strategies for medication accessibility
 - c compliance with clinical trial regulations
 - d government advocacy for sleep disorder solutions.

RESEARCH REVIEW 7

Equipment required

EEG, EMG, EOG and video monitoring equipment

Substances

Substance	Hazardous/ Not hazardous	Warnings (allergies, side-effects)	Protective measures
Red wine (alcohol)	Not hazardous	Potential allergies and impairments to coordination and movement	Monitor participants and ensure they do not drive while intoxicated.
Coffee (caffeine)	Not hazardous	Potential allergies and side effects such as increased heart rate	Monitor participants closely for adverse reactions.

Participant safety

Potential risk(s)	Control measure(s)
Adverse reactions to caffeine or alcohol consumption	Precisely control amount administered and screen participants for allergies.
Discomfort or distress during the sleep lab stay	Ensure lab environment is safe and conducive to sleeping and offer debriefing.

Chapter 8

GROUNDWORK 8

- 1 D 2 C 3 B 4 D 5 A
- 6 Student examples will vary, but should indicate that a high level of functioning refers to the ability to meet the demands of their day-to-day life effectively and independently.
- 7 The SEWB framework is holistic as it views the seven domains of wellbeing, the broader determinants, and the self as being interconnected; all of these elements contribute to a person's wellbeing as a whole.
- 8 Student answers may vary, but should refer to differing levels of resilience. A sample response: People manage anxiety in different ways and may have different levels of resilience. This could account for their different positions on the mental wellbeing continuum.
- 9 Student answers will vary, but should refer to fluctuations in mental wellbeing. A sample response: A phobia of the ocean may have a negative impact on a person's levels of functioning if they avoid going to the beach. However, at other times in their life, it may have no negative impact.
- 10 Student answers will vary, but should include a factor that originates from within and one that originates from the environment around the student.

CASE CRACKER 8

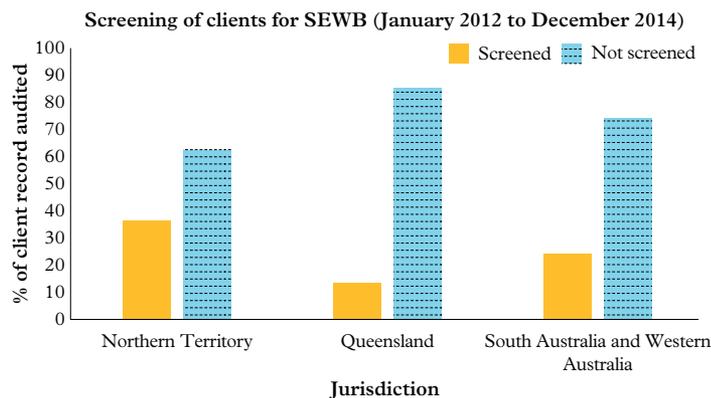
- 1 The SEWB framework describes the wellbeing of the "self" as intrinsically interconnected with seven different domains that, together, strengthen the wellbeing of an Aboriginal or Torres Strait Islander person who accesses the Waminda program.
- 2 Student answers will vary, but should select two domains of the SEWB framework, explain how the Waminda program addresses

them, and describe the effect on Aboriginal and Torres Strait Islander peoples' wellbeing.

- 3 Student answers will vary, but should indicate that Waminda focuses on strengthening wellbeing through a strong community approach and considers a broad range of factors that influence wellbeing, whereas Western approaches generally focus on one individual dimension of mental wellbeing.

DATA DRILL 8

- 1 Student answers may vary. They may use two columns (screened versus not screened) per jurisdiction or stack them to show a distribution. An example of the former is shown.



- 2 Across all jurisdictions, the majority of Aboriginal and Torres Strait Islander clients were not screened for SEWB.
- 3 Student answers may vary, but should suggest that their findings may promote a change in primary healthcare practices. Services may shift to screening SEWB for all Aboriginal and Torres Strait Islander clients, and this could inform treatment and health management approaches.

INVESTIGATION INSPECTOR 8

- 1 Student answers may vary. A sample response: Dr Sill would need to obtain a list of all students enrolled at the school and number them individually. Then, they would use a random number generator to select participants.
- 2 Student answers may vary. A sample response: Dr Sill would need to categorise the students into separate strata based on their year level (one stratum for each year level) and then randomly select a proportional number of students from each stratum to ensure representation from all year levels in their research.
- 3
 - a External validity; studying a broader population will give Dr Sill greater certainty in their data and increase the generalisability of their findings.
 - b The sample size of 50 students will not ensure the representation of each school's student population. Since high school B has a significantly larger student population, a sample size of 50 may not adequately represent the diversity and characteristics of the population.
- 4 As similar results were obtained using the same survey, this suggests that Dr Sill's findings are reproducible.
- 5 Mental wellbeing is a psychological construct that cannot be directly measured. Thus, subjective data is often collected to measure wellbeing, which can introduce bias into the data and lower its accuracy and certainty.

RESEARCH REVIEW 8

Student answers will vary. If a source has been described as credible, it should present the scientific evidence used as a basis to form arguments and conclusions. Sources that are not credible will lack such evidence and may be based on opinions or anecdotes.

EVALUATING ETHICS 8

Student answers will vary but should involve discussion of some of these relevant ethical concepts and guidelines: beneficence, non-maleficence, respect, integrity, justice, informed consent, voluntary participation, withdrawal rights, use of deception and debriefing.

Chapter 9

GROUNDWORK 9

- 1 D 2 A 3 D 4 A 5 D
- 6 Avoiding a phobic stimulus temporarily removes the associated feelings of fear. As this is repeated over time, negative reinforcement of the behaviour occurs, and the phobia is sustained.
- 7 Priyana may only remember times when she felt frightened when up at a height. She may exaggerate the details of these events and remember them as worse than they truly were.
- 8 First, the client is taught a relaxation technique such as a deep breathing exercise. Then, the client works with their psychologist to create a fear hierarchy, rating their fear from lowest to highest.
- 9 Benzodiazepines only target the symptoms of anxiety. They do not provide any long-term treatment to address the cause of a person's phobia.
- 10 Student answers will vary but could suggest using a deep breathing technique or a visualisation exercise.

CASE CRACKER 9

- 1 Long-term potentiation has strengthened the neural connections in the pathways that encode thunderstorms and those that store her experiences of fear. Each time Emma remembers her frightening experience of thunderstorms, the communication in these circuits becomes more efficient, enhancing her fear response.

Antecedent	Behaviour	Consequence	Effect on Emma's future behaviour
Hearing a thunderstorm	Emma would hide in her room.	Removes her feelings of fear of thunderstorm (negative reinforcement)	Encourages Emma to repeat avoidance behaviour

- 3 "Emma has expressed her reluctance to seek treatment due to the fear of being viewed negatively by her friends and colleagues."
- 4 Breathing retraining may help Emma reduce her anxiety and gain more control of her body, given that exposure to a thunderstorm can be unpredictable.
- 5 Student answers may vary. A sample response: Emma may learn a calming visualisation technique to use when a thunderstorm occurs, rather than hiding and avoiding the storm.
- 6 Psychoeducation for Emma's family and friends will provide them with insights into astraphobia, helping them understand her condition better. They will be better equipped to provide support when needed, such as helping Emma to challenge her unrealistic thoughts about thunderstorms. They will also be aware of discouraging Emma's avoidance behaviours. Together, these will help Emma to manage her phobia more effectively.

DATA DRILL 9

- 1 The 0 to 18-year-old age group
- 2 a False b True c True
- 3 There is a negative correlation. As a person ages, the likelihood of them developing a phobia declines.
- 4 -35%
- 5 Females aged 0 to 18 years are most likely to develop a phobia of animals.

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INVESTIGATION INSPECTOR 9

- 1 A literature review involves researching secondary sources to gain an understanding of existing knowledge on a topic and to determine what further research is needed, guiding a future investigation.
- 2 Mixed design; a benefit of this design is that it allows the researcher to investigate more than one independent variable. In this case, Dr Herrera has investigated the different phobia interventions and compared their effectiveness over time.
- 3 IVs: type of intervention received (systematic desensitisation, benzodiazepine or no intervention) and effectiveness of interventions over time; DV: self-reported level of anxiety symptoms.
- 4 Group A is the control condition, which provides a baseline for comparison to groups B and C. This allows Dr Herrera to monitor the effectiveness of each intervention.
- 5 Immediately after the first injection, group C is expected to have the lowest anxiety symptoms due to the calming effects of the benzodiazepine. Group B is anticipated to have reduced symptoms compared to group A (control condition) due to the benefits of systematic desensitisation. However, two weeks later, group B is likely to have the lowest anxiety symptoms because systematic desensitisation has lasting effects to reduce their anxiety associated with injection. In contrast, group C's anxiety symptoms may stay the same or increase because benzodiazepines do not provide long-lasting relief. It is likely group A's symptoms will remain consistent across the experiment as they received no intervention.
- 6 Extending the investigation will increase the robustness of the results by allowing Dr Herrera to assess the long-term effects and sustainability of the treatments over time. This provides more comprehensive insights into the efficacy of benzodiazepines and systematic desensitisation in reducing phobic symptoms.

EVALUATING ETHICS 9

- 1 Student answers may vary. Some sample responses:
 - a The patient should be made aware of the nature of the therapy, its potential benefits and risks, the expected level of distress, and any alternative treatment options before they give written consent to participate.
 - b The therapist should monitor the patient's wellbeing throughout the therapy, ensuring that the exposure hierarchy is manageable so the benefits outweigh any distress.
 - c The treatment should be conducted in a private environment. This ensures that what is discussed or experienced during the sessions remains confidential and no personal data from the sessions should be shared without the patient's permission.
 - d If at any time, the distress is becoming too significant, the patient should be allowed to stop the treatment and have a break before continuing if they wish or stopping permanently.
- 2 Student answers may vary, but possible relevant health and safety guidelines include conducting a risk assessment before beginning the therapy, ensuring a management plan is in place if the patient experiences severe distress or adverse reactions during treatment, or physical safety measures if the exposure sessions involve potentially dangerous phobic stimuli.

RESEARCH REVIEW 9

- 1 2 out of 3 marks; the student has failed to use the terms UCS and UCR when describing the "during conditioning" phase. Student also did not indicate that the NS is presented prior to the UCS.
- 2 Student answers will vary, but should present the key information provided in the marking guide in full sentences.
- 3 1 out of 4 marks; the student has correctly described the antecedent and behaviour but has incorrectly stated the consequence and the effect on future behaviour. A further mark is removed due to not using the ABC model of operant conditioning in their response.

- 4 Student answers will vary, but should present the key information provided in the marking guide in full sentences.

Chapter 10

GROUNDWORK 10

- 1 D 2 D 3 A 4 C 5 B
- 6 Protective factors are biological, psychological and social factors that can improve the health and mental wellbeing of an individual.
- 7 Adequate hydration can improve sleep quality, energy, cognitive functions and mood, which all contribute to mental wellbeing.
- 8 Language revival programs promote cultural continuity as they help reconnect community members with their ancestral language, allowing cultural knowledge, traditions and Songlines to be preserved and shared across generations. This helps to strengthen cultural identity.
- 9 Both mindfulness meditation and CBT strategies address the psychological components of mental wellbeing and can improve cognition and mood.
- 10 Their family might provide tangible support in the form of financial assistance or providing food, whereas the community may offer employment services that the individual can access.

CASE CRACKER 10

- 1 Creating possum-skin cloaks involves a traditional process of decorating and sewing together possum skins.
- 2 “Cultural continuity” can be defined as the ongoing practice, preservation and transfer of cultural traditions, values and knowledge across generations.
- 3 Creating possum-skin cloaks enhances cultural continuity as it allows members of the Gunditjmarra community to draw on skills, knowledge and traditions of ancestors, and pass on stories and skills to future generations. This is important because it helps to celebrate and share culture and identity with others.
- 4 Student answers will vary, but should include strengthening connection to spirit, spirituality and ancestors, connection to Country and land, and connection to culture, and provide an appropriate justification.
- 5 The fact that Gunditjmarra rangers like Braydon Saunders are actively involved in managing parts of their Country reflects their autonomy and self-governance in reclaiming and caring for Country, demonstrating self-determination.

DATA DRILL 10

- 1 *x*-axis: Year; *y*-axis: Percentage of adult Victorian residents
- 2 From 2010 to 2022, the percentage of adult Victorian residents accessing mental wellbeing support services increased.
- 3 Over 2020 and 2021, Victorian residents experienced many months of lockdown restrictions due to COVID-19, which had a negative impact on many people’s mental wellbeing. The increase in people seeking professional mental wellbeing support could explain the significant increase in accessing mental wellbeing services.
- 4 Student answers may vary, but could include reduced stigma against seeking mental wellbeing support, improved access to mental wellbeing support, and increased government funding for mental wellbeing services.
- 5 Student answers will vary. A sample response: It can be concluded that an increased percentage of Victorian adult residents have accessed mental wellbeing support services from 2010 to 2022.

INVESTIGATION INSPECTOR 10

- 1 If primary school students practise mindfulness meditation daily, then their mental wellbeing will improve compared to students who do not practise daily mindfulness meditation.
- 2 Student answers will vary, but should involve assessing the strengths and weaknesses of the investigation. Examples include:

Strengths:

- Use of random sampling: reduces the chance of selection bias and improves the validity of the results as the sample is more likely to represent the broader population of primary school children.
- Informed consent: the researchers obtained informed consent from the parents, demonstrating ethical considerations and respect for the participants’ rights and mental wellbeing.
- Observations during fieldwork: conducting direct observations before and after the intervention can improve the validity of results as it allows the researchers to assess changes in behaviour and interactions. Observations provide direct, real-time data on the participants’ mental wellbeing.
- Control group: the inclusion of a control group (group B) that does not receive the intervention allows for comparison and helps establish the cause-and-effect relationship between mindfulness meditation and changes in mental wellbeing.

Weaknesses:

- Sample size: the sample size of 30 children is relatively small, which may limit the statistical analysis of the results and generalisability of the findings (reduces internal and external validity).
- Age range: the participants are aged 5 to 7, which represents a wide developmental range in young children. Developmental differences between younger and older participants could impact the accuracy of results as the younger children may not be able to properly engage in the mindfulness meditation.
- Observational bias: the use of observations to categorise behaviours as positive, neutral or negative may introduce observational bias. The researchers’ subjective interpretations of the behaviours they see may affect the validity of the data.
- Short duration: the intervention consists of only three days of daily mindfulness meditation sessions; this may not allow the researchers to determine if the independent variable (mindfulness meditation) has caused a change in the dependent variable (mental wellbeing).
- Lack of long-term follow-up: the study assesses changes immediately after the intervention but does not include a follow-up assessment to determine the long-term effects of mindfulness meditation on mental wellbeing.

EVALUATING ETHICS 10

- 1 Student answers will vary, but could include that increasing self-determination directly leads to increased wellbeing.
- 2 Student answers will vary, but could include access to wellbeing resources in remote communities, and presence of community-based initiatives to reduce stigma associated with accessing mental wellbeing care.
- 3 Student answers will vary, but could include amount of government funding for wellbeing programs in Indigenous communities, and regulation of cultural competence training for wellbeing professionals.

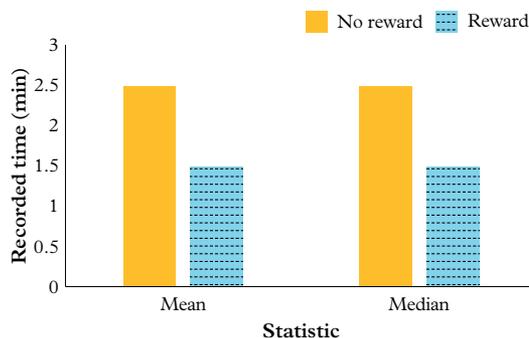
RESEARCH REVIEW 10

- 1 Students should assess the strengths and limitations of each claim.
 - a Claim 1: The claim that only trained professionals should help with mental wellbeing concerns is not entirely accurate. Seeking professional help is essential for serious mental wellbeing concerns as professionals can provide critical care to improve wellbeing. However, some people may feel shy, or financially unable to seek professional care. Further, not all discussions about mental wellbeing need experts; some concerns can be managed alone or with support from friends, family and the community. Learning about your own wellbeing and strategies to help yourself is important, too. Mental wellbeing is complex, so it is good to have different ways to get support, including professionals but also through self-help and community support.

- b Claim 2: Eating a balanced and nutritious diet can positively impact mental wellbeing by providing essential nutrients to support brain function, mood regulation and energy levels. Additionally, a healthy diet can promote gut health, which research shows is linked to mental wellbeing. However, it is important to recognise that mental wellbeing is influenced by numerous factors and dietary changes alone may not address all issues. Nutrition should be viewed as one component of a holistic approach to improving mental wellbeing alongside other biological, psychological and social factors.
- c Claim 3: Spending too much time in bed can be detrimental for mental wellbeing as it can disrupt sleep patterns, resulting in a lack of quality sleep, which is important for positive mental wellbeing. Additionally, staying in bed for long periods can limit your exposure to daylight and reduce physical activity levels, both of which can negatively impact mood and wellbeing. However, if a person is unwell, it may be beneficial for their wellbeing to spend more time in bed. Some people naturally require more sleep than others and therefore may spend longer periods in bed each day. In summary, while excessive bed rest can potentially harm mental wellbeing, individual circumstances vary and need to be considered.

2

Comparison of mean and median values with and without reward offered



- 3 The data shows that, on average, participants created the origami animal faster when a reward was offered. The average time taken reduced by 50 seconds. The median was also lower for trial 2: 1 minute 57 seconds compared to 2 minutes 45 seconds. As the median is less affected by outliers than the mean is, this provides a good indication that results improved in trial 2.
- 4 The data appears to have high precision as the values are quite similar to each other. However, there is one exception with the value 4.55 in trial 1, which appears to be an outlier as it is significantly higher than any of the other results.
- 5 The study appears to have high internal validity as Chloe identified and controlled for potential extraneous variables before conducting her investigation and has achieved the aim of her investigation. The external validity is low, however, due to a small sample size. This may not represent the characteristics of the general population.
- 6 Student answers will vary. A sample response: Chloe didn't assess students' origami-making skills before the experiment. This variability in skill level could affect the time it takes for participants to complete the tasks, making it challenging to attribute differences solely to the use of rewards.

Chapter 11

INVESTIGATION INSPECTOR 11

- 1 Student answers will vary, but some relevant terms include operant conditioning, consequence and positive reinforcement.
- 2 Due to a small sample size, a within-subjects design will provide more data for analysis than a between-subjects design would. It also controls for individual participant differences such as previous experience with making origami.
- 3
 - a the presence or absence of a chocolate reward
 - b the time taken to make the origami animal
 - c All participants were given the same sets of instructions and the same paper, and completed the task in the same classroom.
- 4 Chloe will minimise order effects/practice effects. If Chloe used the same instructions in trial 2, students might complete the origami faster, not because of the incentive of a reward, but because they were already familiar with them, having completed trial 1. Using a different set of instructions reduces this.
- 5 Primary, objective, quantitative data
- 6 Student answers may vary. A sample response:
 - a Participants may have different reaction times when starting and stopping the stopwatch.
 - b A participant may forget to start or stop their stopwatch.
 - c If the stopwatch has not been calibrated properly, it may consistently record time slightly faster or slower than actual time.
- 7 Student answers will vary. A sample response: Maintain confidentiality by not publishing any of the participants' personal details, upholding withdrawal rights by allowing participants to leave the experiment at any time, and removing their results if they wish, and upholding integrity by reporting the results of the experiment honestly in the report upon completion of the experiment.

RESEARCH REVIEW 11.3

- 1 Student answers will vary, but should express ideas succinctly, use the third person perspective, and use key words such as validity, generalisability, limitation and relationship.

Suggested improvements to Chloe's discussion and conclusion sections:

Discussion

The results of the investigation supported the hypothesis that offering students a reward would result in students creating the origami animal faster than when no reward was offered. As displayed in Table 1, the average time taken to create the origami animal decreased by 50 seconds in trial 2 when a reward was offered as an incentive. The median time also decreased by 48 seconds in trial 2. These results suggest that the incentive of receiving a reward, and not necessarily receiving the reward itself, is enough to motivate students to try to learn a new skill more quickly. These results align with previous research by Smyth (2015) who found that offering physical rewards improved how quickly students completed schoolwork. This investigation expands on this idea by demonstrating how rewards can motivate students to learn a new skill, which may extend beyond the classroom.

A limitation of this investigation was the small sample size of only 15 Year 7 students from one high school. This limits the generalisability of the results to all Australian teenagers and therefore reduces the external validity of the investigation. Additionally, it is not known whether the chocolate reward offered to students was an appropriate motivator for all. Therefore, further research to investigate the effects of different types of rewards and using a larger, more diverse sample is required to improve the validity of the investigation and understanding of the relationship between offering a reward and learning.

Conclusion

This investigation provided evidence to suggest that offering a reward to students can improve the time taken to learn a new skill. While the

DATA DRILL 11.2

	Trial 1: Time taken to fold origami frog, without reward offered (min.sec)	Trial 2: Time taken to fold origami fish, with reward offered (min.sec)
Mean	2.41	1.51
Median	2.45	1.57

investigation has some limitations and lacks external validity, it provides insight into the relationship between rewards and learning. This information could be beneficial to teachers who are seeking ways to improve their students' engagement and learning at school.

- 2 Student answers will vary. A sample response: Offering students a reward can reduce the time taken to learn a new skill.

Unit 4 Practice exam questions

Multiple choice

- | | | | |
|------|------|------|------|
| 1 B | 2 C | 3 A | 4 D |
| 5 C | 6 A | 7 D | 8 C |
| 9 D | 10 B | 11 B | 12 C |
| 13 B | 14 A | 15 C | |

Short answer

- 1 Yichen is displaying high levels of mental wellbeing. (1 mark) As she is seeking assistance to help her adjust to the challenges and changes that she is facing, she is demonstrating high levels of resilience. (1 mark) Yichen is also actively seeking out ways to get from her university to her job, so she can continue to maintain her work; this indicates high levels of functioning. (1 mark)
- 2 **a** Conducting a correlational study allows the psychologist to directly observe the police officers' dietary habits and obtain primary, objective data. (1 mark) The natural observation of behaviours without manipulating variables could also provide a more realistic understanding of the relationship between diet and mental wellbeing, increasing the validity of the findings (1 mark)
- b** A controlled experiment would require separating police officers into groups of high/appropriate nutritional intake and low/insufficient nutritional intake. This may not adhere to the ethical concept of non-maleficence, as police officers could experience harm as a result of having a low nutrition diet. (1 mark)
- c** The nutrients found in the food a person consumes impacts the functioning of the brain and the body. (1 mark) Therefore, inadequate nutritional intake can have negative impacts on mental wellbeing, including decreased energy levels, increased responsiveness to stress, and reduced cognitive functioning, which all influence mood. (1 mark)
- d** Student answers will vary, but examples include snacking on fruit or vegetables during their shift, or bringing home-cooked meals instead of purchasing processed takeaway foods. (1 mark)
- 3 **a** Student answers may vary, but should include the independent variable (experiencing or not experiencing nightmares) (1 mark), the dependent variable (mental wellbeing levels) (1 mark) and provide a direction of the predicted/expected effect of the IV on the DV (1 mark). A sample response: Experiencing nightmares will reduce mental wellbeing levels compared to individuals who do not experience nightmares.
- b** A combination of objective and subjective measures provides a more comprehensive set of data and reduces the likelihood of biases influencing the results. (1 mark) This increases the internal validity of the investigation. (1 mark)
- c** Student answers will vary, but should provide examples of changes to emotional state or functioning (e.g. increased irritability, mood swings). (1 mark)
- d** When they avoid horses, they reduce their unpleasant feelings of fear, which demonstrates negative reinforcement. (1 mark) This encourages them to continue to avoid situations involving horses in the future, i.e. strengthens the behaviour. (1 mark)
- 4 Student answers may vary, but should identify two domains and explain how Kirra could increase her connection to them to improve her mental wellbeing. A sample response: As Kirra is physically separated from her family, she may be feeling disconnected from the support of these close relationships (connection to family and kinship). (1 mark) As she

feels that she is missing out on important cultural knowledge from her community, she may be feeling disconnected from continuing to develop her sense of identity. (1 mark) Kirra could strengthen her connection to these two domains of the SEWB by, if possible, connecting with her family virtually or planning a trip down to Gippsland to visit occasionally. (1 mark) This would provide her with the opportunity to strengthen these connections and improve her mental wellbeing. (1 mark)

- 5 **a** Rotational night shifts involve an individual sometimes working at night and needing to be awake when it is dark, and then sometimes working during the day and sleeping during the night. (1 mark) This inconsistent routine prevents the maintenance of a stable sleep-wake pattern, which causes issues with falling asleep and waking up at the required times to meet the demands of their life. (1 mark)
- b** Student answers will vary, but should select one of light, temperature or eating and drinking patterns, then explain how adaptation to the zeitgeber helps to improve sleep during the day. The response must also explain how this works biologically. A sample response: The zeitgeber of light could be used to improve sleep during the day. (1 mark) The SCN detects and signals the release of melatonin from the pineal gland in response to low levels of light (1 mark), so keeping the bedroom dark using blackout curtains could help to promote melatonin release and the onset of sleep during the day. (1 mark)
- c** Student answers will vary, but must make four points about the sleep requirements of a university student compared to an older adult. For example, students could discuss the difference in hours of sleep required, the difference in demands of everyday life (e.g. the university student will have academic obligations, such as attending class during the day), and the subsequent impact on mental wellbeing (levels of functioning and resilience).

Units 3 & 4 Practice exam questions

Multiple choice

- | | | | |
|------|------|------|------|
| 1 C | 2 A | 3 C | 4 B |
| 5 D | 6 B | 7 B | 8 C |
| 9 D | 10 D | 11 D | 12 A |
| 13 B | 14 C | 15 B | 16 A |
| 17 D | 18 C | 19 B | 20 C |
| 21 A | 22 A | 23 C | 24 A |
| 25 B | | | |

Short answer

- 1 **a** Student examples may vary, but should provide a similarity between acute and chronic stress, a difference, and provide examples of each, with reference to the scenario. The response should also describe stress and not just mention a stressor. A sample response: Both acute stress and chronic stress are psychobiological responses to a source of tension. (1 mark) However, acute stress occurs over a short period of time, whereas chronic stress is consistent or recurring over a longer period of time. (1 mark) Davina is experiencing chronic stress due to ongoing pressure at work. (1 mark) This is different from acute stress such as being stuck in traffic or losing her keys. (1 mark)
- b** The brain and spinal cord make up the central nervous system (1 mark), and the autonomic and somatic nervous systems (1 mark for either answer). Once the sensory information is received, Davina's spinal cord transmits this information to her brain, where it is then processed. Her brain then coordinates a response that is signalled to her spinal cord, which then transmits this information to the required motor neurons. (1 mark) The somatic nervous system allows movement of Davina's muscles, and the autonomic nervous system regulates Davina's breathing and heart rate during the class. (1 mark)

- c** The GBA involves a bi-directional communication between the central nervous system and the enteric nervous system, meaning that the brain can influence the gut and the gut can influence the brain. (1 mark) Stress hormones are released, which means gut microbiota will be less diverse. (1 mark) A less diverse microbiota in the gut can impact the brain and cognition (and vice versa), which can result in mood changes or decreased cognition. (1 mark)
- 2 a** An acronym serves as a mnemonic device by improving the process of encoding and storing information in long-term memory, through the creation of a pronounceable word that connects the information in a more meaningful manner. (1 mark) It also assists in the retrieval of information from long-term memory, as the word provides additional cues to aid in retrieval. (1 mark)
- b** It is predicted that participants experiencing condition A will remember the fewest number of words, as they have no mnemonic or cues to assist their recall. (1 mark) In condition B, it is predicted that participants will remember a higher number of words compared to condition A, as the acronym provides additional cues that assist in encoding, storage and retrieval of information. (1 mark) Finally, participants in condition C are predicted to remember the highest number of words, as the method of loci is a more elaborate mnemonic device that provides visual imagery cues to assist in recall. (1 mark)
- c** If a participant had Alzheimer's disease, they would likely perform poorly on the memory test. (1 mark) This is because Alzheimer's disease primarily involves degeneration of the hippocampus (1 mark), which has a key role in consolidating explicit long-term memories, a process required when remembering a list of learnt words. (1 mark)
- 3 a** Retention involves storing a mental representation of the behaviour over a period of time. (1 mark) Jeremy needs to visually retain the key steps he observed of his neighbour skateboarding. (1 mark) Reproduction involves having the necessary physical and cognitive skills to perform the behaviour. (1 mark) Jeremy needs to be physically capable of standing and balancing, and possess the cognitive skills to understand to push his foot to create momentum while skating. (1 mark)
- b** Long-term depression involves the long-lasting weakening of synaptic connections due to repeated low-intensity stimulation. (1 mark) As Jeremy practises not keeping one foot on the ground, the neural pathways representing this will be pruned and weaken. (1 mark) This behaviour will decrease, allowing the strengthening of the skill of balancing with two feet on the skateboard. (1 mark)
- 4 a** Fieldwork involves going to a specific location to investigate a phenomenon or problem that is unique to that site. (1 mark) The psychologist may need to spend some time aboard the navy ship while out at sea to collect their data. (1 mark)
- b** EOG is electro-oculography, an objective measure of sleep in which the electrical impulses from muscles around the eyes are detected and recorded, giving information about eye movement. (1 mark)
- Benefit: EOG provides objective data that is less likely to be biased or inaccurate compared to subjective measures, such as sleep diaries (1 mark)
- Limitation: EOG does not provide data that can distinguish between when a person experiences different stages of NREM sleep (1 mark)
- c** Temperature is a zeitgeber (environmental cue) as body temperature can influence the alignment of an individual's sleep-wake cycle to the circadian rhythm. (1 mark) The naval officers may experience delayed sleep onset in the warm room, as their body temperature will struggle to drop as they wind down for sleep. (1 mark) The naval officers may also experience more fragmented sleep as they will struggle to regulate their body temperature throughout their sleep. (1 mark)
- d** Working rotational shifts can disrupt the naval officers' sleep-wake patterns as they must regularly change the times (day to night) at which they sleep. (1 mark) This affects the SCN, which interprets the level of light in the environment and triggers the pineal gland to release melatonin in low light conditions, inducing sleep. (1 mark)
- e** At the start of the training, it would be predicted that the naval officers would perform better on cognitive tasks than at the end of the training. (1 mark) This is because a full night of sleep deprivation impairs a person's cognitive functioning, such as ability to focus and short-term memory, which would be required to complete cognitive tasks. (1 mark)
- f** Repeatability refers to the ability to obtain the same results again under the same conditions and by the same observer. (1 mark) The psychologist could follow the naval officers on future deployments at sea to determine if they obtain similar results. (1 mark) Reproducibility refers to the ability to obtain the same results again under changed conditions. (1 mark) A different psychologist could conduct a similar investigation with naval officers using the same methods to determine if they obtain similar results. (1 mark)
- 5 a** Cultural continuity (1 mark); Kalti is sharing knowledge with youth in his community to ensure this information is passed down the generations. (1 mark) Self-determination (1 mark); Kalti leads community activities to strengthen his and his community members' cultural connection. (1 mark)
- b** Student answers may vary, but some examples include having access to culturally responsive wellbeing services, mentor programs for the community youth members, and facilitating yarnning circles that provide a safe space for discussing wellbeing. (1 mark)
- 6** The cognitive component of CBT involves addressing Cris's unrealistic thoughts/cognitive biases towards flying. (1 mark) The behavioural component of CBT involves addressing Cris's avoidance behaviours towards flying. Students should provide a specific example of cognitive and behavioural components. (1 mark) By changing Cris's cognition, this could lead to a positive change in his behaviour. (1 mark)

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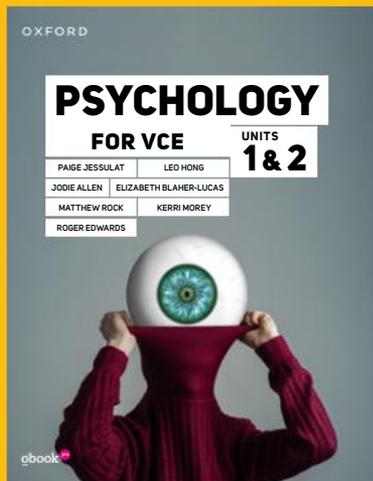
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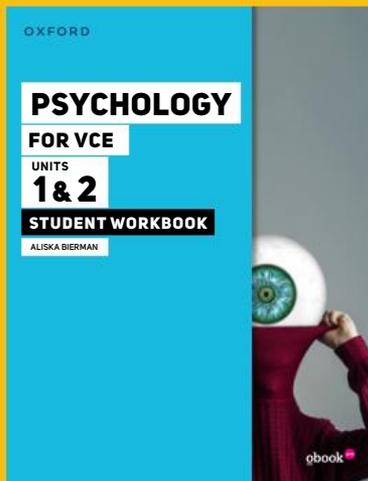
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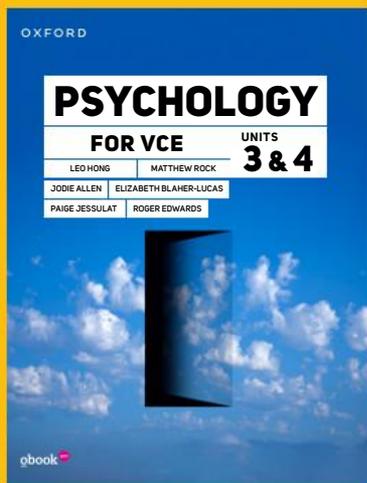


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