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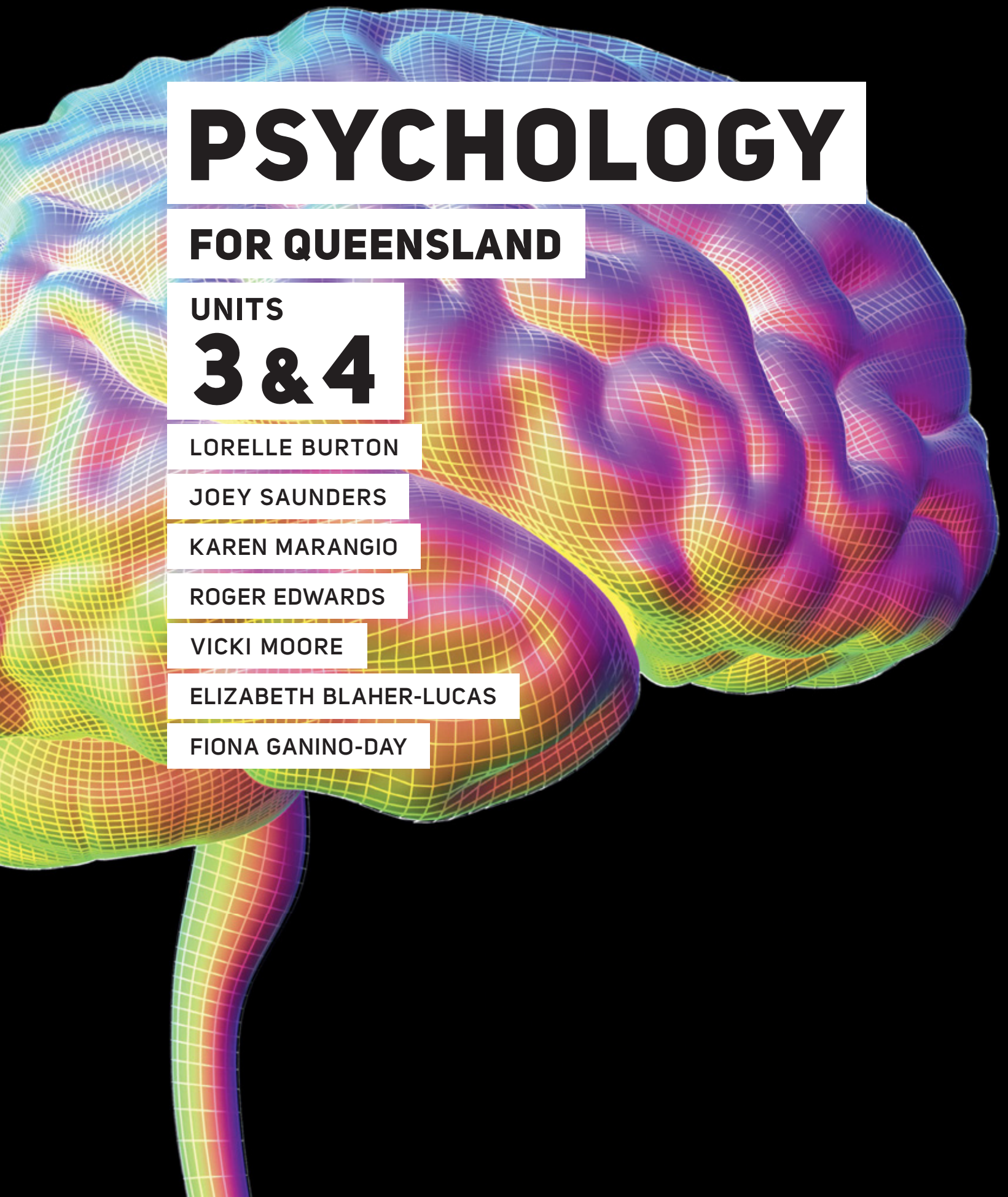

PSYCHOLOGY

FOR QUEENSLAND

UNITS 3 & 4

LORELLE BURTON

JOEY SAUNDERS

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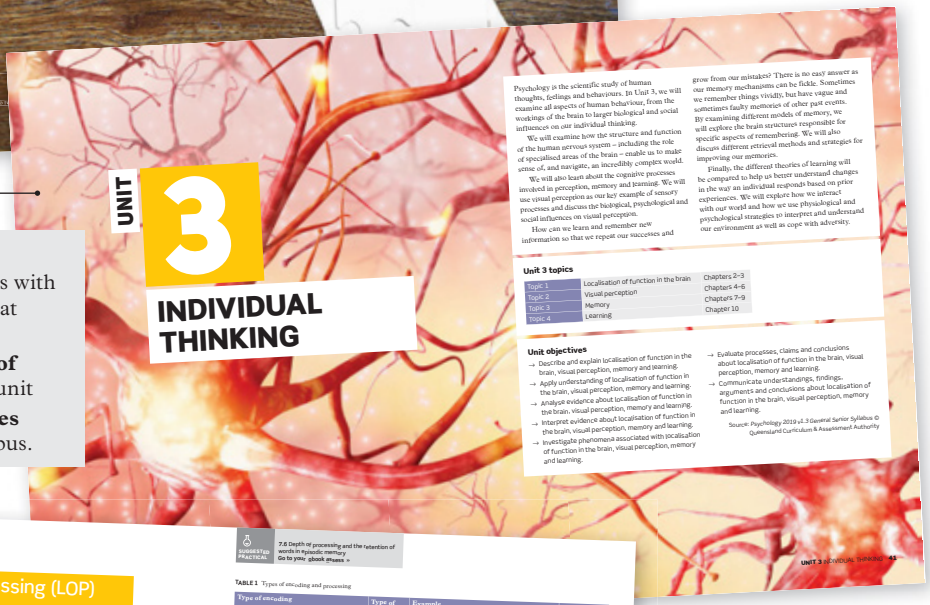
Using *Psychology for Queensland Units 3 & 4*

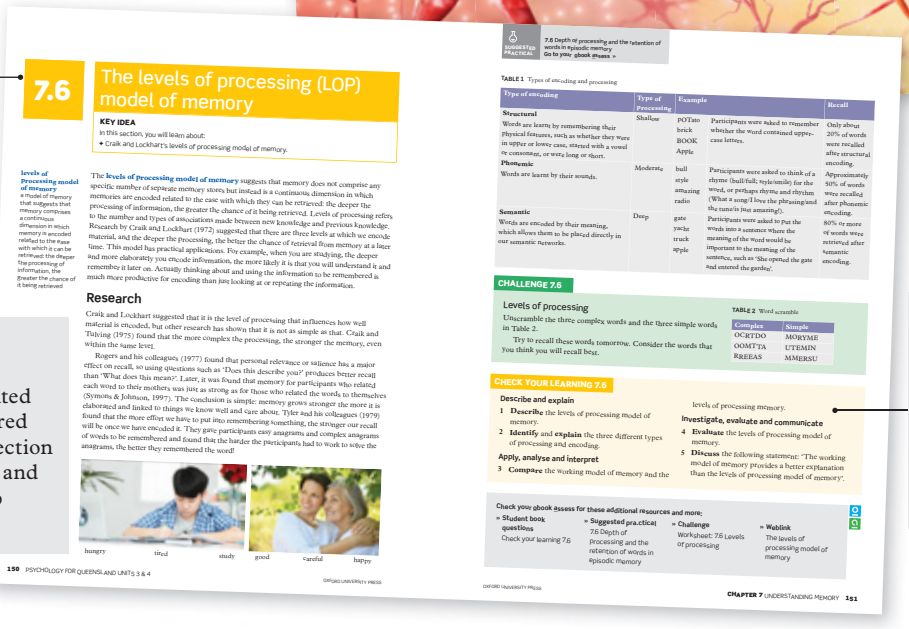
Psychology for Queensland Units 3 & 4 has been purpose-written to meet the requirements of the QCAA Psychology General Senior Syllabus. The second of a two-volume series, *Psychology for Queensland Units 3 & 4* offers complete support for teachers and students of Units 3 & 4 Psychology, providing unparalleled depth and comprehensive syllabus coverage.

Chapter openers
Each chapter begins with a chapter opener that includes:
- subject matter from the **syllabus**
- a list of the **mandatory** and **suggested practicals** from the syllabus
- key **questions** to get students thinking about the content covered in the chapter.

Psychology toolkit
The Student book begins with a stand-alone reference chapter that includes:
- assessment advice
- a step-by-step guide to preparing for your exam
- methods for presenting and analysing psychology data.



Unit openers
Each unit begins with a unit opener that includes:
- an **overview of topics** in the unit
- **unit objectives** from the syllabus.



Section-based approach
Content is presented in clearly structured **sections**. Each section is clearly labelled and numbered to help navigation.

Check your learning
Each section ends with **Check your learning** questions that revise the content covered in the section and allow students to practise using cognitive verbs.

Full-colour diagrams and photos
Rich visual material illustrates concepts and engages students.

Study tips
Practical assessment advice helps students improve their performance in assessment tasks.

Case studies
Real-life examples illustrate theoretical points being explained in the text.

Margin glossary
Key terms and definitions are highlighted to help students recall important information.

Challenges
Scenarios and questions encourage critical thinking.

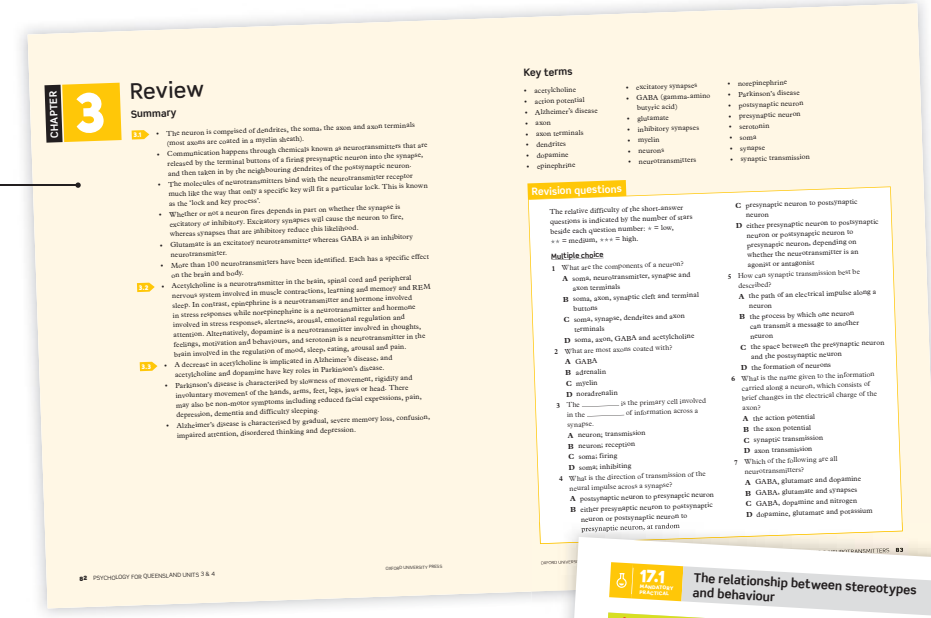
Science as a human endeavour
Real-world contexts promote curiosity and can be used as a starting point for research investigations.

obook assess
Every section includes links to a range of digital resources that support student learning and assessment.

Chapter reviews
Each chapter review includes:

- a **summary of key learning** in each chapter
- **revision questions** written to target assessment through multiple-choice and short-answer questions
- **key terms** introduced throughout the chapter.

Practical manual
Each mandatory practical from the syllabus has **proposed methodologies and materials** included in the practical manual. Suggested practicals are included via obook assess. Each practical is flagged in the relevant section of the Student book.


CHAPTER 3

Review

Summary

- The neuron is comprised of dendrites, the soma, the axon and axon terminals (most axons are coated in a myelin sheath).
- Communication happens through chemicals known as neurotransmitters that are released by the terminal buttons of a firing presynaptic neuron into the synapse, and then taken in by the neighbouring dendrites of the postsynaptic neuron.
- The molecules of neurotransmitters bind with the neurotransmitter receptor much like the way that only a specific key will fit a particular lock. This is known as the 'lock and key process'.
- Whether or not a neuron fires depends in part on whether the synapse is excitatory or inhibitory. Excitatory synapses will cause the neuron to fire, whereas synapses that are inhibitory reduce this likelihood.
- Glutamate is an excitatory neurotransmitter whereas GABA is an inhibitory neurotransmitter.
- More than 100 neurotransmitters have been identified. Each has a specific effect on the brain and body.
- Acetylcholine is a neurotransmitter in the brain, spinal cord and peripheral nervous system involved in muscle contractions, learning and memory and REM sleep. In contrast, epinephrine is a neurotransmitter and hormone involved in stress responses while norepinephrine is a neurotransmitter and hormone involved in stress responses, alertness, arousal, emotional regulation and attention. Alternatively, dopamine is a neurotransmitter involved in thoughts, feelings, motivation and behaviours, and serotonin is a neurotransmitter in the brain involved in the regulation of mood, sleep, eating, arousal and pain.
- A decrease in acetylcholine is implicated in Alzheimer's disease, and acetylcholine and dopamine have key roles in Parkinson's disease.
- Parkinson's disease is characterised by slowness of movement, rigidity and involuntary movement of the hands, arms, feet, legs, jaws or head. There may also be non-motor symptoms including reduced facial expressions, pain, depression, dementia and difficulty sleeping.
- Alzheimer's disease is characterised by gradual, severe memory loss, confusion, impaired attention, disordered thinking and depression.

Key terms

- acetylcholine
- action potential
- Alzheimer's disease
- axon
- axon terminals
- dendrites
- dopamine
- epinephrine
- excitatory synapses
- GABA (gamma-amino butyric acid)
- glutamate
- inhibitory synapses
- myelin
- neurons
- neurotransmitters
- norepinephrine
- Parkinson's disease
- postsynaptic neuron
- presynaptic neuron
- serotonin
- soma
- synapse
- synaptic transmission

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: + = low, ++ = medium, +++ = high.

Multiple choice

1 What are the components of a neuron?
A soma, neurotransmitter, synapse and axon terminals
B soma, axon, synaptic cleft and terminal buttons
C soma, synapse, dendrites and axon terminals
D soma, axon, GABA and acetylcholine

2 What are most axons coated with?
A GABA
B adrenalin
C myelin
D noradrenalin

3 The _____ is the primary cell involved in the _____ of information across a synapse.
A neuron; transmission
B neuron; reception
C soma; firing
D soma; inhibiting

4 What is the direction of transmission of the neural impulse across a synapse?
A postsynaptic neuron to presynaptic neuron
B either presynaptic neuron to postsynaptic neuron or postsynaptic neuron to presynaptic neuron, at random
C presynaptic neuron to postsynaptic neuron
D either presynaptic neuron to postsynaptic neuron or postsynaptic neuron to presynaptic neuron, depending on whether the neurotransmitter is an agonist or antagonist

5 How can synaptic transmission best be described?
A the path of an electrical impulse along a neuron
B the process by which one neuron can transmit a message to another neuron
C the space between the presynaptic neuron and the postsynaptic neuron
D the formation of neurons

6 What is the name given to the information carried along a neuron, which consists of brief changes in the electrical charge of the axon?
A the action potential
B the axon potential
C synaptic transmission
D axon transmission

7 Which of the following are all neurotransmitters?
A GABA, glutamate and dopamine
B GABA, glutamate and synapses
C GABA, dopamine and nitrogen
D dopamine, glutamate and potassium

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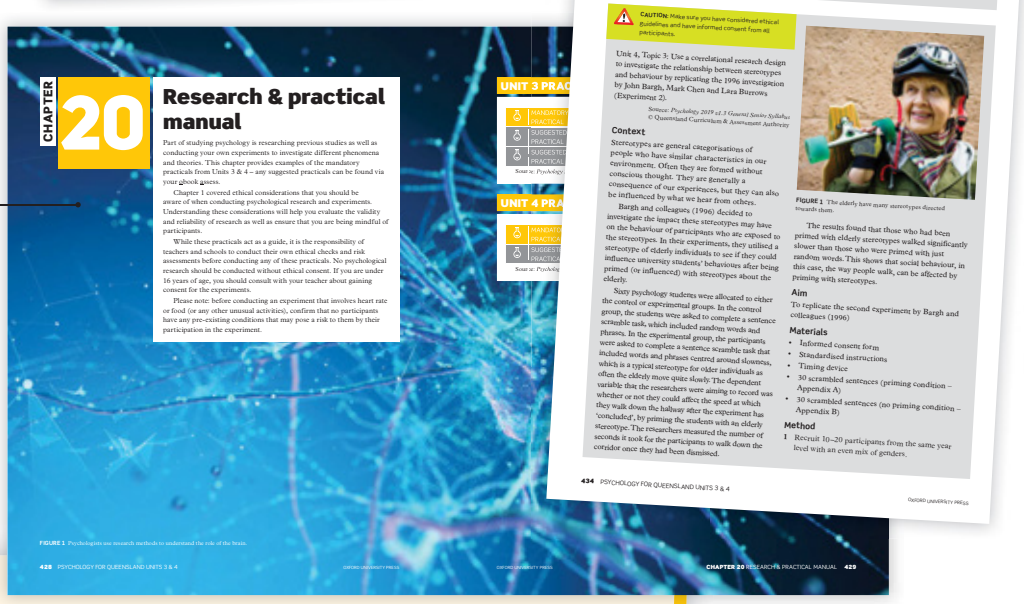
CHAPTER 20

Research & practical manual

Part of studying psychology is researching previous studies as well as conducting your own experiments to investigate different phenomena and theories. This chapter provides examples of the mandatory practicals from Units 3 & 4 – any suggested practicals can be found via your obook assess.

Chapter 1 covered ethical considerations that you should be aware of when conducting psychological research and experiments. Understanding these considerations will help you evaluate the validity and reliability of research as well as ensure that you are being mindful of participants.

While these practicals act as a guide, it is the responsibility of teachers and schools to conduct their own ethical checks and risk assessments before conducting any of these practicals. No psychological research should be conducted without ethical consent. If you are under 16 years of age, you should consult with your teacher about gaining consent for the experiments.

Please note: before conducting an experiment that involves heart rate or food (or any other unusual activities), confirm that no participants have any pre-existing conditions that may pose a risk to them by their participation in the experiment.

UNIT 3 PRAC

MANDATORY PRACTICAL
SUGGESTED PRACTICAL
SUGGESTED PRACTICAL

Source: Psychology

UNIT 4 PRA

MANDATORY PRACTICAL
SUGGESTED PRACTICAL

Source: Psychology

FIGURE 1 Psychologists use research methods to understand the role of the brain.

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17.1 MANDATORY PRACTICAL

The relationship between stereotypes and behaviour

CAUTION: Make sure you have considered ethical guidelines and have informed consent from all participants.

Unit 4, Topic 3: Use a correlational research design to investigate the relationship between stereotypes and behaviour by replicating the 1996 investigation by John Bargh, Mark Chen and Lara Burrows (Experiment 2).

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

Context

Stereotypes are general categorisations of people who have similar characteristics in our environments. Often they are formed without conscious thought. They are generally a consequence of our experiences, but they can also be influenced by what we hear from others.

Bargh and colleagues (1996) decided to investigate the impact these stereotypes may have on the behaviour of participants who are exposed to the stereotypes. In their experiments, they utilised a stereotype of elderly individuals to see if they could influence university students' behaviours after being primed (or influenced) with stereotypes about the elderly.

Sixty psychology students were allocated to either the control or experimental groups. In the control group, the students were asked to complete a sentence scramble task, which included random words and phrases. In the experimental group, the participants were asked to complete a sentence scramble task that included words and phrases centred around slowness, which is a typical stereotype for older individuals as often the elderly move quite slowly. The dependent variable that the researchers were aiming to record was whether or not they could affect the speed at which they walk down the hallway after the experiment has 'concluded', by priming the students with an elderly stereotype. The researchers measured the number of seconds it took for the participants to walk down the corridor once they had been dismissed.

FIGURE 1 The elderly have many stereotypes directed towards them.

The results found that those who had been primed with elderly stereotypes walked significantly slower than those who were primed with just random words. This shows that social behaviour, in this case, the way people walk, can be affected by priming with stereotypes.

Aim

To replicate the second experiment by Bargh and colleagues (1996)

Materials

- Informed consent form
- Standardised instructions
- Timing device
- 30 scrambled sentences (priming condition – Appendix A)
- 30 scrambled sentences (no priming condition – Appendix B)

Method

1 Recruit 10–20 participants from the same year level with an even mix of genders.

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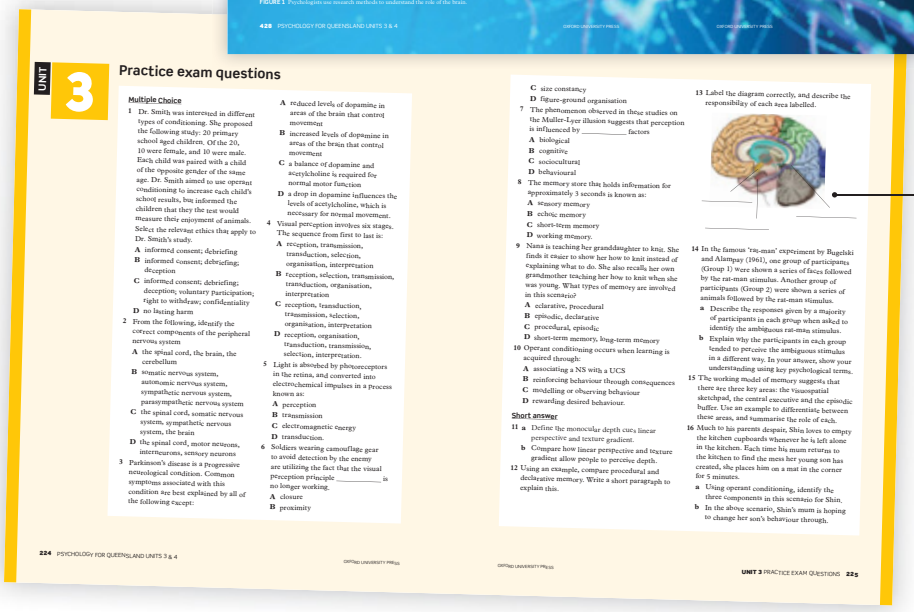
UNIT 3

Practice exam questions

Multiple choice

1 Dr. Smith was interested in different types of conditioning. She proposed the following study: 20 primary school aged children. Of the 20, 10 were female, and 10 were male. Each child was paired with a child of the opposite gender of the same age. Dr. Smith aimed to use operant conditioning to increase each child's school results, but informed the children that they the test would measure their enjoyment of animals. Select the relevant ethics that apply to Dr. Smith's study.
A informed consent; debriefing
B informed consent; debriefing; deception
C informed consent; debriefing; deception, voluntary participation; right to withdraw; confidentiality
D no lasting harm

2 From the following, identify the correct components of the peripheral nervous system
A the spinal cord, the brain, the cerebellum
B somatic nervous system, autonomic nervous system, sympathetic nervous system, parasympathetic nervous system
C the spinal cord, somatic nervous system, sympathetic nervous system, the brain
D the spinal cord, motor neurons, interneurons, sensory neurons

3 Parkinson's disease is a Progressive neurological condition. Common symptoms associated with this condition are best explained by all of the following except:
A reduced levels of dopamine in areas of the brain that control movement
B increased levels of dopamine in areas of the brain that control movement
C a balance of dopamine and acetylcholine is required for normal motor function
D a drop in dopamine influences the levels of acetylcholine, which is necessary for normal movement.

4 Visual perception involves six stages. The sequence from first to last is:
A reception, transmission, transduction, selection, organisation, interpretation
B reception, selection, transmission, transduction, organisation, interpretation
C reception, transduction, transmission, selection, organisation, interpretation
D reception, organisation, transduction, transmission, selection, interpretation.

5 Light is absorbed by photoreceptors in the retina, and converted into electrochemical impulses in a process known as:
A perception
B transmission
C electromagnetic energy
D transduction.

6 Soldiers wearing camouflage gear to avoid detection by the enemy are utilising the fact that the visual perception principle _____ is no longer working.
A closure
B proximity
C size constancy
D figure-ground organisation

7 The phenomenon observed in these studies on the Muller-Lyer illusion suggests that perception is influenced by _____ factors
A biological
B cognitive
C sociocultural
D behavioural

8 The memory store that holds information for approximately 3 seconds is known as:
A sensory memory
B echoic memory
C short-term memory
D working memory.

9 Nana is teaching her granddaughter to knit. She finds it easier to show her how to knit instead of explaining what to do. She also recalls her own grandmother teaching her how to knit when she was young. What types of memory are involved in this scenario?
A eclarative, Procedural
B episodic, declarative
C procedural, episodic
D short-term memory, long-term memory

10 Operant conditioning occurs when learning is acquired through:
A associating a NS with a UCS
B reinforcing behaviour through consequences
C modelling or observing behaviour
D rewarding desired behaviour.

Short answer

11 a Define the monocular depth cue, linear perspective and texture gradient.
b Compare how linear perspective and texture gradient allow people to perceive depth.

12 Using an example, compare procedural and declarative memory. Write a short paragraph to explain this.

13 Label the diagram correctly, and describe the responsibility of each area labelled.

14 In the famous 'rat-man' experiment by Rugelski and Alampay (1961), one group of participants (Group 1) were shown a series of faces followed by the rat-man stimulus. Another group of participants (Group 2) were shown a series of animals followed by the rat-man stimulus.
a Describe the responses given by a majority of participants in each group when asked to identify the ambiguous rat-man stimulus.
b Explain why the participants in each group tended to perceive the ambiguous stimulus in a different way. In your answer, show your understanding using key psychological terms.

15 The working model of memory suggests that there are three key areas: the visuospatial sketchpad, the central executive and the episodic buffer. Use an example to differentiate between these areas, and summarise the role of each.

16 Much to his parents despair, Shin loves to empty the kitchen cupboards whenever he is left alone in the kitchen. Each time his mum returns to the kitchen to find the mess her young son has created, she places him on a mat in the corner for 5 minutes.
a Using operant conditioning, identify the three components in this scenario for Shin.
b In the above scenario, Shin's mum is hoping to change her son's behaviour through

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Practice exam questions
Each unit includes a set of practice questions to prepare students for their end-of-year external examination. Questions include:

- **multiple-choice questions** to consolidate learning
- **short-answer questions** with additional guidance on how long students should spend on each question.

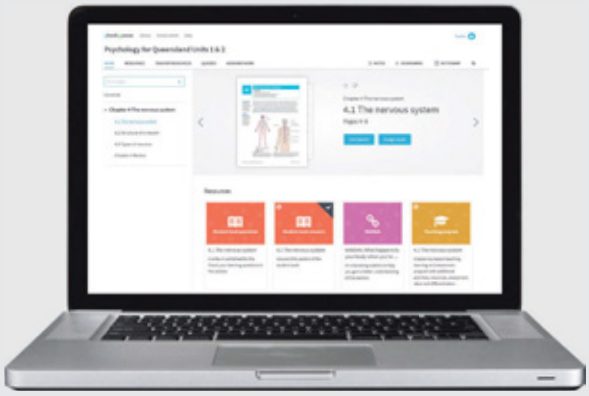
Student workbooks

Psychology for Queensland Units 3 & 4 and *Units 1 & 2* are supported by two Student workbooks that follow the same structure as the Student books, ensuring that students are consolidating relevant topic knowledge and developing key assessment skills. The workbooks include:

- a **toolkit** chapter that explains each key internal assessment
- **Data drill** activities that allow students to practise analysis and interpretation skills for the Data test
- **Experiment explorer** features to support the modification of a practical as required in the Student experiment
- **Research review** activities to help students develop skills in evaluating a claim and conducting research
- **Exam excellence** questions that include multiple-choice and short-answer questions to prepare students for the external assessment
- **practice internal assessments** (Data test, Student experiment and Research investigation)
- write-in worksheets for all **mandatory** and **suggested practicals**
- **answers** to all activities and practice assessments.

obook assess

Psychology for Queensland Units 3 & 4 is supported by a range of engaging and relevant digital resources via obook assess.



Students receive:

- a complete digital version of the Student book with notetaking and bookmarking functionality
- video tutorials demonstrating key skills
- write-in worksheets to accompany all mandatory and suggested practicals
- interactive auto-correcting multiple-choice quizzes
- a range of engaging weblinks to support understanding
- access to work assigned by their teacher: reading, homework, tests, assignments.

In addition to the student resources, teachers also receive:

- detailed planning resources
- Student book answers
- printable (and editable) sample assessments, including data tests and exams with answers
- the ability to set up classes, set assignments, monitor progress and graph results, and to view all available content and resources in one place.

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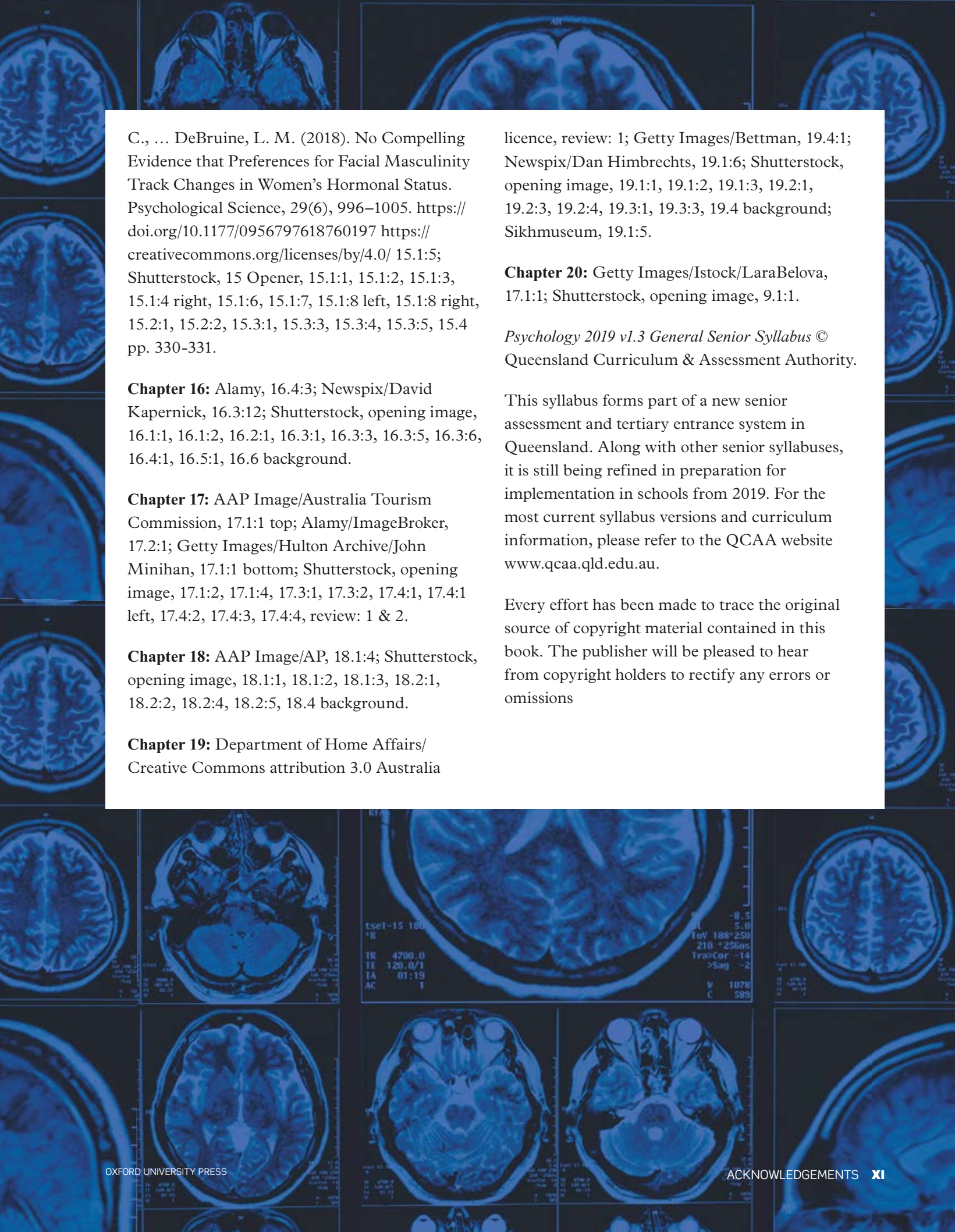

C., … DeBruine, L. M. (2018). No Compelling Evidence that Preferences for Facial Masculinity Track Changes in Women's Hormonal Status. Psychological Science, 29(6), 996–1005. https://doi.org/10.1177/0956797618760197 https://creativecommons.org/licenses/by/4.0/ 15.1:5; Shutterstock, 15 Opener, 15.1:1, 15.1:2, 15.1:3, 15.1:4 right, 15.1:6, 15.1:7, 15.1:8 left, 15.1:8 right, 15.2:1, 15.2:2, 15.3:1, 15.3:3, 15.3:4, 15.3:5, 15.4 pp. 330-331.

Chapter 16: Alamy, 16.4:3; Newspix/David Kapernick, 16.3:12; Shutterstock, opening image, 16.1:1, 16.1:2, 16.2:1, 16.3:1, 16.3:3, 16.3:5, 16.3:6, 16.4:1, 16.5:1, 16.6 background.

Chapter 17: AAP Image/Australia Tourism Commission, 17.1:1 top; Alamy/ImageBroker, 17.2:1; Getty Images/Hulton Archive/John Minihan, 17.1:1 bottom; Shutterstock, opening image, 17.1:2, 17.1:4, 17.3:1, 17.3:2, 17.4:1, 17.4:1 left, 17.4:2, 17.4:3, 17.4:4, review: 1 & 2.

Chapter 18: AAP Image/AP, 18.1:4; Shutterstock, opening image, 18.1:1, 18.1:2, 18.1:3, 18.2:1, 18.2:2, 18.2:4, 18.2:5, 18.4 background.

Chapter 19: Department of Home Affairs/ Creative Commons attribution 3.0 Australia licence, review: 1; Getty Images/Bettman, 19.4:1; Newspix/Dan Himbrechts, 19.1:6; Shutterstock, opening image, 19.1:1, 19.1:2, 19.1:3, 19.2:1, 19.2:3, 19.2:4, 19.3:1, 19.3:3, 19.4 background; Sikhmuseum, 19.1:5.

Chapter 20: Getty Images/Istock/LaraBelova, 17.1:1; Shutterstock, opening image, 9.1:1.

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This syllabus forms part of a new senior assessment and tertiary entrance system in Queensland. Along with other senior syllabuses, it is still being refined in preparation for implementation in schools from 2019. For the most current syllabus versions and curriculum information, please refer to the QCAA website www.qcaa.qld.edu.au.

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CHAPTER 1

The psychology toolkit

Psychology is the study of the human brain and nervous system. It uses the scientific method to investigate the relationship between the brain and human nervous system, including human behaviours, cognitions and emotions.

Psychologists develop new theories and conduct experiments to test the validity of each theory. Psychologists can carry out these tests through observation or by manipulating variables. Once they have collected data, psychologists analyse it to look for trends or patterns. Psychologists seek to explain the relationship between cause and effect.

During Psychology Units 3 & 4, there are a number of assessments that you are required to complete, as well as practicals and suggested research. This chapter will help you understand the processes of data collection and analysis, conducting research and preparing for your assessments.

This chapter is intended to be used as a toolkit, so that you can dip in and out of it as needed. It can be referred to throughout the year.

FIGURE 1 Psychology is a science because it uses scientific measures to reach conclusions about human phenomena.

1.1 Understanding the QCAA Senior Psychology course

KEY IDEAS

In this section, you will learn about:

+ key dates and assessments in Senior Psychology.

The requirements of the QCAA Senior Psychology course are set out in the syllabus document. You can find a link to this via your obook assess. This section outlines key topics and assessments throughout Psychology Units 3 & 4.

Structure of Psychology Units 3 & 4

Psychology Units 3 & 4 includes the following topics:

TABLE 1 Unit 3 Individual thinking

Topic		Corresponding chapters
1	Localisation of function in the brain	• Chapter 2 The nervous system & the brain • Chapter 3 Neurons & neurotransmitters
2	Visual perception	• Chapter 4 Visual perception Chapter 5 Influences on visual perception • Chapter 6 The fallibility of visual perception
3	Memory	• Chapter 7 Understanding memory • Chapter 8 Brain structures involved in memory • Chapter 9 How we remember & forget
4	Learning	• Chapter 10 Learning

TABLE 2 Unit 4 The influence of others

Topic		Corresponding chapters
1	Social psychology	• Chapter 11 Social psychology • Chapter 12 Status & power in groups
2	Interpersonal processes	• Chapter 13 Prosocial & antisocial behaviour • Chapter 14 Aggression • Chapter 15 Attraction & relationships
3	Attitudes	• Chapter 16 Attitude & bias • Chapter 17 Stereotypes, prejudice & discrimination
4	Cross-cultural psychology	• Chapter 18 Community & culture • Chapter 19 Cultural diversity

Assessment

The QCAA has outlined three internal assessments: the data test, the student experiment and the research investigation. At the end of Unit 4, students will also sit an external examination.

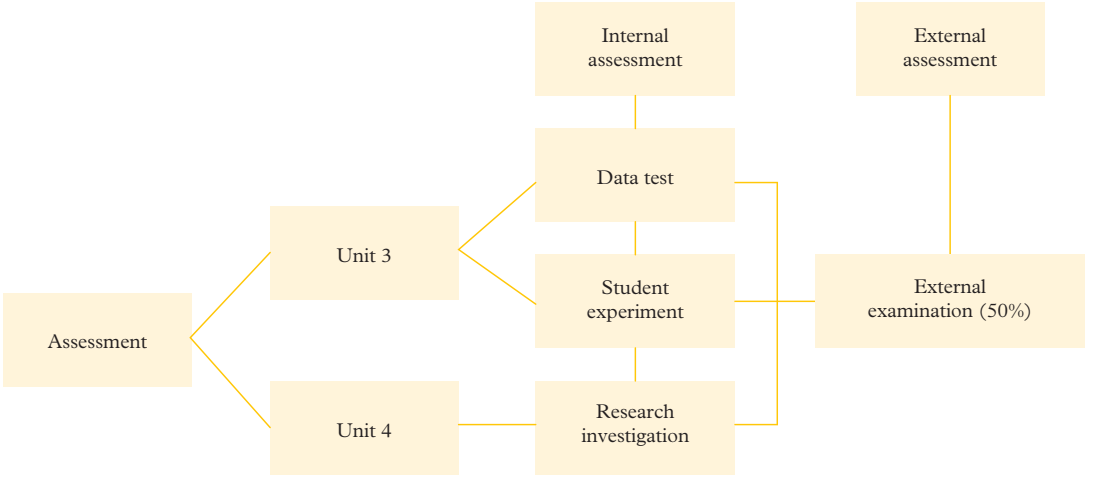

FIGURE 1 Differentiation between internal assessments and end-of-year assessment

Throughout the year, you will be required to complete internal assessments as part of your coursework. Sections 1.2, 1.3 and 1.4 provide guidance about some of these tasks. Before completing any of these, you should consult your teacher for their advice and determine if they have any preferred presentation styles. You should also familiarise yourself with the QCAA Senior Psychology Syllabus, which includes ISMGs (Instrument Specific Marking Guides). When you read through each of the internal assessments you should ensure that you understand the key requirements of each. Section 1.4 in this chapter provides guidance on exam preparation. Part of this is familiarising yourself with the syllabus, and ensuring that you follow guidance from your teacher for the exam structure.

CHECK YOUR LEARNING 1.1

Describe and explain

1 **Identify** the three internal assessments.
2 **Recall** the topics covered in Unit 3 and those covered in Unit 4.
3 **Identify** the topics that appeal most to you, and those that you think you may find challenging.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 1.1

» **Weblink**
QCAA Senior Psychology Syllabus

1.2 Student experiment

KEY IDEA

In this section, you will learn about:

+ the student experiment assessment.

In Unit 3, you are required to participate in the student experiment. This is part of your final assessment and contributes 20% to your final mark. The student experiment requires you to conduct your own practical by modifying an existing experiment. To modify this experiment, you will need to develop a research question that you can hypothesise. You will then need to conduct a literature review of the topic, and develop a methodology (this may be the same as or different from the original experiment). You also need to conduct a risk assessment before the experiment is conducted.

Once the experiment is complete, you must analyse the data and draw conclusions from it. You then need to present this information in a written report, poster or oral presentation (your teacher may have a preferred assessment format for this).

Developing a research question

To develop your research question you will need to become familiar with the original experiment. You may want to modify the original experiment to account for an extraneous variable or confounding variable, or perhaps there is an opportunity for further research in the topic area. When developing your research question, you should consider the potential ways you can measure it, as well as the current literature available on the topic. Refer to Section 1.8 to consider research sources and what makes research valid and reliable.

Preparation

After conducting your research, you will need to design your experiment. This will include the way you will be sampling participants and the experimental design. You should refer to Section 1.6 to determine the participant selection and experimental design.

Before you can conduct any research involving people, you will need to prepare an informed consent form. You will also need to determine if there will be any deception involved in the experiment and ensure there will be no lasting harm. For participants under 18 years of age, you will need parental/guardian consent. Once you have met the ethical components of psychological research, you may conduct your experiment. Section 1.9 covers ethical considerations in greater detail.

You will also need to conduct a risk assessment. A risk assessment requires you to consider any risks that may come to participants as a result of the experiment. These should be considered in your informed consent form.

Data collection and analysis

Once you have prepared your method, you will need to determine how data will be collected and analysed. For data collection and interpretation methods, refer to Section 1.7.

Reporting the student experiment

You have several options for how your experiment can be finalised, including a poster, presentation or report. If you write a report, you may want to follow APA style.

APA style

As you read psychological journals, you will notice the regular format followed by the authors – the formatting guidelines are outlined in the latest edition of the *Publication Manual of the American Psychological Association* (APA). Each paper has the following sections: Abstract, Introduction, Method, Results, Discussion and References. The headings are always set out in the same way, starting with a capital letter and centred on the line.

Abstract

The abstract is written on its own page. Though it is presented first, it is often written last and summarises the overall paper. It should be written as a single paragraph and contain no more than 150 words.

Introduction

The introduction must:

- state the research aim
- explain the main concepts involved in the research
- define all terms used in the research
- summarise previous relevant research
- explain why the research was considered necessary
- state the independent variable, the dependent variable and how they are operationalised
- state the experimental hypotheses being tested.

Study tip

In a journal article, there is no 'introduction' heading. It follows on from the abstract.

Method

This section is intended to allow other people to understand your methodology and replicate the study. The method can be subdivided into participants, measures and procedure.

Participants

Detail the age, sex, years of education and other common characteristics of the participants in the sample.

Measures

The tests and measures used must be described in detail. Any evidence of their validity or reliability should be quoted. Sources must be acknowledged.

Procedure

The testing procedures used are described in detail – from the selection of participants, to how you conducted the study. The description should provide specific details to ensure a future researcher could accurately reproduce your study. If procedures, such as counterbalancing, have been used to control extraneous variables, this is where they are described.

FIGURE 1 The student experiment requires you to modify an existing experiment and present a report.

Results

In quantitative psychological research, the results must be shown step by step. There must be no discussion of the findings in the results section. It is useful to include a table of descriptive statistics, showing who the participants were and their scores on any tests or measures. There must be analytical statistics that demonstrate whether there is any statistical significance in the differences identified between either 'before' and 'after', or 'experimental' and 'control' conditions.

Where appropriate, the data collected should be expressed visually, such as in a graph. A graph must always be preceded by a table that shows the graphed information in detail. It must be appropriate to the information it illustrates, with labelled axes, title, constant intervals on axes (unless it is a logarithmic graph) and an origin point at zero where possible.

Discussion

In quantitative psychological research, the discussion is based on the hypothesis introduced at the end of the introduction.

You should outline the statistical analysis used to test an alternative hypothesis and provide a statement of support or non-support for the research hypothesis (Burton, 2018). Each hypothesis must be accepted or rejected in specific terms. If the hypothesis is supported, then you should discuss the main finding, consider whether it replicates previous research on the topic and deliberate on what your study has contributed to the body of knowledge on the topic.

If a hypothesis is rejected, it is necessary to provide a full explanation of the unexpected finding. An alternative hypothesis to replace the one that has been discredited should be suggested and rationalised. There should also be an explanation of the importance of the findings – what they mean and how they can be applied to the real world.

The discussion also includes comments noting any identified weaknesses in the current research and suggestions for further research on the topic.

CHECK YOUR LEARNING 1.2

Describe and explain

1 **Explain** what a method needs to include.
2 **Describe** the student experiment.

Investigate, evaluate and communicate

3 **Design** a methodology to test the following statement: 'Male students who have less than eight hours of sleep each night are likely to find it hard to remember new information the next day'.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 1.2
- **Video**
  The Student experiment
- **Increase your knowledge**
  Modifying an experiment
- **Weblink**
  QCAA Senior Psychology Syllabus

1.3 The research investigation

KEY IDEAS

In this section, you will learn about:

- research and planning the research investigation
- communicating the findings of your research investigation.

The research investigation will be completed in Unit 4, and counts towards 20% of your final mark. The research investigation requires you to evaluate a research claim that your teacher will provide. To evaluate the claim, you will need to develop a research question and then read scientific literature to answer your research question and support or refute the claim. This book includes several Science as a Human Endeavour sections, which you may want to use as a springboard for your research.

Research and planning

You will need to choose how you want to present your research investigation. This may need to be in consultation with your teacher.

Researching the claim

Once you have chosen a claim, you will need to conduct thorough research. However, before you begin, consider what you have already learnt about the claim during the year, record notes and use this as a basis for your research.

You will then need to develop a research question. A good scientific argument acknowledges both sides of a theory. You should research information that both supports and refutes your claim in order to develop a sophisticated argument.

Study tip

Take notes while you are reading through research. Using a logbook to keep track of your information will make it easier to find when you are writing your report.

Valid and reliable sources

Typically, research published in a journal, university, hospital or health organisation is credible. Psychological reports can be quite detailed, so it is important that you set aside time to read through these properly so that you are able to take notes and process any key information. By reading broadly, you can cross-check ideas, which will help you develop a credible argument.

Interpreting scientific evidence

When interpreting scientific evidence, you will need to apply your understanding of psychological results and data interpretation discussed throughout this chapter. Assessing the sampling method, experimental design and recorded data will help you establish a strong argument.

It is important to consider the research findings from all your research. You can look for patterns, as well as differences, in the research.

FIGURE 1 Keeping a logbook can assist you in tracking your research and finding any patterns.

Study tip

As you read literature, look for information that you understand rather than focusing on what you don't.

Does one article support your claim, but two refute it? Were there any variables that weren't considered in one article that featured in another? How did the researchers obtain the data? Is there any correlation? When did the research conclude and does it affect your claim? These are all questions you should ask to validate the research you have gathered.

It can be tempting to just read the conclusion and discussion, but it is important to also read through the results, including tables and graphs.

Communicate your findings

Once you have conducted your research, you need to present your findings.

An overview

Your overview should:

- include the claim and rationale for how you developed your research question
- present both sides of the argument
- explain the psychological theories behind the claim and any cause-and-effect relationships.

Analysis and interpretation

To analyse the data, you should consider any trends or relationships identified in your research. You then need to interpret these trends and relationships and state if they support the argument or not.

Conclusion and evaluation

After interpreting the evidence, you need to provide a conclusion to your research question. You then need to evaluate the claim in terms of how you might improve or extend the research. Perhaps you read too broadly and didn't narrow down the key terms of the claim enough. Maybe you think your research was too narrow and didn't cover the key terms. Alternatively, you may have found new research that provides opportunity for future investigation. These are just some of the questions to ask yourself as you evaluate your investigation.

CHECK YOUR LEARNING 1.3

Describe and explain

1 **Explain** why it is important to read thoroughly when you research.

Apply, analyse and interpret

2 Read the table of contents at the start of this book. **Consider** any Science as a Human Endeavour topics that you find immediately interesting, and write these down as potential ideas for a research investigation. **Explain** why you are interested.

Investigate, evaluate and communicate

3 **Develop** a research question about the following statement: 'Adolescents who grow up in a culturally diverse society are less likely to be prejudiced than those who do not'.

obook assess

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 1.3
- **» Video**
  The Research Investigation
- **» Weblink**
  Google Scholar
- **» Weblink**
  QCAA Senior Psychology Syllabus

1.4 Exam preparation

KEY IDEAS

In this section, you will learn about:

- how to prepare for exams
- exam question strategies.

Throughout the year, you will have many opportunities to prepare for your exams. By taking advantage of these opportunities, you are more likely to retain information from the entire year and prevent stress at exam time. It is important that you are consistently revising information during Units 3 & 4, as it is all potentially examinable at the end of the year.

Managing your study

Finding time to study can be difficult, especially when maintaining a social life, part-time work and extracurricular activities. The following tips are useful for staying motivated:

- **Create a study timetable**: A study timetable can help you organise your week around specific commitments. Perhaps you want to assign Friday and Saturday nights to seeing your friends and every Wednesday night to sports training? You might work Tuesday night and Saturday morning, which leaves you with Monday and Thursday nights to study. Recording this in your planner can help you stay focused and motivated.
- **Use to-do lists**: A to-do list helps you see what tasks you need to complete and when. Crossing items off a to-do list also reminds you of the progress you make each day.
- **Set up a study environment**: Create a study environment where you feel comfortable. This could be your desk at home, school or local library. Ensure that there are no distractions, and that you have everything you need, such as a calculator, paper and pens.
- **Avoid distractions**: When you set aside time to study, it is important to use that time to study. Avoid using your phone and don't have the TV on in the background.
- **Reward yourself**: It is important to study during your senior years of high school, but this does not mean you must neglect other areas of your life. After you have studied, reward yourself by catching up with friends, watching an episode of your favourite television show or doing something you enjoy.
- **Participate**: During your lessons throughout the year, you should participate in practical experiments, research and class discussions about theories of psychology. By being an active participant in these discussions, you will have greater familiarity with psychological terms and theories. You will also be more comfortable with the subject matter and have a greater ability to think about the concepts.

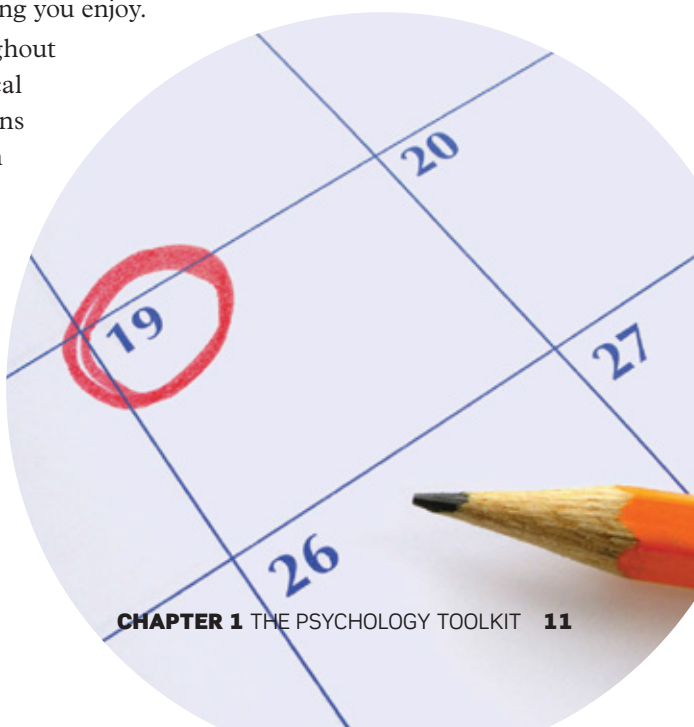

FIGURE 1 Using a study timetable and calendar can help you manage your time and prioritise important assessments and events.

The exam

Some students find it useful to study in an exam-like setting. This may mean that you wear your school uniform and use certain pens or pencils. It is also a good idea to practise as many questions as you can to become familiar with the language and cognitive verbs used, as well as the way that you are expected to respond.

Your exam will include both multiple choice and short answer questions. You will need to get used to reading each type of question in detail. It is important to identify the topic that the question refers to and identify what the question is actually asking. Make sure to pay attention to key words. They may be phrased as 'What is *not* a theory of motivation', or 'Explain how Ainsworth's *and* Bowlby's theories of attachment are different'. By establishing what a question is asking you to do, you will be more confident in articulating a response. Knowing the information is not enough; you need to be able to use it correctly in order to answer the question in front of you.

Cognitive verbs

During assessment tasks and examinations, you will be presented with cognitive verbs. Cognitive verbs are task words that prompt the type of response required to help you provide the right type of information when answering a question.

It is important that you understand the difference between different task words. For example, a question that asks you to *compare* is different from one that asks you to *contrast*. The former requires you to show similarities and differences, while the latter is asking you to show only the differences.

Understanding what a cognitive verb is specifically asking for means you can provide exactly what the examiner is looking for when formulating a response. Examiners want to award marks, but can only do so if you provide the correct information. For example, if you describe data in your answer, but do not analyse the data, you will not receive full marks.

You may also encounter cognitive verbs that have multiple definitions; it is important that you are able to identify which definition is appropriate to the question.

Below are some cognitive verbs you may encounter throughout this book and in your assessments (a full list of QCAA cognitive verbs is provided on your obook assess).

TABLE 1 Cognitive verbs

Cognitive verb	Definition	Sample question
Assess	• Measure, determine, evaluate, estimate or make a judgment about the value, quality, outcomes, results, size, significance, nature or extent of something.	**Assess** why we may not always be aware of bodily functions such as breathing. Be sure to describe the part of the nervous system involved in this day-to-day bodily movement.
Consider	• Think deliberately or carefully about something, typically before making a decision. • Take something into account when making a judgment • View attentively or scrutinise; reflect on.	**Consider** why conscious responses to sensory stimuli are also known as voluntary responses.
Describe	• Give an account (written or spoken) of a situation, event, pattern or process, or of the characteristics or features of something.	**Describe** elaborative rehearsal.
Differentiate	• Identify the difference/s in or between two or more things. • Distinguish, discriminate, recognise or ascertain what makes something distinct from similar things.	**Differentiate** between an optical illusion, such as the Müller-Lyer illusion, and an ambiguous image.

Cognitive verb	Definition	Sample question
Evaluate	• Make an appraisal by weighing up or assessing strengths, implications and limitations. • Make judgments about ideas, works, solutions or methods in relation to selected criteria. • Examine and determine the merit, value or significance of something, based on criteria.	**Evaluate** whether using elaborative rehearsal is appropriate for remembering a grocery list.
Explain	• Make an idea or situation plain or clear by describing it in more detail or revealing relevant facts. • Give an account; provide additional information.	**Explain** classical conditioning.
Identify	• Distinguish; locate, recognise and name; establish or indicate who or what someone or something is. • Provide an answer from a number of possibilities. • Recognise and state a distinguishing factor or feature.	**Identify** the stages in visual perception.
Interpret	• Use knowledge and understanding to recognise trends and draw conclusions from given information; make clear or explicit; elucidate or understand in a particular way. • Identify or draw meaning from, or give meaning to, information presented in various forms, such as words, symbols, pictures or graphs.	View the graph shown in Figure 1. **Interpret** how reliable chunking is according to the graph.
Investigate	• Carry out an examination or formal inquiry in order to establish or obtain facts and reach new conclusions. • Search, inquire into, interpret and draw conclusions about data and information.	**Investigate** the effects of the bystander effect on pro-social behaviour.
Justify	• Give reasons or evidence to support an answer, response or conclusion. • Show or prove how an argument, statement or conclusion is right or reasonable.	**Justify** the use of the tri-component model of attitudes.
Predict	• Give an expected result of an upcoming action or event. • Suggest what may happen based on available information.	**Predict** if a shared goal is likely to reduce prejudice between individuals.

CHECK YOUR LEARNING 1.4

Describe and explain

1 **Construct** a study timetable for yourself. Include any other commitments such as sport, work, volunteering and social activities.

2 Write down all your subjects and **identify** how much study time each subject will require each week.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 1.4
- **» Video**
  Preparing for exams
- **» Increase your knowledge**
  Cognitive verbs
- **» Weblink**
  QCAA Senior Psychology Syllabus

1.5 Psychology as a science

KEY IDEAS

In this section, you will learn about:

- the scientific method
- hypotheses and variables.

Study tip

For more information on the scientific method, refer to *Psychology for Queensland Units 1 & 2*.

Psychology is a science that uses research methods and experimental evidence to test theories and to understand human nature. Psychologists use the scientific method to answer research questions.

The scientific method

scientific method a logical process of problem-solving applied in all sciences

The **scientific method** is a logical process of problem-solving applied in all sciences. It involves eight steps:

1. Identify the area of research and form a research aim.
2. Collect information.
3. Identify the research question and formulate a hypothesis.
4. Design a research method to test the hypothesis.
5. Collect and analyse the data.
6. Draw a conclusion – accept or reject the hypothesis.
7. Report findings.
8. Test the conclusion.

Variables

independent variable (IV) the variable that is manipulated by the experimenter who then measures resulting changes in the dependent variable

dependent variable (DV) the property that is measured in psychological research, to look for effects of the independent variable

operationalisation quantification of a variable

extraneous variable a variable other than the independent variable that could cause changes in the value of the dependent variable

Psychologists use variables to examine cause and effect. A variable is a quantity or quality that can be different at different times or in different places. In psychology, we are mainly interested in properties that vary from person to person or within the same person at different times. These could include: age, race, gender, IQ, aggression, position in family, income, eyecolour, quality of life and feelings of welbeing.

Research is all about variables. But what is a variable?

Every psychological experiment will have at least one **independent variable (IV)** and one **dependent variable (DV)**. The IV is deliberately manipulated or varied in some way by the experimenter. Simple experiments may use one IV with two values, such as male/female or yes/no. The DV is the property that is measured in the research; this value depends on the IV. The DV is the property that the researcher believes will change as a result of the changes in the value of the IV. The DV is usually continuous, and should be written as an operational definition. Consider the following hypothesis: 'People who eat more jelly beans will achieve a greater exam result than those who don't increase their jelly-bean intake'. The jelly beans are the IV and the exam results are the DV. This is because the hypothesis suggests that exam results are dependent on jelly-bean consumption.

Operationalisation of a variable means that the variable is stated in terms that show how it is measured. Ask yourself: How can I present this variable as a number? This might include:

- age: operationalised as age in total months
- IQ: operationalised as a score on an intelligence test (e.g., WAIS-5)

Extraneous and confounding variables

An **extraneous variable** is a variable other than the IV that could cause changes in the value of the DV (which is undesirable). When the potential effects of an extraneous variable have been removed from the experiment (usually by the experimental design), the variable is said to be a controlled variable. Using the jelly bean example, an extraneous variable could be the consumption of fruit, which could also affect exam results.

A **confounding variable** is a variable other than the IV that has a systematic effect on the value of the DV. If a confounding variable exists, no valid conclusions can be drawn, so very stringent procedures are used to prevent this from happening. A confounding variable in the jelly bean study could be an increase in time spent studying, which could also affect exam results.

confounding variable
a variable other than the independent variable that has a systematic effect on the value of the dependent variable; if a confounding variable exists, no valid conclusions about the research can be drawn.

Hypothesis

A **hypothesis** in psychological research is a clear statement predicting how changes in the independent variable(s) will affect the value of the dependent variable(s). A hypothesis should also clearly state the population the researcher intends to draw conclusions from.

Experimental research also forecasts a **null hypothesis**. The null hypothesis states that the independent variable will have no effect on the dependent variable, or that any change on the dependent variable will be unrelated to the independent variable. For example, it was hypothesised that there would be no statistically significant gender difference evident on the spatial ability test.

hypothesis
a prediction of the outcome of research stated in terms of the influence of changes in the value of the independent variable on the value of the dependent variable

null hypothesis
hypothesis that there will be no significant difference between groups; any difference observed is caused by error

The **alternative hypothesis** is one that states that there will be a relationship between the independent variable and the dependent variable. For example, it was hypothesised that there would be a statistically significant age difference evident on the spatial ability test, with older students expected to outperform younger students.

alternative hypothesis
hypothesis that there will be a relationship between the independent and dependent variables

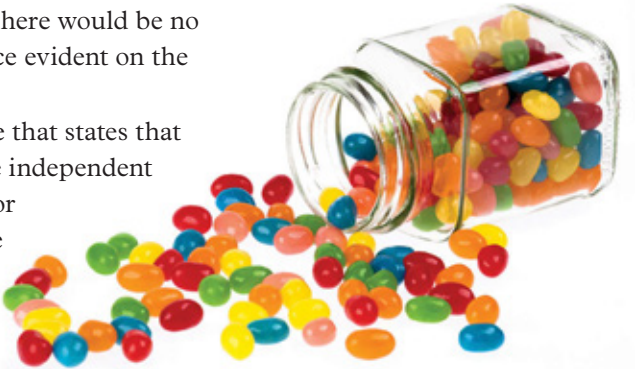

FIGURE 1 Will jelly bean consumption affect exam results?

CHECK YOUR LEARNING 1.5

Describe and explain

1 **Explain** what is meant by the null hypothesis.

Apply, analyse and interpret

2 **Differentiate** between the independent variable and the dependent variable.

3 **Compare** extraneous variables and confounding variables.

4 A hypothesis reads, 'Breathing relaxation techniques will help people achieve a better night's sleep'. **Determine** the independent variable and dependent variable. **Identify** errors in this hypothesis and suggest confounding or extraneous variables.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 1.5

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Identifying variables

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Understanding psychology as a science

1.6 Sampling methods and experimental design

KEY IDEAS

In this section, you will learn about:

- participant selection
- experimental designs.

After deciding what variables to investigate, psychologists need to decide how to select participants for their study and how best to design their research.

Participant selection

In research, we are always interested in drawing conclusions that are valid for a particular group or groups of people. The group about which we wish to draw conclusions is referred to as the **population**.

population
the group of people about which we wish to draw conclusions

It is rarely possible to perform an experiment on every member of a population. As a result, psychologists select a smaller number of individuals from the population to be participants in their research and to represent the population. This group is referred to as the **sample** and the selection of participants for research is called 'sampling'. Sampling procedures must ensure that the sample is representative of the population from which it is drawn. This means that personal characteristics of the sample should be distributed in the same proportions as in the population.

sample
the members of the population who have been chosen to take part in the research

Convenience sampling is when researchers use the people who are easily available to them. This may be people in their local café. These people are probably not representative of the greater population, but are readily accessible to the researcher.

convenience sampling
using whoever is available at the time of research

Two procedures used to make sure that the sample is representative are random sampling and stratified sampling (or stratified random sampling).

Random sampling

Random sampling is a sampling procedure in which every member of the population has an equal chance of being selected – just as the Gold Lotto numbers do in each draw!

random sampling
a sampling procedure in which every member of the population has an equal chance of being selected

Imagine, for example, that we wish to draw conclusions about all 50 000 Psychology students in Queensland. QCAA has allocated a number to each Psychology student, so all we need to do is put the QCAA numbers in a barrel – just like a huge Gold Lotto barrel – roll the barrel and pull out one number at a time until we have enough for our experiment.

This would be very time-consuming, so we would use technology to help. All scientific calculators and computers have the capacity to generate a list of random numbers. If we just instruct the computer to give (for example) 500 random numbers between 1 and 50 000, we can then get a list of the population from QCAA and select the students whose numbers appear in the 500 different positions shown in the random number list.

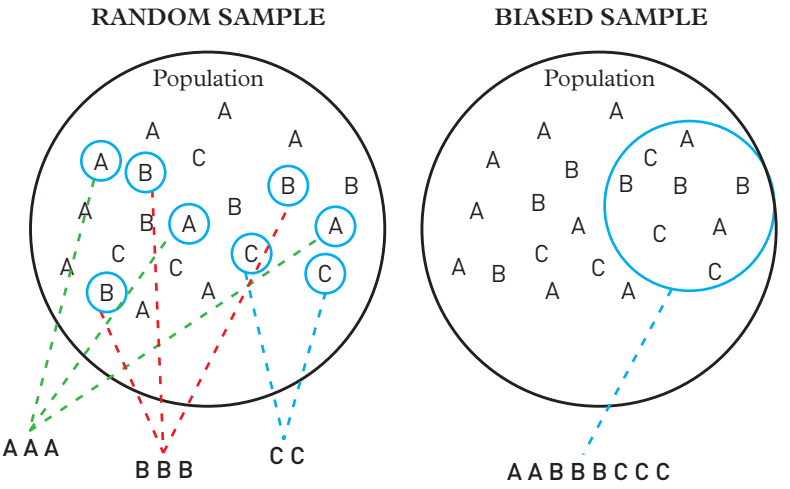

FIGURE 1 Personal characteristics are distributed in the random sample in the same proportions as in the population. The biased sample has certain elements overrepresented (C) and underrepresented (A).

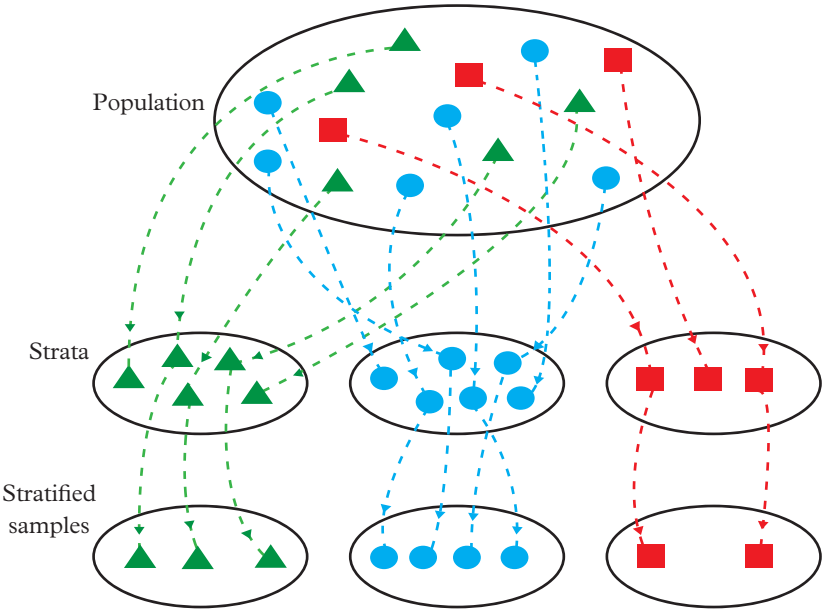

FIGURE 2 Stratified sampling involves dividing the population into distinct subgroups and then selecting a separate sample from each subgroup in the same proportions as they occur in the population.

Stratified sampling

Stratified sampling (or stratified random sampling) is a process by which the effects of a certain variable can be eliminated as a possible confound in an experiment. This is done by ensuring that this variable is distributed within the sample in the same proportions as it is within the population. For example, if we wanted to draw conclusions about Psychology students, we should first note that there are 16 000 students, 12 000 of whom are female. This means that if our sample were 50:50 males and females, the sample would not represent the population and our results could not be generalised to the population. In this case, stratification by gender would mean that we should take a sample of (for example) 160 students – 120 females and 40 males – in order to eliminate the possible confounding effects of gender.

stratified sampling
a sampling process by which the effects of a certain variable can be eliminated as a possible confound in an experiment

Experimental and control groups

experimental group (E-group)
the group of research participants exposed to the independent variable; the results are compared with the control group so that the effects of the independent variable can be determined

control group (C-group)
the group of research participants not exposed to variations in the independent variable; the results are compared with the experimental group so that the effects of the independent variable can be determined

In psychological research, participants may be randomly allocated to different groups. The basic experimental method uses two different groups called the **experimental group (E-group)** and the **control group (C-group)**.

Members of the E-group are exposed to the IV. This is referred to as the condition that receives the treatment. The treatment is the variable that the E-group participants receive and the members of the control group do not. The purpose of the E-group is to show the effects of the IV on the value of the DV.

The C-group consists of the participants who are not exposed to the IV – they do not receive the treatment. The purpose of the C-group is to form a basis for comparison with the E-group.

After the experiment, the average value of the DV for the E-group is compared with the average value of the DV for the C-group. If there is a significant difference, it is concluded that the independent variable (the treatment) has caused this difference.

It is important that the E-group and the C-group are as similar as possible in relevant participant characteristics, and that they are treated as similarly as possible throughout the experiment.

Random allocation

random allocation
a subject-selection procedure where all participants who have been selected for an experiment have an equal chance of being in the E-group or C-group

Random allocation means that all participants who have been selected for an experiment must have an equal chance of being in the E-group or the C-group.

When the sample is large enough, this means that the E-group and the C-group will be equivalent on all participant characteristics, and the presence or absence of the IV will be the only difference between them – meaning that it is entirely responsible for any difference in the measured DV.

For example, suppose we performed an experiment to test the theory, 'Sleep deprivation adversely affects performance on a problem-solving task', and we allocated all males to the E-group and all females to the C-group. No conclusions could be drawn from this research because the difference in results between the two groups may be due to differences in the gender of the participants, rather than (or as well as) the effects of the sleep deprivation. We would say that these results were confounded by gender.

Experimental designs

Another method of controlling extraneous variables is by the design of the experiment. We shall examine three experimental designs, each of which has certain advantages and certain disadvantages. A researcher will choose a design that best suits the population and variables to be investigated. The three experimental designs we shall look at are repeated measures, matched participants and independent groups.

Repeated measures design

repeated measures design
a subject-selection procedure where each participant is part of both the E-group and the C-group

In a **repeated measures design** (also known as 'within participants design'), each participant is part of both the E-group and the C-group. For example, in the research described above, looking at the effects of sleep deprivation on problem-solving ability, all participants would be tested for problem-solving on two occasions (once in a normally rested state and once in a sleep-deprived state) and the results for each participant would be compared.

The greater the time that passes between the two measurements being taken, the less chance there is that either practice or boredom will affect the results. The problem is, however, that increasing the interval between the two events increases the likelihood that participants will withdraw.

A better method of overcoming order effects is **counterbalancing**. In the counterbalancing procedure, half the participants will first perform the task with the IV present (experimental condition) and then perform the task with the IV absent (control condition). The other half of the participants will experience the conditions in the reverse order. Random selection should be used to decide which participants perform the tasks in which order.

counterbalancing a method for controlling order effects in a repeated measures design

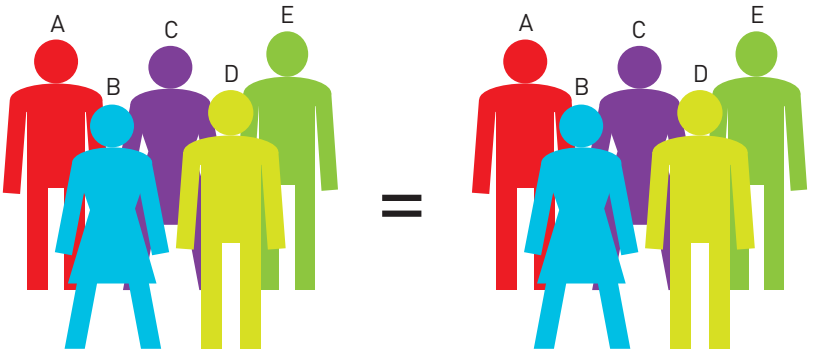

FIGURE 3 A repeated measures design involves using the same subjects in each condition of an experiment.

Matched participants design

The **matched participants design** enables a researcher to identify a likely confound variable, and to eliminate the effects of this variable from the experiment. Participants can be ranked in accordance with their scores on this variable and then allocated to the respective groups.

matched participants design a subject-selection procedure that attempts to eliminate confounding variables by 'matching', on key characteristics, each individual in the experimental group with an individual in the control group

For example: An educational psychologist designed a program that she believed would increase the rate at which Prep children learnt to read. She decided to test this by giving an E-group of children instructions using her program. As a C-group, she used children taught by traditional methods.

She believed that the intelligence quotient (IQ) of each child could be a confounding variable, so she measured the IQ of each child. Then the two children with the highest IQ scores were randomly allocated, one to the E-group and one to the C-group. The two children with the third and fourth highest IQ scores were also randomly allocated, one to the E-group and one to the C-group. This procedure continued until all the children were allocated and the mean IQ of the E-group and the C-group were the same.

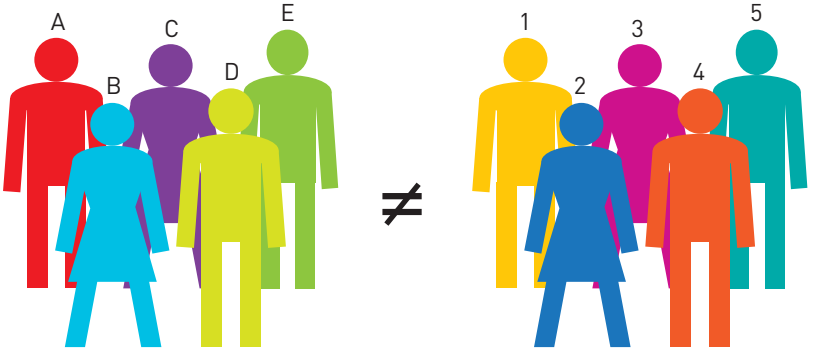

FIGURE 4 A matched participants design involves using different but similar subjects in each condition of an experiment. An effort is made to match the subjects in each condition in important characteristics that might affect performance.

Independent groups design

independent groups design allocates participants to E-group or C-group at random; also known as 'between participants design'

The **independent groups design** (also known as 'between participants design') allocates participants to the E-group or the C-group at random.

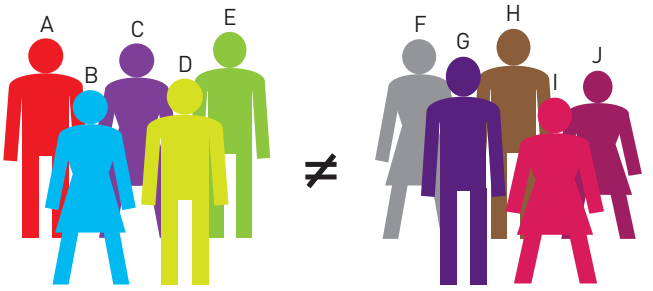

FIGURE 5 An independent groups design involves using different subjects in each condition of the experiment.

TABLE 1 Advantages and disadvantages of some experimental designs

Experimental design	Advantages	Disadvantages
Repeated measures	Using the same participants as the E-group and the C-group means that confounds caused by 'participant variables' will be eliminated.	• It takes a long time. • Participants have to take part in both conditions, so 'drop-outs' are likely.
	Uses fewer participants than other designs.	• The procedure can suffer from confounding variables known as order effects: participants may perform better on the task when doing it a second time because of the effect of practice, or participants may do worse the second time because of fatigue or boredom.
Matched participants	The variable on which the participants are 'matched' will not influence the results because its effects will be the same in the E-group and the C-group.	• It is very time-consuming (and therefore expensive) to find out the value of this variable for each participant. • If one of the pair drops out, the scores for the other must also be eliminated.
Independent groups	The procedure can all be done at once and drop-outs are unlikely.	• The procedure needs a large number of participants to ensure that the spread of participant variables in the sample will match the spread in the population.

placebo effect participants' behaviour that is influenced by their expectations of how they should behave, caused by the belief that they have received some treatment

Placebo effect

single-blind procedure allocating participants to groups in such a way that they do not know whether they are in the E-group or the C-group

The **placebo effect** refers to participants' behaviour being influenced by their expectations of how they should behave, caused by the belief that they have received some treatment. This means that the expectations of the participants, as well as (or instead of) the IV, may affect the value of the DV, and therefore that the results of the experiment are not valid.

The placebo effect can be eliminated by using a **single-blind procedure** in the experimental process – allocating participants to groups in such a way that they do not know whether they are in the E-group or the C-group.

Experimenter effect

The **experimenter effect** refers to the outcome of an experiment being unintentionally (or even intentionally) influenced by the experimenter. It occurs, for example, if the experimenter treats the members of the E-group and the C-group differently, and therefore influences the behaviour of the participants and the outcome of the experiment.

The experimenter effect can be addressed by using a **double-blind procedure** in the experimental process, ensuring that neither the experimenter nor the participants are aware of who is in the E-group or the C-group. This procedure is most commonly used when there is a possibility that the expectations of either the experimenter or the participants will influence the outcome of the experiment.

Table 2 summarises the ways in which psychologists control possible problem (confounding) variables in research.

experimenter effect
the outcome of an experiment being influenced by the person conducting the experiment

double-blind procedure
the method of allocating participants to groups so that both the experimenter and the participants are unaware of who is in the E-group or the C-group

TABLE 2 Controlling extraneous variables and bias

Source of problem	Description of problem	Control procedures
Participants	• Participant variables • Interpersonal differences	• Large sample (independent groups) • Repeated measures • Matched participants
Procedure	• Artificial environment (laboratories or observation)	• Use naturalistic observation (with observer not in environment)
Design	• Order effects • Placebo/experimenter effects	• Counterbalancing • Independent groups • Single-blind • Double-blind • Inter-rater reliability check
Data collection	• Bias/distraction/confusion	• Standard procedures

CHECK YOUR LEARNING 1.6

Describe and explain

1 **Explain** what a population is.
2 **Describe** a random sample.
3 **Summarise** the difference between the placebo effect and the experimenter effect.

Apply, analyse and interpret

4 **Differentiate** between single-blind and double-blind measures.
5 **Compare** a repeated measures design with an independent groups design.

Investigate, evaluate and communicate

6 **Evaluate** the benefits of convenience sampling.

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1.7 Data collection and interpretation

KEY IDEAS

In this section, you will learn about:

- data collection
- types of data
- statistics in psychology
- inferring from data and drawing conclusions.

Throughout Units 3 & 4, you will need to be able to collect and interpret data: data will be a major component of your data test and student experiment, as well as conducting practicals.

Data collection

Observation

naturalistic observation observation of voluntary behaviours occurring within the subject's natural environment

controlled observation observation of voluntary behaviours within a structured environment such as a laboratory

There are two types of observation: naturalistic and controlled. **Naturalistic observation** is when voluntary behaviours occurring within a subject's natural environment are documented. **Controlled observation** is when voluntary behaviours are monitored within a structured environment such as a laboratory.

TABLE 1 Different types of observation

Type	Strength	Weakness
Naturalistic observation	Highly realistic, especially if the observer is not visible	Lack of ability to control the IV
Controlled observation	Control over the environment enables more accurate observations.	Participant behaviour may be changed by the environment.

Interview

All interviews involve interaction between the researcher and the participant. Interviews can be structured or clinical. In a structured interview participants are asked a set of pre-determined questions with a fixed choice of responses, such as yes/no, or never/sometimes/often/always. In a clinical interview there are structured guidelines, but further questioning is used for clarification.

Strengths of a structured interview are that it is easy to compare participants and easy to replicate; however, data may be missed through limited choices in response. Strengths of clinical interviews are flexibility, and they are usually high in validity. However, they rely on the objectivity of the interviewer.

Questionnaires

Questionnaires are methods of collecting written responses from participants. They can take various forms:

- **Surveys:** May be question-and-answer or response to Likert-type scales (rating scales). Surveys are easy to replicate and to score, and Likert scales can provide a means of quantifying data. A weakness is that they may be open to bias if participants are trying to appear in a particular way.

- **Psychological tests:** Personality and multiple-choice IQ tests are types of psychological tests. Strengths of psychological tests include being standardised, easy to replicate and easy to score. Weaknesses include being difficult to construct and validate.

Interpreting data

Research originally sets out to draw conclusions and find out something useful about the population of interest. Generalisation of results occurs after the research is complete. For this to be possible, the following criteria must be met:

- The results must show statistical significance.
- All sampling procedures were appropriate.
- All experimental procedures were appropriate.
- All measures were valid.
- All possible confounding variables were controlled.

The good news is that, in psychology, although we use statistics, we never have to calculate more than the very simplest of them.

Computer programs and calculators do it for us! It is very useful, however, to know how these statistics work and what they mean.

Descriptive statistics

When we collect data, it comes in a totally unorganised form. For example, imagine you rolled a die 80 times and recorded the number shown on each throw:

1, 3, 6, 5, 2, 1, 6, 1, 5, 2, 1, 2, 5, 4, 3, 6, 5, 2, 3, 4, 1, 4, 3, 2, 5, 1, 6, 2, 3, 1, 5, 5, 2, 3, 5, 4, 1, 3, 5, 3, 6, 3, 1, 6, 6, 3, 3, 4, 3, 3, 6, 3, 1, 3, 4, 6, 2, 4, 6, 3, 4, 5, 4, 6, 2, 3, 4, 5, 5, 4, 2, 1, 5, 4, 5, 6, 1, 6, 2, 5.

Placing the data into a frequency table will make it much easier to perform simple calculations on it. Compare the dataset above with Table 2. Which would you prefer to work with?

TABLE 2 Frequency table of die rolls

Number on die	Frequency
1	12
2	11
3	17
4	12
5	15
6	13

Often we need to calculate what percentage of a dataset is represented by a certain score. This is easy to do using the formula:

$$\frac{\text{Number of times the score occurs}}{\text{Total number of scores in data set}} \times 100$$

If we wished to discover what percentage of rolls scored 6:

$$\frac{13}{80} \times 100 = 16.25\%$$

FIGURE 1 Placing data from rolling a die into a frequency table makes calculations easier.

Representing the data

The frequency table made the data better organised, but it still doesn't tell us much. So we can use a histogram or a frequency polygon – which are graphical representations of how often each score appears – to get a clearer picture of how the numbers rolled on the die. We could also show the data as a pie chart. It is always important to use a type of graph that communicates the information clearly and accurately.

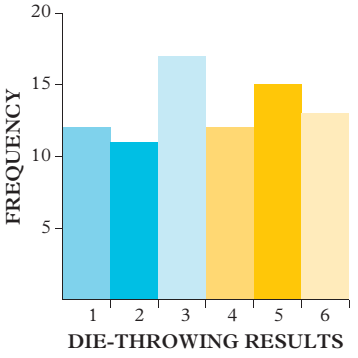


FIGURE 2 The histogram shows the number of occasions each number was thrown in 80 rolls of one die.

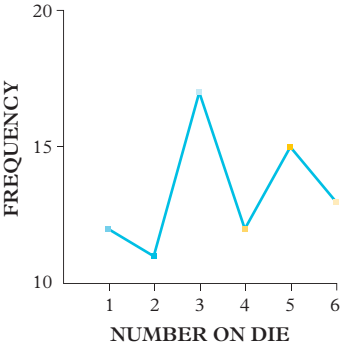


FIGURE 3 This frequency polygon shows the number of occasions each number was thrown in 80 rolls of one die.

Where one variable is continuous (where it can have any value within a certain range) – such as body mass, age in months or IQ – we can express it in a table or on a line graph. For example, suppose your Psychology teacher sets you a group classwork assignment and you want to find what size of group is the most efficient. The data in Table 3 is presented as the line graph shown in Figure 4.

TABLE 3 Time taken to complete classwork for different-sized study groups

Group size	Time (hours)
2	5.0
3	3.0
4	2.5
5	2.0
6	2.5
7	5.0

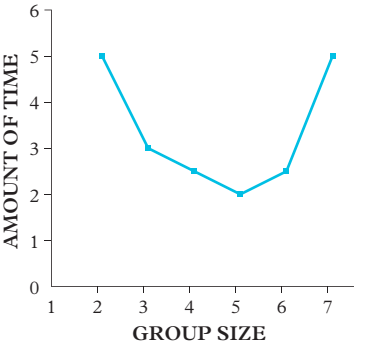


FIGURE 4 Time taken to complete classwork for different-sized study groups.

The normal curve

When all scores in a set of data are plotted in a graph, psychologists hope that the graph will form a normal curve – also known as a bell curve because of its shape (Figure 5). This is because statistical procedures can be applied to the bell curve without further manipulation of the data.

Measures of central tendency

Measures of central tendency tell us how the data are clustered near the central point of the dataset. You will notice that for the normal curve, the three measures – mean, median and mode – are all at the same point.

TABLE 4 IQ scores of 12 students represented in a frequency table

Student	IQ score	Student	IQ score
John	88	Hanna	111
Robert	94	Jacob	111
Kiet	99	Adelina	119
Luke	102	Ahmed	125
Kerry	105	Arisa	125
Shelley	111	Akash	130

The dataset in Table 4 represents the IQ scores of 12 students. Using the data, we can calculate these three measures.

- **Mean**: The average of all the scores is calculated by adding up all the scores and dividing that total by the number of scores.

  $88 + 94 + 99 + 102 + 105 + 111 + 111 + 111 + 119 + 125 + 125 + 130 = 1320$

  $\frac{1320}{12} = 110$

  The mean IQ score for this group of children is 110. We write this as:

  $M = 110$ or $\overline{X} = 100$

mean
the average of all the scores, calculated by adding up all the scores and dividing that total by the number of scores

- **Median**: This is the middle number (or mean of the two middle numbers) of a number series listed in numerical order. For this dataset, the median is:

  88, 84, 99, 102, 105, 111, 111, 111, 119, 125, 125, 130

  $\frac{(111 + 111)}{2} = 111$

median
the middle number (or mean of the two middle numbers) of a number series listed in numerical order

- **Mode**: This is the most commonly occurring score in the dataset. For this dataset, the mode is 111.

mode
the most commonly occurring score in the dataset

Measures of variability (dispersion)

Measures of variability tell us about how scores are spread out. When used along with measures of central tendency, they tell us a great deal about the features of the dataset. Three such measures are range, variance and standard deviation.

- **Range**: The most basic of these measures, range is the difference between the highest score and the lowest score in the dataset. For the IQ scores listed in Table 4, the range would be:

  $$130 - 88 = 42$$

  This is not a very informative measure as it gives no indication of how the scores are spread along the range.

range
the difference between the highest score and the lowest score in the dataset

- **Variance**: Variance is a more useful measure than range because it uses information for each score in the dataset and gives us a measure of how much, on average, the scores differ from the mean.

variance
a measure of how much, on average, the scores differ from the mean

But there is a problem! Some of the scores are higher than the mean (positive difference) and some are lower (negative difference). So if we just take the average difference, the negatives and positives will tend to even out and the 'mean difference' that we calculate will be incorrect. The way we overcome this is to square the differences, so that all figures are positive. (Remember: $-X \times -X = +X^2$)

Calculating the variance in our set of IQ scores, with a mean of 110, provides the data in Table 5. For the set of scores in Table 4, the mean variance is 157. This score is an indication of the spread, but it is very hard to compare it with the original IQ scores as it is in squared units, which don't mean much, so we need to go one step further and calculate the standard deviation.

TABLE 5 Variance of IQ scores from Table 4

Score	Difference from mean	Squared difference from mean (variance)
88	–22	484
94	–16	256
99	–11	121
102	–8	64
105	–5	25
111	+1	1
111	+1	1
111	+1	1
119	+9	81
125	+15	225
125	+15	225
130	+20	400

standard deviation
a measure that tells us how far, on average, scores are different from the mean

- **Standard deviation**: The standard deviation is a measure that tells us how far, on average, scores are different from the mean. This is done by taking the square root of the mean variance. So in this case, the standard deviation is:

$$\sqrt{157} = 12.5$$

In a normal curve, a certain set percentage of scores will fall within one, two, three or four standard deviations of the mean, as shown in Figure 5.

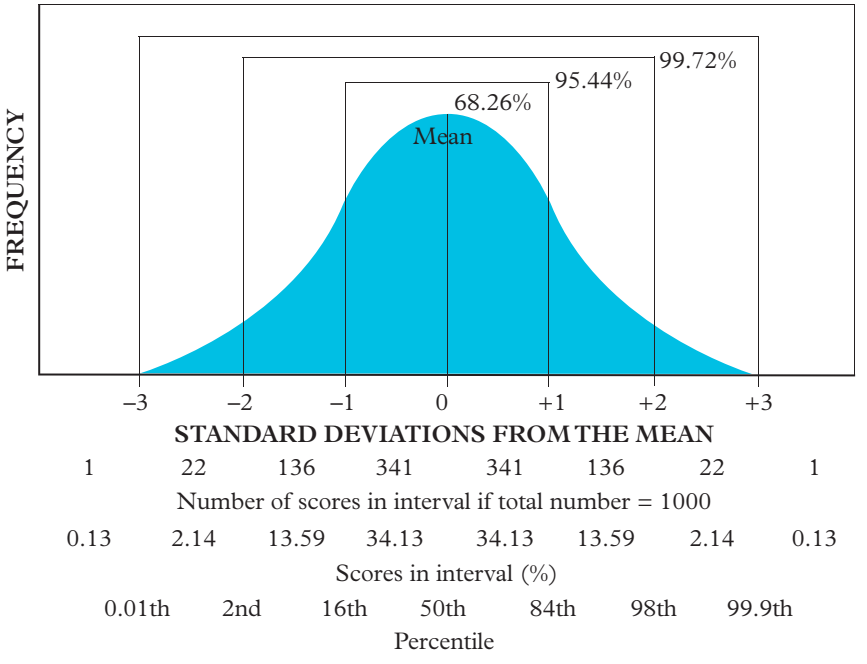


FIGURE 5 Distribution in a normal curve, showing percentiles by standard deviation

Inferring from data

After the experiment, the researcher needs to decide whether the results could be due to chance alone – in which case no cause-and-effect relationship can be inferred. To do this, the researcher calculates the mean score for the E-group and the C-group, and uses inferential statistics to decide whether the difference is statistically significant or is likely to have been caused by pure chance.

While the means are different, the question is whether they are different enough to show that the IV has caused a significant change.

In Figure 6, the E-group mean is higher than the C-group mean, but is this statistically significant? This will depend on the size of the sample as well as the difference. The larger the sample, the less difference is needed to reach statistical significance.

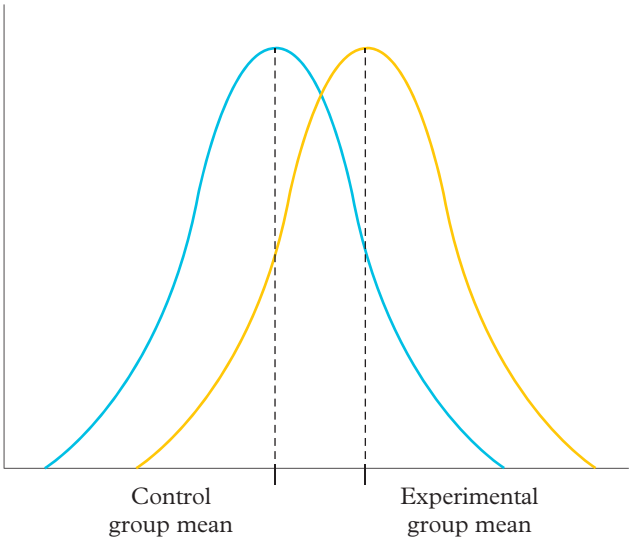


FIGURE 6 While the C-group and the E-group have different means, the importance of the difference depends on the sample size.

P-values

The inferential tests will give a *probability* that the difference is caused by chance. This is expressed as a *p*-value, where $p = .03$ means that there are three chances in 100 (3 per cent) that this difference would be achieved by chance alone.

Psychologists are generally prepared to accept that a difference is statistically significant if the difference could have been caused by chance alone on five or fewer times in 100. This is stated as $p \leq .05$.

Inferential tests

One of the simplest inferential techniques is called Student's t-test. 'Student' was actually a chemist named William Sealy Gosset who was working for the Guinness brewery in Dublin, Ireland, in 1908. Gosset invented the t-test as a cheap and easy way of monitoring the quality of Guinness stout! His employers were afraid of other brewers also being able to use statistical methods for their quality control, so Gosset's identity had to be kept secret!

Alternatively, the Mann-Whitney *U* test can be used. The *U* test is a test of the null hypothesis. It does not require the assumption of normal distributions. The *U* test is used to compare the differences between two groups when the dependent variable is either ordinal or continuous.

The Wilcoxen signed-rank-test can also be used as an alternative to the t-test, when the population cannot be assumed to be normally distributed. It is used to compare two sets of scores from the same set of participants.

Measures of relationship

Correlational studies are intended to identify and describe the relationship between two variables. Unlike the experimental method, the correlational method makes no attempt to manipulate variables. Rather, the intent of such a study is usually to establish the strength and direction of the relationship that may exist between the two variables.

Pearson product moment correlation
a measure of the strength of the linear relationship between two continuous variables

Spearman correlation
a measure of two ordinal variables that uses the ranked values for each variable to examine how they change together but not necessarily at a constant rate

The **Pearson product moment correlation** measures the linear relationship between two continuous variables: a change in one variable (variable A) is associated with a proportional change in the other variable (variable B). In contrast, the **Spearman correlation** measures the relationship between two ordinal variables and uses the ranked values for each to examine how the variables tend to change together, but not necessarily at a constant rate.

The relationship between variables can be examined using a scatter diagram (see Figure 8). For example, a Pearson correlation of $r = 1.0$ indicates a perfect linear relationship between two variables. When one variable increases, the other variable increases by a consistent manner, and is represented by a perfect straight line on a scatter diagram or scatter plot.

- **Positive correlation**: A positive correlation is one in which the two variables change in the same direction – that is, as one increases, so does the other; or as one decreases, so does the other. For example, we might expect to find a positive correlation between hours spent studying each week and results in Senior Psychology – meaning that as the number of hours spent studying each week increases, the average Psychology results increase.
- **Negative correlation**: A negative correlation is one in which the two variables change in the opposite direction – that is, as one increases, the other decreases. For example, we might expect to find a negative correlation between hours spent playing online games and study scores for Psychology – meaning that as the number of hours spent playing online games increases, the average study score in Psychology decreases.

Study tip

Remember: correlation does not mean causation.

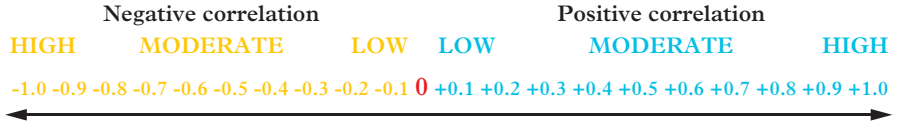


FIGURE 7 Negative and positive correlation

correlation
a statistical measure of the strength and direction of the relationship between two variables; does not show a cause-and-effect relationship, but describes the way in which the variables vary in relation to each other

- **Strength of correlation**: **Correlation** also shows the strength of the relationship. This is indicated by a correlation coefficient, expressed as a decimal number in the range of $-1.0 < r < +1.0$.
  - The (+) or (–) sign in front of the number shows whether it is a positive or negative correlation. The number following the positive or negative sign indicates the strength of the correlation. The higher the number, the stronger the correlation, whether positive or negative. Correlation coefficients of +1.0 or –1.0 show perfect positive or perfect negative correlations respectively. This would mean that as one variable increased by one unit, the other variable would increase by one unit (perfect positive correlation) or decrease by one unit (perfect negative correlation).
  - A correlation coefficient of $r = .00$ indicates that the two variables are not related in any way. In contrast, a correlation of $r = .80$ indicates that two variables are strongly correlated; a correlation of $r = .14$ indicates that two variables are weakly correlated.

- **Scatter diagrams (scatter plots)**: Correlational data are often represented graphically by a scatter diagram. A scatter diagram shows the values of the two variables for each participant in the sample by representing the intersection of those two values with a dot on a graph.

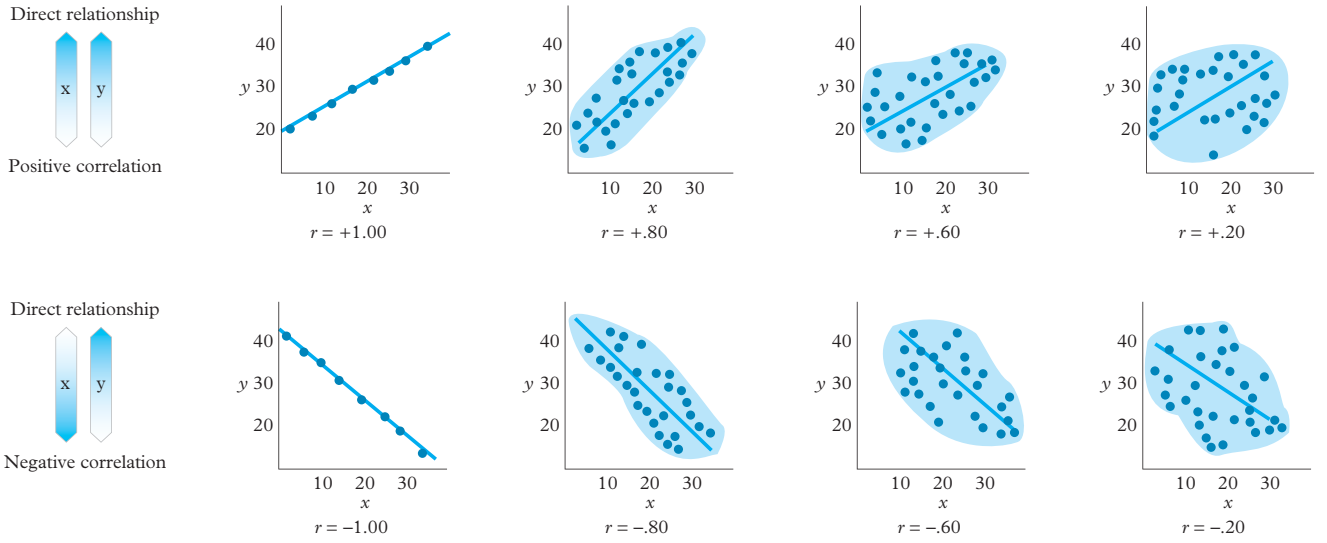


FIGURE 8 Scatter diagrams showing relationship and correlations – the scatter diagrams show various strengths and directions of correlation, from perfect positive correlation to perfect negative correlation.

CHECK YOUR LEARNING 1.7

Describe and explain

1 **Describe** naturalistic observation.
2 **Explain** the difference between an interview and a questionnaire.
3 **Summarise** descriptive statistics.
4 **Define** the mode, mean and median.
5 **Identify** the significant *p*-values from this list: .21, .02, .5, .04, .3.
6 **Describe** a positive correlation.
7 **Calculate** the mean, mode and median from the following data:

10, 10, 11, 12, 13, 16, 17, 19, 20, 19, 18, 21

Apply, analyse and interpret

8 **Compare** naturalistic and controlled observation.
9 **Differentiate** between *p*-values and correlational values.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 1.7

» **Video**
Data collection

» **Increase your knowledge**
Interpreting data

» **Increase your knowledge**
Representing data

1.8 Research in psychology

KEY IDEAS

In this section, you will learn about:

- reliability
- validity.

Research is a vital part of psychology. The student experiment and research investigation require you to review scientific literature to apply to research claims and hypotheses. Understanding what is considered 'good' research is an important part of psychology. 'Good' research must be reliable and valid. **Reliability** and **validity** are used to determine the quality of the statistical findings of research. Reliability refers to how consistent a measuring instrument is, and validity refers to the extent to which the research has measured what it was supposed to measure.

reliability
the extent to which a measure could be expected to produce the same result with the same subject(s) under the same conditions on other occasions

validity
the extent to which an instrument measures what it is supposed to measure

Reliability

There are four different types of reliability:

1. **Internal reliability**: This refers to the extent to which all the items in a research instrument contribute equally to the final score. A test would have a high internal reliability if the correlation between scores on the odd-numbered items and even-numbered items were high.
2. **Inter-rater reliability**: With an objective test, the same result should be obtained by anyone administering the test. The procedures to be used are therefore standardised – they are the same each time the test is administered.
3. **Parallel form reliability**: Some tests have more than one form that measures the same property. These can be very useful if the research is investigating change in the property measured. The property is measured before the treatment with the independent variable (pre-test) and again, with a parallel form, after the treatment (post-test).
4. **Test-retest reliability**: Any test should be checked to ensure that it would produce the same result if re-administered to the same person under the same conditions at a different time.

Validity

There are four different types of validity:

1. **Internal validity**: This examines whether the results gained from a measure are truly due to the variable that it is thought to be measuring.
2. **Content validity**: Also known as face validity, this is a form of internal validity that involves examining the instrument to decide whether it appears to be measuring what it is supposed to measure.
3. **Construct validity**: This is a form of internal validity that involves deciding whether the test can be used to support the theory that is being tested (e.g., Does an IQ test measure all of the abilities that are considered to make up IQ?).
4. **External validity**: This is a criterion-related validity that refers to the extent to which results from this measure are comparable with other, established measures of the variable.

Conducting research

When conducting psychological research you may come across statistical values that you are not familiar with, and that are not required for Units 3 & 4, so when reading research it is important to evaluate it as best you can.

Always try to use respected search engines. Using a source such as Wikipedia may be a good place to start to familiarise yourself with a concept; however, when researching you should ensure that you use trustworthy resources such as medical and psychological journals, university journals and databases, as well as government sources (many of these can be found via Google Scholar). These are good sources of information, because the studies have been peer reviewed and checked before they are published.

When you review research you should consider the date of research, methodology, sample size and its representation of the population, and the reliability and validity of the results.

It is also important that you don't just read information that suits your hypothesis or research question. A well-rounded literature review looks at all sides of a theory. For example, if you were researching the effects of caffeine on memory, your literature review would need to present prior research that supports and refutes the impact of caffeine on memory.

FIGURE 1 A study that has test-retest reliability as an external validity should achieve the same results when replicated, like achieving straight bull's-eye shots on a dartboard.

CHECK YOUR LEARNING 1.8

Describe and explain

1 **Explain** what is meant by reliable and valid research.
2 **Identify** two sources of reliable and valid information.
3 **Summarise** why the quality of research is important in forming new experiments.

Apply, analyse and interpret

4 **Determine** if the following are reliable and valid sources of information:
   - **a** beyondblue
   - **b** your local newspaper
   - **c** an email from your friend's sibling who has studied psychology
   - **d** an online journal accredited by the APA (American Psychological Association)
   - **e** an article published by *The Age*
   - **f** an article published by *PedestrianTV*.

Investigate, evaluate and communicate

5 Chelsea hypothesised that girls who played sport from 15–18 would achieve better QCE grades than girls who did not. When Chelsea was reviewing literature, she relied on sources that supported her theory, and did not consider sources that discussed the whole theory. **Discuss** why this may be detrimental to her study.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 1.8

» **Increase your knowledge**
Is this reliable?

» **Weblink**
Google Scholar

1.9 Ethical responsibilities

KEY IDEAS

In this section, you will learn about:

- the ethics committee in psychology
- the importance of ethics in psychological research.

In Units 3 & 4, you will be required to conduct practicals as well as the student experiment, which may require you to use people in your sample. There are ethical requirements that must be adhered to before you conduct any research.

Research with animals has always been a feature of science. While animals are still used today, the guidelines protecting them are more stringent than they were in the past (for example, Harry Harlow from Unit 1 who experimented on monkeys). Animals must be protected, pain must be minimised and the animals must be well cared for.

As psychology is interested in the functioning of human beings, using people as participants is unavoidable. It is vital that the wellbeing of participants is safeguarded. The overriding and perhaps most important ethical principle is that there must be no physical or psychological harm to participants.

This section will outline the role of ethics committees and the key ethical guidelines that need to be met before conducting an experiment.

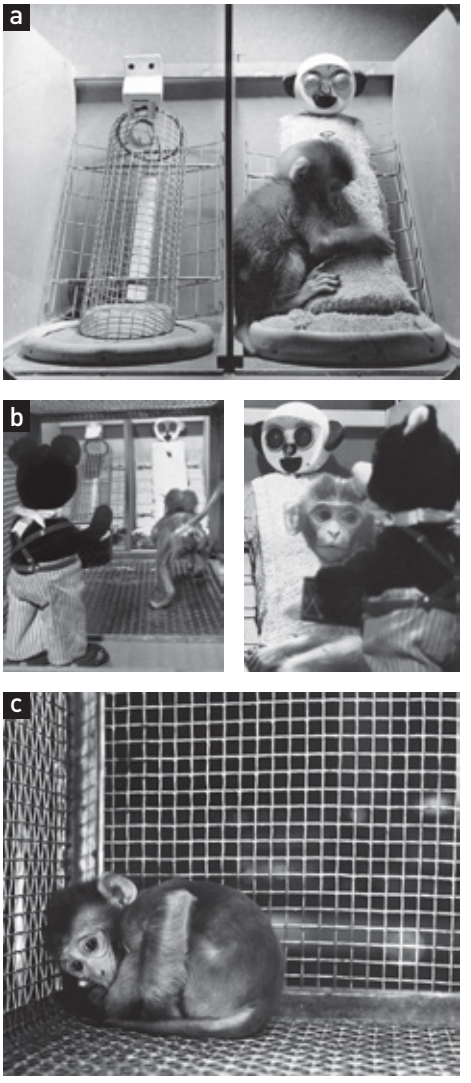


FIGURE 1 Ethical considerations must be made when conducting an experiment.

Ethical guidelines

Before a psychologist is able to conduct research, they must submit detailed plans of their proposal to the Human Research Ethics Committee (HREC) of their university or research institution (e.g., hospital). The HREC will study the proposal and indicate any changes that must be made or additional procedures that will be required before it can give approval. When you are conducting research, you should consult with your teacher about the ethical requirements of any experiment or practical you are running.

The Australian Psychological Society publishes a 'Code of Ethics' for psychologists. This includes

a section on the conduct of psychological researchers, and draws together regulations and guidelines from bodies such as the National Health and Medical Research Council and guidelines such as the National Privacy Principles.

The HREC will take account of each of the following ethical considerations before giving approval.

- **The role of the experimenter**: The researcher must always act in a professional manner, making sure that the best interests of the participants, and of society in general, are met.
- **Participants' rights** (respect for participants): Researchers must always maintain respect for the participants. Participants' rights include those listed below.
  - **Confidentiality** (privacy): Participants must not be identified in any way in terms of test results, their involvement in the study or any other confidential data. Data needs to be stored and disposed of using secure procedures. The means by which confidentiality is to be established and maintained should be described to the participants at the beginning of the study.
  - **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.
  - **Withdrawal rights**: Participants have the right to leave a study at any stage, regardless of the possible effects on the results. They also have the right to withdraw their results after the study has been completed. This must be explained to the participants before beginning the study.
- **Informed consent**: Participants must be given information about a study before they agree to take part. For participants who are either too young or too intellectually disabled to give their consent, their guardian must be given the information before giving consent on their behalf. As you are studying Senior Psychology, some participants may be too young to give their own consent and you will need parental consent for these students.
- **Deception in research**: This is only permitted if the results would be confounded if the participants had much information before taking part in the study. The researcher must ensure that participants do not unexpectedly suffer distress; the study must be stopped immediately if this occurs. Participants must be debriefed when the study is complete.
- **Debriefing**: Debriefing occurs after completion of the study and participants are told the results and conclusions of the study. Any erroneous beliefs about the study are corrected, especially if there was any deception involved. Participants are informed of the availability of, and how to obtain, counselling if they feel they need it.

National Health and Medical Research Council

The National Health and Medical Research Council (NHMRC) is the Australian Government body that oversees all research with human subjects.

The NHMRC's National Statement on Ethical Conduct in Human Research (2007) is organised around four values.

confidentiality
participants must not be identified in any way in terms of test results, their involvement in the study or any other confidential data

voluntary participation
participants have the right to decline to participate in a study; they must not be pressured to take part in the study and must not be tricked into taking part

withdrawal rights
the right of participants to leave a study at any stage, including the right to withdraw their results after the study has been completed, regardless of the possible effects on the results

informed consent
the ethical basis for psychological treatment or experimentation requiring that the subject (or client) is fully aware of all procedures and their likely and possible effects, and participates on a voluntary basis

deception in research
only permitted if the results would be confounded if the participants had too much information before participating in the study; the researcher must ensure that there is no distress and the research must cease immediately if distress occurs

debriefing
the experimental process in which, after the experiment, subjects are told of the purpose of the research, and any deception is explained; a vital ethical component of any psychological research

Research merit and integrity

Research that has merit is:

- justifiable by its potential benefit, including its contribution to knowledge and understanding, social welfare and individual wellbeing
- designed or developed using methods appropriate for achieving the aims of the proposal
- based on a thorough study of the current literature, as well as previous studies
- designed to ensure that respect for the participants is not compromised by the aims of the research, its procedures or results.

Justice

In research that is just:

- the selection of research participants is fair
- the process of recruiting participants is fair
- there is fair distribution of the benefits of participation in research
- there is no exploitation of participants in the conduct of research
- there is fair access to the benefits of research.

Beneficence

The likely benefit of the research must justify any risks of harm or discomfort to participants. The likely benefit may be to the participants, to the wider community or to both. Researchers are responsible for:

- designing the research to minimise the risks of harm or discomfort to participants
- clarifying for participants the potential benefits and risks of the research
- the welfare of the participants in the research context.

Study tip

When conducting any research, refer to this section to ensure you are being ethical. Consult with your teacher if you have any doubts or concerns.

Respect for human beings

Researchers must respectfully guarantee:

- voluntary participation
- withdrawal rights
- protection of vulnerable participants
- consideration of welfare of participants – physical/social/emotional/cultural.

National Privacy Principles

The National Privacy Principles (NPPs) came into effect in December 2001, as an amendment to the *Privacy Act 1988*. The aim of the NPPs is to ensure that organisations that hold information about people handle that information responsibly. They also give people some control over the way information about them is handled. The NPPs apply to conventional, electronic and digital environments. Some of the NPPs are as follows:

- Collection of data must be necessary.
- Data use must be only for the purposes specified.
- Data quality must be accurate, complete and up-to-date.
- Data security is essential for storage and destruction of data.
- Informed consent must be obtained (openness).
- Anonymity of participants must be maintained.

Further details can be found online by searching for 'National Privacy Principles'.

CHALLENGE 1.9

Should you use unethical data?

In the past, ethical committees weren't as established and there was more 'freedom' for researchers in all sciences to conduct research without restriction.

In Chapter 10, you will be exposed to the Little Albert experiment. The experiment left 'little Albert' with a fear of animals, which is one example of harm coming to a participant. Alternatively, in Dr Philip Zimbardo's research (Chapter 12) the right to withdraw was not adhered to which caused harm to participants. Despite how this information was gained, it has been beneficial to our understanding of psychology.

Create a list of positives and negatives associated with using this research. Debate this with your class.

CHECK YOUR LEARNING 1.9

Describe and explain

1 **Explain** the importance of the principle 'Do no harm'.
2 **Select** two ethical requirements and **explain** what each means using an example.
3 **Identify** an ethical body in Australia.
4 **Create** an informed consent form.

Apply, analyse and interpret

5 **Consider** when it would be appropriate or permitted to use deception in research. If it is used, **summarise** the provisions that must be made.
6 Imagine that you are a researcher. You have just finished a study that was investigating the effects of television on violence, but the study was advertised as looking at people's boredom rates with advertisements. Deception was approved and deemed necessary to avoid influencing how participants behaved. **Evaluate** the use of deception in this study and write a short statement that debriefs participants.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 1.9
- **» Video**
  Ethical considerations
- **» Challenge**
  Worksheet: 1.9 Should you use unethical data?
- **» Increase your knowledge**
  Informed consent

CHAPTER 1

Review

Summary

1.1
- There are three internal assessments (data test, student experiment and research investigation) and one external assessment.

1.2
- The student experiment is worth 20% of your final mark. You must modify an existing experiment by extending, refining or redirecting it.

1.3
- The research investigation is worth 20% of your final mark. You must select a claim to evaluate, develop a research question to answer, provide a rationale for your research question and conduct a literature review.

1.4
- Your external examination is worth 50% of your final mark. It will involve two papers and include multiple-choice and short-answer questions.

1.5
- Psychology is a science because it follows the scientific method to answer questions about psychological phenomena.

1.6
- Participant selection is vital to experimental psychology. A sample should represent the greater population being investigated. Samples can be convenient, random or stratified random.
- There are two groups in psychological experiments: the experimental group and the control group.
- A repeated measures design is where the same participants are in the E-group and the C-group.
- A matched participants design is where characteristics are matched between different participants in the E-group and the C-group.
- An independent groups design is where the two groups are randomly allocated.
- The placebo effect is where a participant's behaviour is influenced by their expectations; it is controlled by a single-blind procedure where the participants do not know which group they are in.
- The experimenter effect is where the outcome of research is influenced by the researcher. It is controlled by using a double-blind procedure, where the researcher and participants do not know which group the participants are in.

1.7
- Data can be collected via observation, interview and questionnaires.
- Data is interpreted using descriptive statistics and is represented in tables and graphs (histogram, scatterplot, frequency polygon, etc.).
- Measures of central tendency are the mean (average), the median (middle number) and the mode (the most frequently occurring data).
- The standard deviation is a measure that tells researchers how different a score is from the mean.
- A p-value is significant if it is $<.05$. This means that there are 5 or fewer chances in 100 that the results would be achieved by chance alone.
- Correlation shows a relationship, but does not show a cause.
  A positive correlation is when as one variable increases, so does another.
  A negative correlation is where one variable increases as the other decreases.

1.8
- Reliable research will consistently measure the same or similar results despite changes in participant and location.
- Valid research measures what it was intended to measure.

1.9

- Ethics are an integral part of conducting psychological research. In psychology, researchers and practitioners must ensure that there is no harm to participants, that the role of the experimenter is professional and that participants' rights aren't breached.
- Participants are entitled to confidentiality, voluntary participation and the right to withdraw from the experiment at any time.
- Researchers must always receive informed consent from participants, and deception is only allowed if without it the study would be compromised. Debriefing should occur at the end of every experiment.

Key terms

- alternative hypothesis
- confidentiality
- confounding variable
- control group (C-group)
- controlled observation
- convenience sampling
- correlation
- counterbalancing
- debriefing
- deception in research
- dependent variable (DV)
- double-blind procedure
- experimental group (E-group)
- experimenter effect
- extraneous variable
- hypothesis
- independent groups design
- independent variable (IV)
- informed consent
- matched participants design
- mean
- median
- mode
- naturalistic observation
- null hypothesis
- operationalisation
- Pearson product moment correlation
- placebo effect
- population
- random allocation
- random sampling
- range
- reliability
- repeated measures design
- sample
- scientific method
- single-blind procedure
- Spearman correlation
- standard deviation
- stratified sampling
- validity
- variance
- voluntary participation
- withdrawal rights

Revision questions

The relative difficulty of the short answer questions is indicated by the number of stars beside each question number: ★ = low, ★★ = medium, ★★★ = high.

Multiple choice

1 Select the step that is not part of the scientific method.

A Hypothesise about a concept.
B Analyse data.
C Use a methodology to test a theory.
D Debate an ethical concept.

2 Define an independent variable.

A the variable that an experimenter manipulates
B a variable that accidentally influences the dependent variable
C a variable that does not interact with the dependent variable
D the variable that an experimenter is using as the control

3 Identify the null hypothesis.

A All results will be significant.

B No results will be significant.

C There will be a relationship between the independent and dependent variables.

D The confounding variable will determine the result of the dependent variable.

4 Recall why convenience sampling is flawed.

A It samples the entire population, which is unrealistic.

B It is not representative of the whole population.

C It only measures one variable.

D It is only controlled by the experimenter.

5 Describe a repeated measures design.

A Participants are part of both the E-group and the C-group.

B Participants are matched with someone who has similar characteristics to them.

C Experimenters always use a double-blind procedure.

D Participants are convenience sampled.

6 Select the best example of naturalistic observation.

A A researcher watches people order their daily coffee without their knowledge.

B Participants are put in a controlled environment so that the researcher is aware of all variables.

C People go about their daily lives.

D Participants ask people to behave as they normally would in a recreated version of their natural environment.

7 Identify the mode, mean and median of the following data.
5,5,5,7,8,9,10,14,15,16,17,17,20,22

A 5, 12.14, 12

B 7, 15, 24

C 5, 12.14, 24

D 10, 12.14, 5

8 Identify which number is not a significant *p*-value.

A .02

B .0089

C .09

D .001

9 What does a negative correlation suggest?

A As one variable increases the other increases.

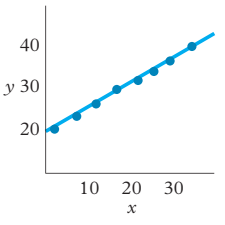
B As one variable increases, the other decreases.

C As one variable decreases, the other decreases.

D Both variables are always increasing.

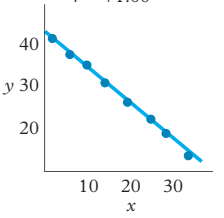
10 Select the graph that best represents a weak positive correlation.

A



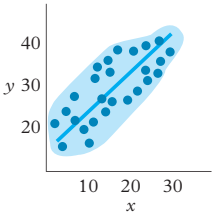
$r = +1.00$

B



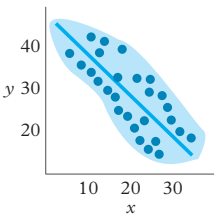
$r = -1.00$

C



$r = +.80$

D



$r = -.80$

Short answer

Describe and explain

★ **11 Explain** why valid research is important.

★ **12 Summarise** the ethics of psychology.

★ **13 Describe** the importance of debriefing.

★★ **14 Define** the independent variable, dependent variable, extraneous variable and confounding variable.

★★ **15 Identify** the independent variable and population in the following hypotheses.

- **a** Primary school students will find it easier to learn two languages when they have a bilingual parent.
- **b** Football players are likely to score more goals when they train.
- **c** Teenagers are more likely to adopt a stereotype if their in-group also adopts that stereotype.

Apply, analyse and interpret

★ **16 Distinguish** between informed consent and the right to withdraw.

★ **17 Compare** range and variance.

★ **18 Deduce** the mean for the following dataset: 8, 9, 10, 16, 17, 19, 19, 25

★★ **19 Consider** the use of human beings in psychological research. Write a brief paragraph to summarise the dangers of this.

★★ **20 Infer** what an p-value of .70 would suggest.

★★★ **21 Determine** what the most successful research design would be if you wanted to remove any possible confounding or extraneous variables.

Investigate, evaluate and communicate

★★ **22 Assess** the importance of gaining parental consent when a participant is underage. Write a response, and suggest the importance of an underage person understanding the research themselves.

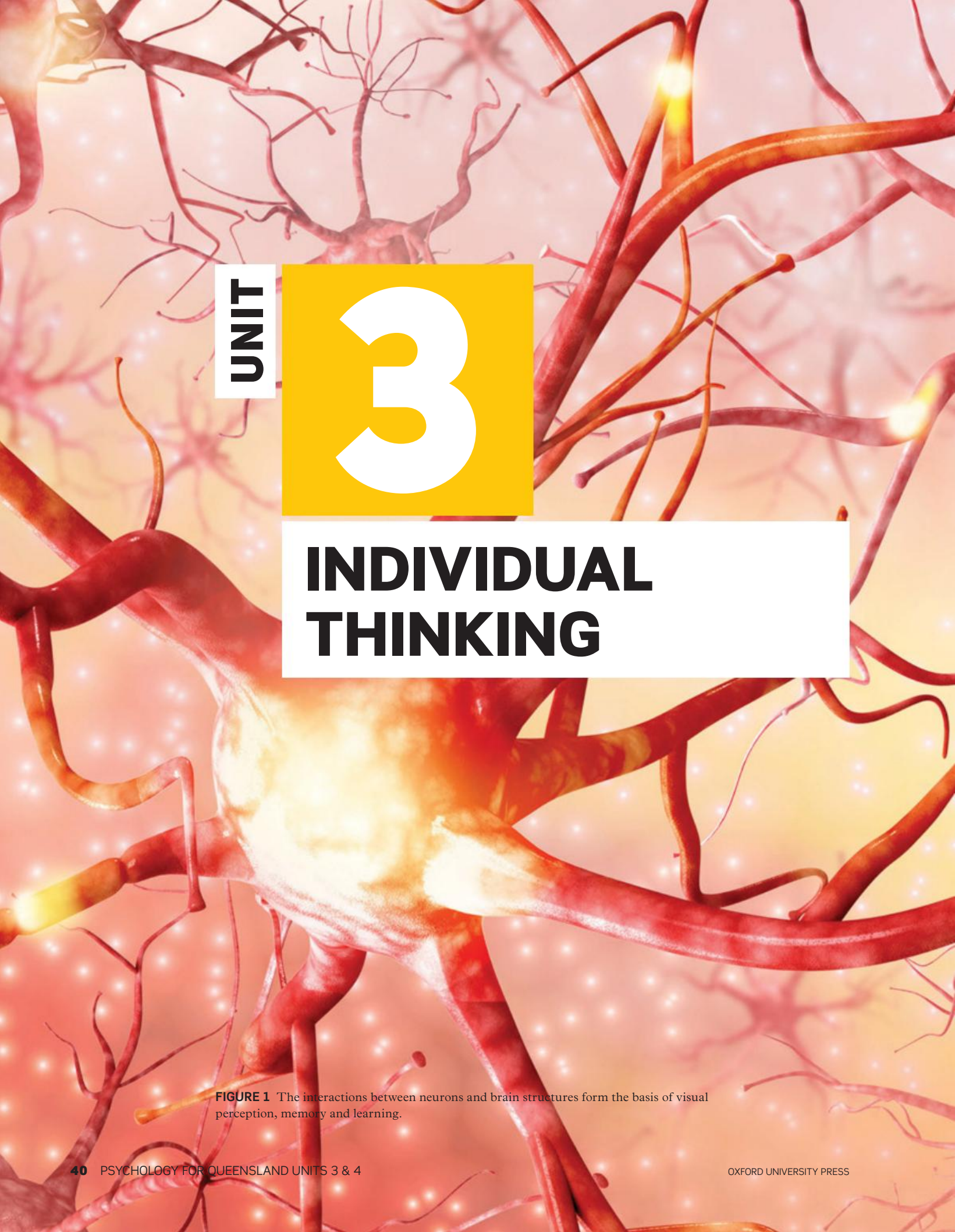
★★ **23 Discuss** why it is important to use credible resources in literature reviews. Present your ideas in an essay.

★★ **24 Justify** the use of a double-blind procedure.

★★★ **25** Dr Seashore conducted a study where she had to deceive her participants. The participants were told that the study was investigating their seating preferences in restaurants, but Dr Seashore was actually testing their prejudice towards certain restaurants. At the end of the study, Dr Seashore told participants that the study had been testing the stereotypes that they possessed towards certain types of food. **Comment** on what is wrong with this as a debriefing statement, and write an alternative statement that would be better.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 1 Review
- **» Revision notes**
  Revision notes for Chapter 1
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 1



UNIT 3

INDIVIDUAL THINKING

FIGURE 1 The interactions between neurons and brain structures form the basis of visual perception, memory and learning.

Psychology is the scientific study of human thoughts, feelings and behaviours. In Unit 3, we will examine all aspects of human behaviour, from the workings of the brain to larger biological and social influences on our individual thinking.

We will examine how the structure and function of the human nervous system – including the role of specialised areas of the brain – enable us to make sense of, and navigate, an incredibly complex world.

We will also learn about the cognitive processes involved in perception, memory and learning. We will use visual perception as our key example of sensory processes and discuss the biological, psychological and social influences on visual perception.

How can we learn and remember new information so that we repeat our successes and grow from our mistakes? There is no easy answer as our memory mechanisms can be fickle. Sometimes we remember things vividly, but have vague and sometimes faulty memories of other past events. By examining different models of memory, we will explore the brain structures responsible for specific aspects of remembering. We will also discuss different retrieval methods and strategies for improving our memories.

Finally, the different theories of learning will be compared to help us better understand changes in the way an individual responds based on prior experiences. We will explore how we interact with our world and how we use physiological and psychological strategies to interpret and understand our environment as well as cope with adversity.

Unit 3 topics

Topic 1	Localisation of function in the brain	Chapters 2–3
Topic 2	Visual perception	Chapters 4–6
Topic 3	Memory	Chapters 7–9
Topic 4	Learning	Chapter 10

Unit objectives

→ Describe and explain localisation of function in the brain, visual perception, memory and learning.

→ Apply understanding of localisation of function in the brain, visual perception, memory and learning.

→ Analyse evidence about localisation of function in the brain, visual perception, memory and learning.

→ Interpret evidence about localisation of function in the brain, visual perception, memory and learning.

→ Investigate phenomena associated with localisation of function in the brain, visual perception, memory and learning.

→ Evaluate processes, claims and conclusions about localisation of function in the brain, visual perception, memory and learning.

→ Communicate understandings, findings, arguments and conclusions about localisation of function in the brain, visual perception, memory and learning.

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

CHAPTER 2

The nervous system & the brain

Imagine you're in an aeroplane, flying over Brisbane at night. As you look down, you can see the amazing network of communication and transport infrastructure: car headlights dotted along freeways and side streets; trains speeding along their designated routes; arterial roads converging on transport hubs; and CityCats hurtling across the Brisbane (Maiwar) River towards the Story Bridge. Imagine that all this is being controlled from one central point. Now you have an idea of the intricacies of your brain and nervous system – only yours would be more than 20 000 times larger and more complex!

Sometimes extra pressure can be put on the system – comparable to how a car accident on the Riverside Express can cause delays both in and out of Brisbane city, or when a train delay in Ipswich interrupts the ebb and flow of the commuters' working day. The system is subjected to stress and the same can happen to a person. Strategies to deal with such stressors and return the system to normal can be implemented through our understanding of psychological processes. We can also use our knowledge of our nervous systems to help deal with both biological and psychological stress on our bodies and minds.

In this chapter, you will learn more about our nervous system and our functioning. You will recall the different divisions of the nervous system (central and peripheral nervous systems and their associated subdivisions) in responding to, and integrating and coordinating with, sensory stimuli received by the body. You will investigate the distinction between conscious and unconscious responses to sensory stimuli by the nervous system, including the role of the spinal reflex. Knowledge of the human nervous system is important to understanding how we navigate, survive and make the best of the everyday world we live in.

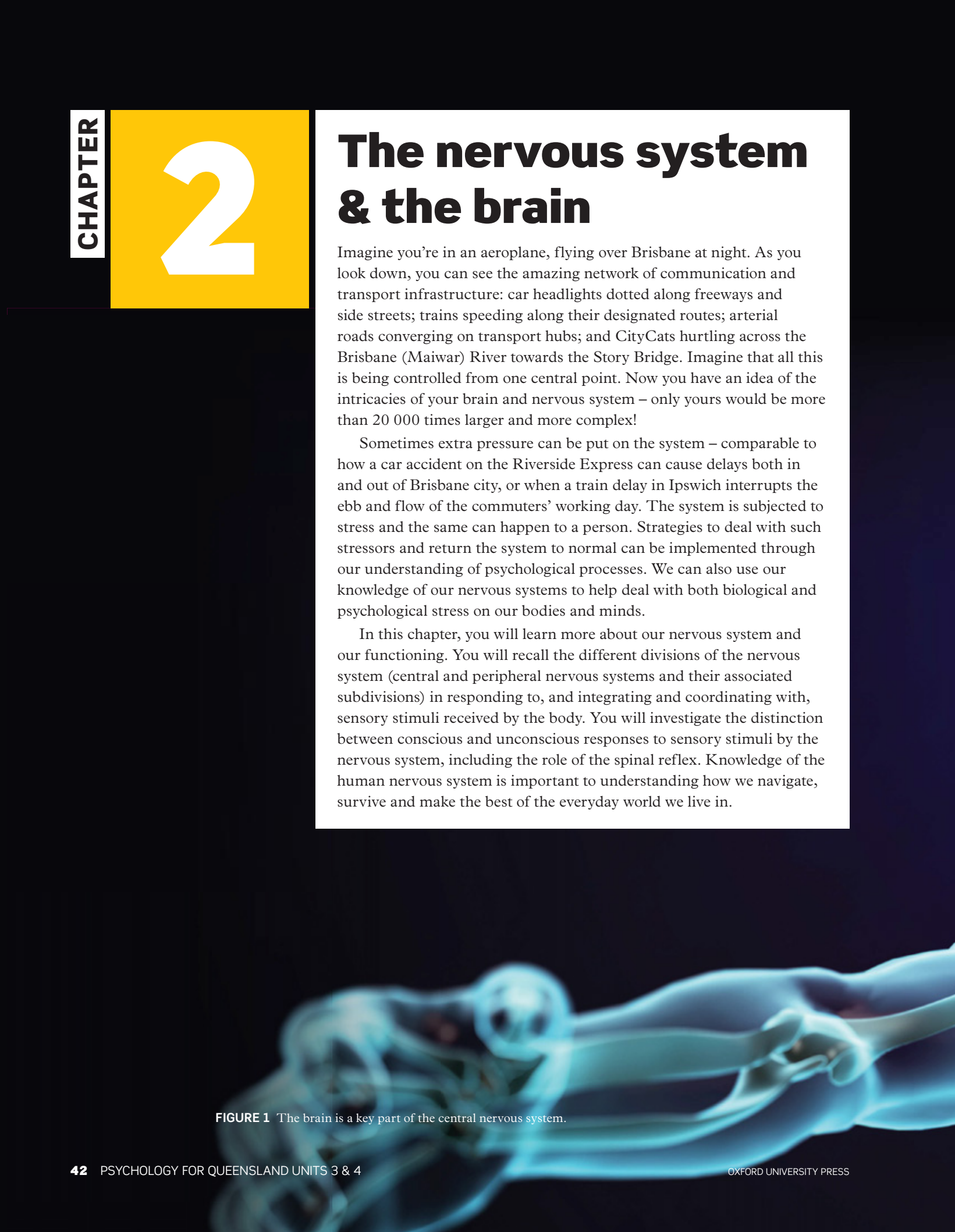


FIGURE 1 The brain is a key part of the central nervous system.

OBJECTIVES

- → Recall the structure of the human nervous system, with reference to the central (i.e. brain and spinal cord) and peripheral (i.e. somatic and autonomic) nervous systems.
- → Describe the role of the spinal cord in the human nervous system, with reference to the spinal reflex.
- → Recognise that the cerebral cortex can be divided into a number of discrete areas, which have specific functions, including the frontal, occipital, parietal and temporal lobes.
- → Recall that language processing occurs within Broca's area, Wernicke's area and Geschwind's territory.
- → Recognise that voluntary movement is coordinated from the primary motor cortex, cerebellum and basal ganglia.
- → Recognise that emotion occurs within the limbic system, amygdala and prefrontal cortex.

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2.1 The human nervous system

KEY IDEAS

In this section, you will learn about:

- the central nervous system, including the brain and spinal cord
- the peripheral nervous system, including the somatic and autonomic nervous systems.

central nervous system comprises the brain and spinal cord; the CNS controls the body by processing and responding to sensory input from the peripheral nervous system

peripheral nervous system communicates information from the body to the central nervous system (e.g., aches and pains) and to the body's organs, glands and muscles

The nervous system can be divided into two major sections: the **central nervous system** and the **peripheral nervous system**. Neuroimaging techniques have enabled scientists to observe the parts of the brain that are active during different types of cognitive processes, many of which are active at any given time. It is important to remember that different parts of the brain interact with each other and are not isolated structures. The brain needs to receive information from the body's sense organs – the eyes, ears, skin, nose and tongue – which are constantly receiving information from the environment. The brain is also connected with the muscles and glands in the body so that an organism is able to respond to and act on the environment.

The central nervous system

The central nervous system comprises the brain and the spinal cord. It helps the brain to communicate with the rest of the body by sending messages to the peripheral nervous system.

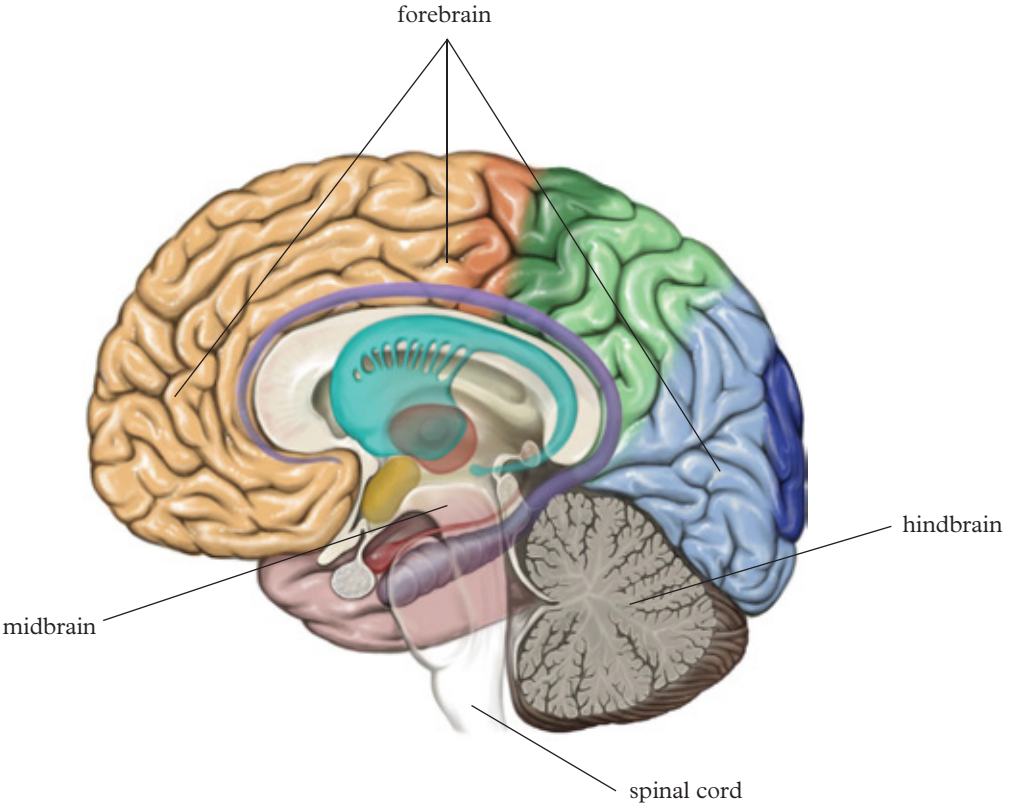


FIGURE 1 Forebrain, midbrain, hindbrain and spinal cord

The brain

The brain is made up of the hindbrain, the midbrain and the forebrain; each structure is detailed in Unit 1. The hindbrain links the spinal cord and the rest of the brain and is important for movement and balance. The midbrain coordinates movement, sleep and arousal. The forebrain is responsible for receiving and processing sensory information and for higher order thinking processes, including problem-solving, planning, memory, language and emotions (Figure 1).

The spinal cord

The **spinal cord** runs from the brain stem, inside the vertebrae to the lower-middle section of the spine. The upper section is responsible for communication between the brain and the upper parts of the body; the lower section is responsible for communication between the brain and the lower parts of the body, such as the legs, toes and feet (Figure 2).

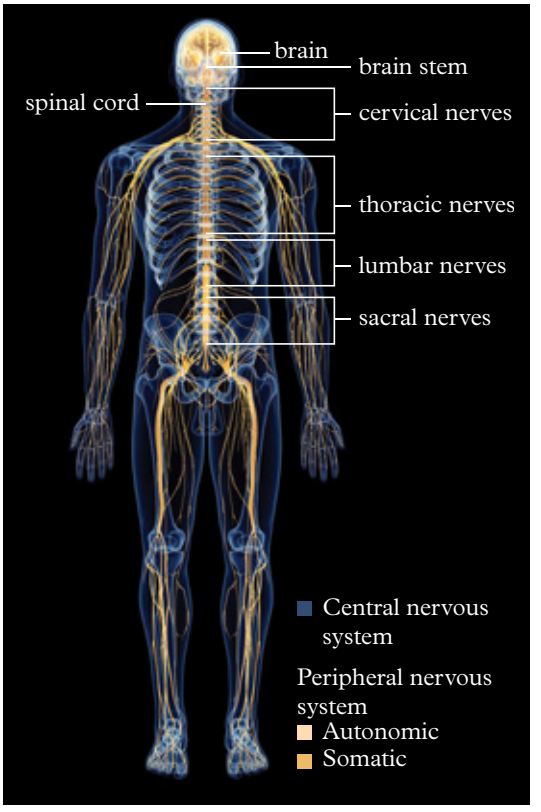


FIGURE 2 The human nervous system and spinal cord

The peripheral nervous system

The peripheral nervous system works with the central nervous system to enable you to interact with your environment. Imagine that you find a feather. You pick it up and stroke it and find that it feels soft on your fingers. In this scenario, the motor neurons of your peripheral nervous system are responsible for initiating the movement of your muscles in your arm and hand so you can touch the feather. The **sensory neurons** of your peripheral nervous system convey the sensation of the feather from the sensory receptors in the skin on your hand to the brain via the central nervous system. Your brain then registers the feather as being soft.

The peripheral nervous system has two subdivisions: the somatic nervous system and the autonomic nervous system.

Somatic nervous system

The **somatic nervous system** controls the voluntary movement of skeletal muscles (striated or striped muscles). **Motor neurons** communicate messages from the central nervous system to the particular muscles that an organism intends to move at any particular moment.

Autonomic nervous system

The **autonomic nervous system** is mostly responsible for the communication of information between the central nervous system and the body's non-skeletal muscles (also known as smooth or visceral muscles) such as the heart and stomach, together with the internal organs and the glands that carry out basic bodily functions such as digestion and the heartbeat.

spinal cord
the bundle of nerve fibres connecting the brain with the peripheral nervous system

sensory neurons
neurons that carry information from the body and from the outside world into the central nervous system; also known as effector neurons

somatic nervous system
the division of the peripheral nervous system that carries sensory information into the central nervous system and motor commands from the central nervous system to the skeletal muscles

motor neurons
neurons that communicate messages from the central nervous system to the particular muscles that an organism intends to move at any particular moment; also known as efferent neurons

autonomic nervous system
consisting of the parasympathetic and sympathetic branches and responsible for the communication between the body's non-skeletal (visceral) muscles and the internal organs and the glands that carry out bodily functions

For the most part, the autonomic nervous system operates without the organism's voluntary control or conscious awareness, enabling it to pay attention to other matters, such as responding to threats in the environment. However, some actions of the autonomic nervous system, such as breathing and blinking, can be voluntarily influenced. For example, you generally don't notice each time you inhale and exhale but, during a medical examination, you can deliberately hold your breath and then breathe out on demand.

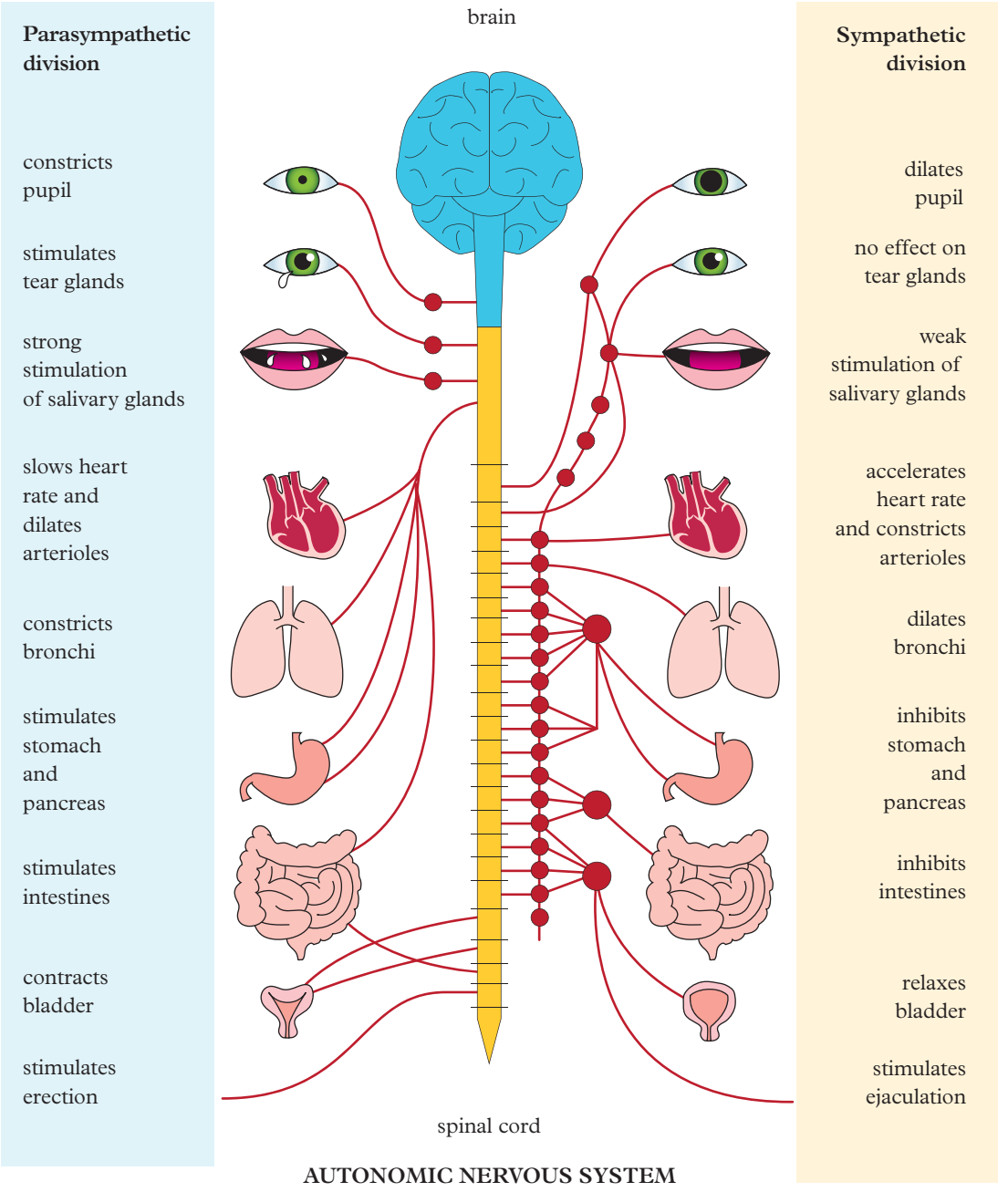


FIGURE 3 The role of the autonomic nervous system during different levels of arousal

sympathetic nervous system
a branch of the autonomic nervous system that activates the fight-flight-freeze response

TABLE 1 Muscles and glands controlled by the autonomic nervous system

Muscles	Glands
• In the skin (around hair follicles; smooth muscle) • Around blood vessels (smooth muscle) • In the eye (the iris; smooth muscle) • In the stomach, intestines and bladder (smooth muscle) • Of the heart (cardiac muscle) • Gastrointestinal tract • Gall bladder • Liver	• Pancreas • Adrenal medulla (adrenal gland) • Sweat gland

The sympathetic and parasympathetic nervous systems

The autonomic nervous system is further divided into two branches: the **sympathetic nervous system** and the **parasympathetic nervous system**. These two systems have different roles, which are complementary to each other.

The **fight-flight-freeze response** is activated by both the sympathetic nervous system and the parasympathetic nervous system. The sympathetic nervous system is like an emergency system that becomes active when the organism is threatened. It prepares the body for action, such as running away or fighting the threat. In contrast, the parasympathetic nervous system controls the freeze response. This is activated when you are aware that you are unable to fight or outrun the threatening stimulus. The parasympathetic nervous system is also responsible for **homeostasis**; that is, maintaining balance in automatic day-to-day bodily functions, such as digestion, normal heart rate and breathing.

parasympathetic nervous system
a branch of the autonomic nervous system, responsible for maintaining our day-to-day functioning and for most of the automatic functions of the body such as digestion, heart rate, breathing and some glandular functions

fight-flight-freeze response
a physiological response to stress that causes an organism to react in a combative manner (flight), by removing itself from the situation (flight), or by not reacting at all (freeze)

homeostasis
the state of balance in the body's metabolism

CHECK YOUR LEARNING 2.1

Describe and explain

1 **Construct** a labelled diagram (similar to Figure 2) to illustrate your understanding of the structure of each component of the nervous system. Make sure that you include the following:
   - **a** central nervous system (brain and spinal cord)
   - **b** peripheral nervous system
   - **c** somatic nervous system
   - **d** autonomic nervous system (sympathetic and parasympathetic).

2 **Explain** the functions of each of the systems covered in Question 1.

Apply, analyse and interpret

3 **Compare** the autonomic nervous system with the somatic nervous system.

Investigate, evaluate and communicate

4 When people sustain injury to their nervous system, they can have impaired motor coordination and movement initiation. **Investigate** a possible explanation. (HINT: consider the role of the CNS + PNS.)

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 2.1

» **Increase your knowledge**
The human nervous system

» **Weblink**
Exploring the nervous system

2.2 The cerebral cortex

KEY IDEAS

In this section, you will learn about:

- the four lobes of the cerebral cortex
- Broca's area, Wernicke's area and Geschwind's territory.

cerebral cortex the multi-layered outer surface of the cerebrum responsible for receiving information from the environment, controlling our responses, and allowing complex voluntary movements and higher order thinking processes

cerebrum the part of the brain most responsible for voluntary movement and complex thought processes such as perception, imagination, judgment and decision-making

corpus callosum the band of neural fibres that connects the right and left cerebral hemispheres

frontal lobe the largest lobe of the brain; has several functions, including initiating movement of the body, language, planning, judgment, problem-solving, aspects of personality and emotions; extremely well developed in higher order mammals

parietal lobe the location of the primary somatosensory cortex in the brain; enables a person to perceive their own body and where things are located in their immediate environment

The **cerebral cortex** is crucial to our understanding of how we process sensory information and how we move and speak. It helps us to detect the difference between pieces of information, to understand the meaning of this information and to think in abstract and symbolic ways, enabling creativity in art, writing, debating and the use of metaphor (Burton *et al.*, 2015). The cerebral cortex is the name given to the outer area of the **cerebrum**. The cerebrum(located in the forebrain) is separated into the left and right cerebral hemispheres. Each hemisphere is almost symmetrical in appearance and are joined by a set of neural fibres known as the **corpus callosum**.

Lobes of the cerebral cortex

The cerebral cortex of each hemisphere of the brain is made up of four distinct lobes: the **frontal lobe**, the **parietal lobe**, the **occipital lobe** and the **temporal lobe**. Both hemispheres have one of each of these lobes, making eight lobes in total. From the sensory receptors (for all senses except smell), signals are sent to the **thalamus**, deep beneath the cerebral cortex. The thalamus then relays this information to the primary cortex of the relevant lobe, which then processes and interprets it. We are constantly bombarded by stimuli – sights, sounds, smells, feelings and tastes – and we cannot address each one. The thalamus also selects which incoming information most requires our attention at any given moment.

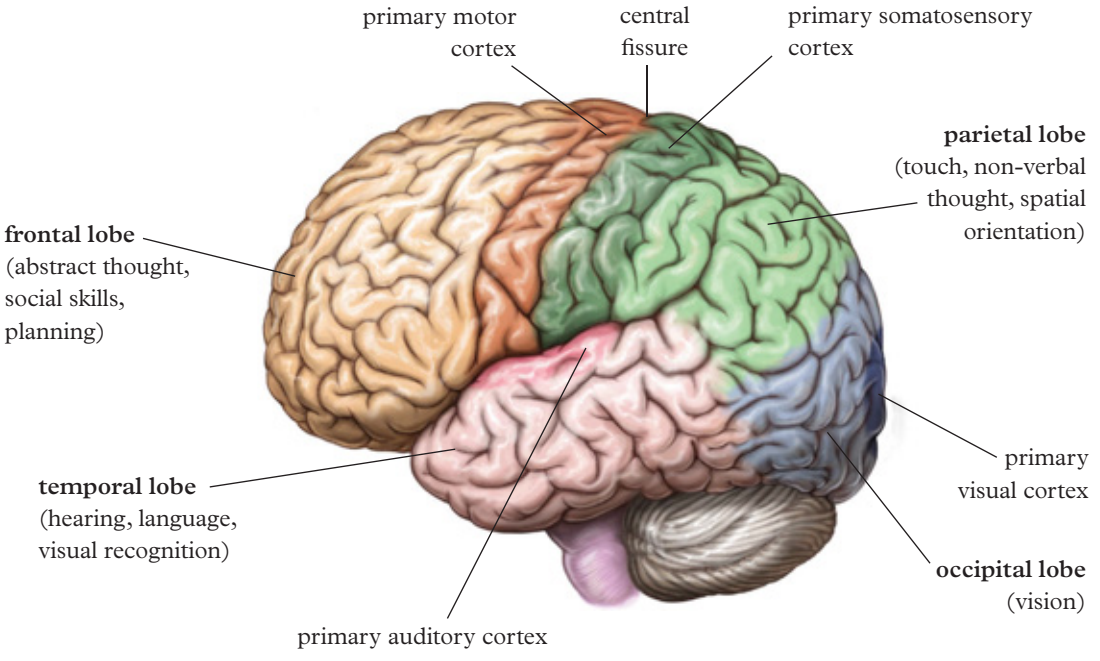


FIGURE 1 The lobes of the brain

Frontal lobes

The frontal lobes are the largest of the lobes and are responsible for speech, abstract thought, planning and social skills. The **primary motor cortex** is situated at the rear of each frontal lobe, adjacent to the central fissure; it is responsible for the movement of the body's skeletal muscles. The primary motor cortex functions contralaterally, meaning that the left primary motor cortex is responsible for the movement of the right-hand side of the body, and vice versa.

Parietal lobes

The parietal lobes enable a person to perceive three-dimensional shapes and designs. They help you to perceive your own body, and the space around yourself and the location of objects in your environment. The **primary somatosensory cortex** is situated at the front of each parietal lobe, adjacent to the central fissure. It is responsible for processing sensation such as touch, pressure, temperature and pain. Like the primary motor cortex, it functions contralaterally: the left primary somatosensory cortex is responsible for processing sensation in the right-hand side of the body, and vice versa. If the right primary somatosensory cortex is damaged, a person will be unable to process sensation from parts of the body on the left side, and the relevant body part will be numb. The reverse will happen if the left primary somatosensory cortex is damaged. The cortical area responsible for sensation on the toes is located at the top of the somatosensory cortex, and the area responsible for sensation in the mouth is located at the bottom.

Temporal lobes

The temporal lobes process auditory information (sensations received by the ears). The **primary auditory cortex** is in the upper part of the temporal lobes. The temporal lobes perform the complex auditory analysis necessary for understanding human speech or listening to music. Parts of the lobes specialise in sensitivity to particular types of sounds. People with a damaged right temporal lobe tend to be unable to recognise songs, faces or paintings. People with a damaged primary auditory cortex often experience forms of deafness – or complete deafness if the entire primary auditory cortex is removed.

Occipital lobes

The occipital lobes are responsible for vision. Information from the left side of each retina is processed in the left occipital lobe and information from the right side of each retina is processed in the right occipital lobe. Information from the centre of the visual field and the centre of each retina is processed in both occipital lobes. The **primary visual cortex** is located at the back of the occipital lobes. Different parts of the primary visual cortex process different types of visual stimuli. A person with a damaged primary visual cortex would be unable to process any visual stimuli that their eyes see; it would be as if they were blind. If part of an occipital lobe were damaged, there would be a gap in a person's visual field where some specific visual stimuli that would not be processed.

Association areas of the cerebral cortex

The parts of the cerebral cortex dissociated from the lobes are comprised of the association areas. The **neurons** in the association areas are typically less specific in their function than those in the primary cortices. Neurons in the association areas located closest to a primary cortex for a specific sense specialise in analysing and interpreting that particular sensory information. Neurons in the association areas that are farther from a primary cortex may be more involved in the integration of information from several senses and memories.

occipital lobe
the cerebral cortex at the rear of the brain; the location of the primary visual cortex and association areas involved with integration of visual stimuli

temporal lobe
the part of the forebrain beneath the temporal plate of the skill, at the side of the head above the ears; contains Wernicke's area and the primary auditory cortex

thalamus
structure in the brain located between the cerebral cortex and the midbrain, just above the brain stem; responsible for relaying motor and sensory signals to the cerebral cortex

primary motor cortex
located at the rear of each frontal lobe; responsible for movement of the skeletal muscles of the body

primary somatosensory cortex
located at the front of each parietal lobe; processes sensations such as touch, pressure, temperature and pain

primary auditory cortex
located in the upper part of the temporal lobe; receives sounds from the ears

primary visual cortex
located in the occipital lobe; processes information from the eyes

neurons
nerve cells, responsible for communication within the body

Much of the frontal lobes are taken up by the association area responsible for higher order mental processes, such as language, reasoning, planning, attention, judgment, problem-solving and aspects of personality. People with damaged frontal lobes may fail to learn from experiences. For example, if they attempt a problem-solving task, they will be unable to evaluate which strategy was most successful and will go through a trial-and-error process each time they are confronted with the same problem. They are also likely to make mistakes in planning because they lack foresight. The association areas of the parietal lobes integrate sensory information to form a single perception. They also construct a spatial coordinate system to represent the world around us (Kandel *et al.*, 1991). The association areas of the temporal lobes are important for processing and encoding memory, and the association areas of the occipital lobes integrate of visual stimuli.

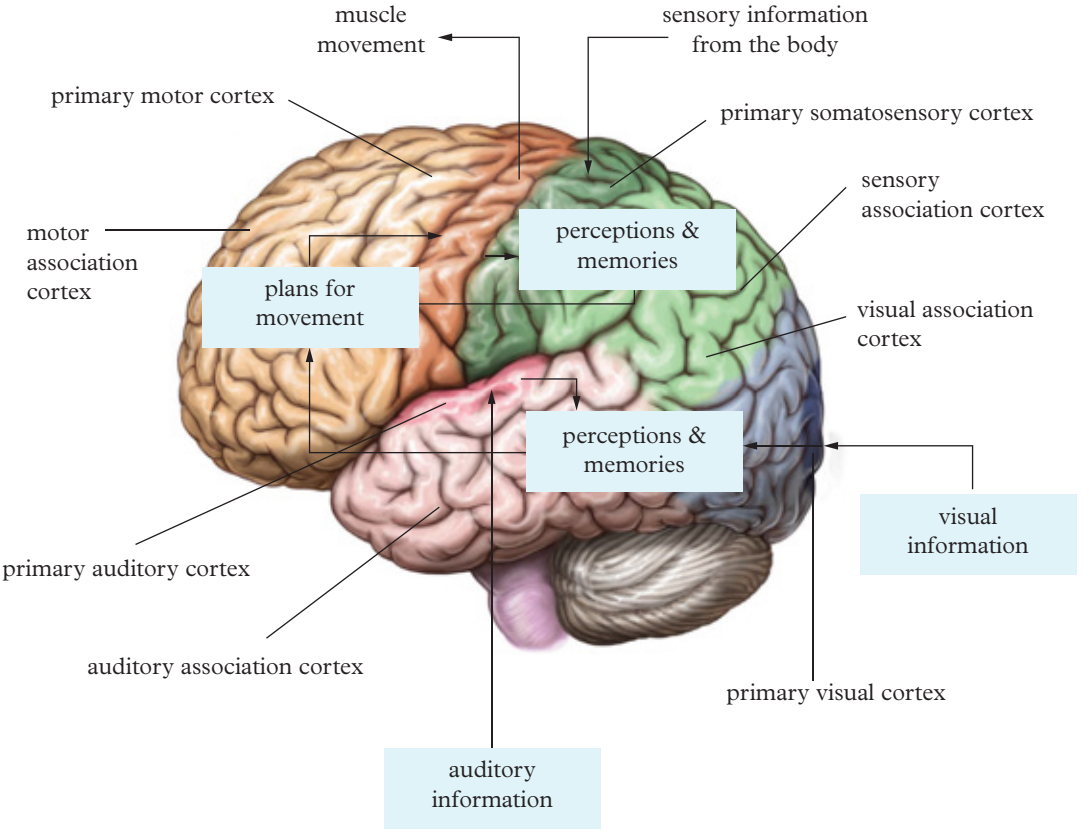


FIGURE 2 The association areas in the left hemisphere of the brain. The arrows indicate the communication channels.

Processing language

Broca's area

Broca's area
the speech production centre of the brain

localisation of function of the brain
specific parts of the brain are responsible for different functions

Broca's area is found in the association area of the left frontal lobe. It coordinates the movement of the lips, tongue and vocal cords to articulate words. It is also important in the use and understanding of grammar. Damage to Broca's area can result in Broca's aphasia: difficulty speaking, putting grammatically correct sentences together and articulating words. However, people with Broca's aphasia can comprehend language. This indicates that Broca's area is the motor region for language production. Surgeon Pierre Paul Broca conducted scientific studies of patients with damage (or lesions) to Broca's area, providing the first clinical evidence for **localisation of function of the brain**, whereby specific behaviours were linked to specific areas in the brain (Burton *et al.*, 2019; Carlson, 2008).

Wernicke's area

Wernicke's area is located in the left temporal lobe and is responsible for storing receptor codes that interpret the meaning of language and for creating grammatically correct speech. German physician Carl Wernicke discovered this area by studying patients who were able to speak, but unable to comprehend language due to lesions in the posterior region of the temporal lobes of their brains. Therefore, Wernicke's area is thought to be the sensory region for language comprehension. People with damage to Wernicke's area may suffer from Wernicke's aphasia. They struggle to comprehend language and produce sentences that are fluent, but meaningless – often referred to as 'word salad'. Scientific studies of Wernicke's area extended the clinical evidence provided by Broca for localisation of function in the brain (Burton *et al.*, 2019; Carlson, 2008).

Wernicke's area
part of the left temporal lobe, responsible for language reception and interpretation and for creation of grammatically correct speech

Geschwind's territory
area of the brain that provides a connection between Broca's area and Wernicke's area

Geschwind's territory

Geschwind's territory exists in the posterior parietal lobe. It provides a connection between Broca's area and Wernicke's area via a bundle of nerve fibres. It develops with age and allows people to understand the meaning of particular words. The connection between the motor (Broca's area) and sensory (Wernicke's area) regions of the brain involved in language helps to explain how we input words we hear or read and link them to those areas of the brain responsible for producing speech (Catani & Mesulam, 2008; *Science Daily*, 2004; Oestreich, Whitford & Garrido, 2018; see also *The Brain from Top to Bottom*, 2018a).

Geschwind's territory is located in an area in the brain where the neurons are multimodal – capable of simultaneously responding to and processing a range of stimuli, including auditory and visual stimuli (*Science Daily*, 2004; *The Brain from Top to Bottom*, 2018a). It is the ideal area for processing the properties of words – how they sound, how they look and what they represent. Geschwind's territory provides a platform for abstract thinking by enabling the brain to interpret and classify stimuli. Evidence for the existence and functional role of Geschwind's territory was gathered by studying people with aphasia and the neural structure of animals (rhesus monkeys) and comparing them with human neural structures involved with language.

Study tip

For more information on the location of Broca's area, Wernicke's area, and Geschwind's territory, refer to *Psychology for Queensland Units 1 & 2 Student Book*.

Study tip

Remember: Broca's area affects speech production, Wernicke's area affects speech comprehension and Geschwind's territory links the two!

CHECK YOUR LEARNING 2.2

Describe and explain

1 **Describe** the function of each of the following:
   - **a** frontal lobe
   - **b** parietal lobe
   - **c** temporal lobe
   - **d** occipital lobe

2 **Identify** which lobe would be involved in processing the following sensory information:
   - **a** listening to music on the radio
   - **b** navigating a crowded room
   - **c** looking at beautiful scenery

3 **Describe** the role of the thalamus.

4 **Explain** what Broca's area, Wernicke's area and Geschwind's territory are responsible for.

Apply, analyse and interpret

5 **Select** one of the lobes of the brain. **Consider** its importance in responding to, and integrating and coordinating with, sensory stimuli received by the body. Write a brief paragraph about this process.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 2.2
- **» Increase your knowledge**
  The four lobes of the brain
- **» Weblink**
  The cerebral cortex

2.3 Spinal reflexes

KEY IDEA

In this section, you will learn about:

+ conscious and unconscious responses and the role of the spinal reflex.

For our bodies to respond to what is happening in both our external and internal environments, messages need to be relayed to and from our central nervous system (the brain and the spinal cord). Our peripheral nervous system (PNS) is responsible for ensuring that we are able to make both voluntary and involuntary movements in response to external or internal stimuli. The PNS also ensures that we are able to maintain appropriate levels of arousal, respond to our environment in appropriate ways and maintain homeostasis. Without these messages, our body would be unable to react to dangers in our environment (such as pulling away from a hot object or a venomous spider). We would also not be able to engage in voluntary behaviours, such as holding a loved one's hand.

Our basic life-preserving processes, such as breathing, are also controlled by the PNS. Breathing is an unconscious response and explains why you typically don't think about it unless, for example, you're asked to 'breathe in and breathe out' or if you are practising mindfulness. This section will examine the role of the spinal cord in the human nervous system and introduce you to various innate spinal reflexes.

Unconscious responses

Autonomic

Receptors in the body receive sensory stimuli from the environment, such as temperature, and from internal factors, such as oxygen levels and blood-sugar levels, and there is an unconscious or autonomic response. An example is the pupillary response in which our pupils expand or contract depending on the amount of available light. We don't consciously decide to widen or constrict our pupils, rather our sympathetic nervous system controls pupil dilation and our parasympathetic nervous system controls pupil constriction.

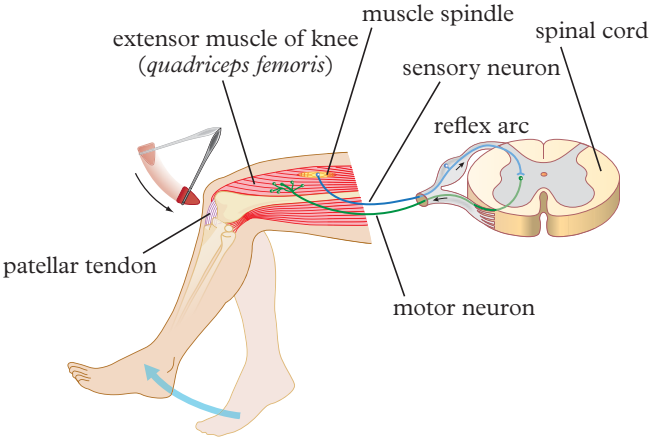


FIGURE 1 A two-neuron (monosynaptic) reflex arc

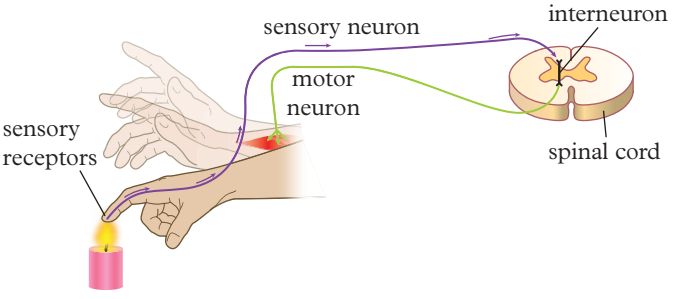


FIGURE 2 Three-neuron reflex arcs (polysynaptic) are more common than two-neuron reflex arcs.

Spinal reflexes

Reflexes are responses to sensory stimuli – which are innate, not learnt. These responses tend to be simple behaviours that contribute to our safety and survival. Many of these are controlled within the spinal cord without involving the brain and are therefore referred to as spinal reflexes. This enables an organism to respond faster than if a nerve impulse needed to be sent to the brain. This means that pulling away from a hot or sharp object, for example, can be almost instantaneous.

The process of receiving a sensation and responding to it reflexively involves a reflex arc. There are two forms of reflex arc:

- **monosynaptic reflex arc**: involving only one synapse, where an affector neuron brings a sensation from receptors in the body and an effector neuron carries motor messages to the muscles of the body
- **polysynaptic reflex arc**: involving interneurons connecting the affector and effector neurons, and, therefore, at least two synapses.

Only a few of the simplest reflexes, such as the 'knee-jerk' or patellar reflex are monosynaptic. The role of the synapse in transmitting neural impulses, such as those in a reflex arc, is explained in detail in Chapter 3.

reflex
simple, automatic response to a sensory stimulus

monosynaptic reflex arc
a reflex arc made up of only two neurons (one sensory and one motor)

polysynaptic reflex arc
a reflex arc made up of multiple neurons, with one or more interneurons connecting the sensory and motor neurons

Conscious responses

The somatic nervous system controls our conscious voluntary responses; such as when we perceive a potential danger and, without experiencing any autonomic arousal, take deliberate action to avoid it. This might occur if you see a nail sticking up on your deck and you hammer it back in so that no one will get hurt. Such responses always involve the brain, though some voluntary movements (such as walking) require less conscious attention.

CHECK YOUR LEARNING 2.3

Describe and explain

1 **Explain** the spinal reflex.
2 **Describe** two examples of the spinal reflex in action.

Apply, analyse and interpret

3 **Consider** the effect on survival if you did not have a reflex arc.
4 **Differentiate** between autonomic responses and spinal reflexes.
5 **Compare** conscious and unconscious responses.

Investigate, evaluate and communicate

6 Humans have evolved to possess certain physical and neurological features to increase survival. **Investigate** how the dilation and constriction of our pupils is beneficial to human survival. **Summarise** your findings in a brief essay.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 2.3

» **Increase your knowledge**
Different responses

» **Weblink**
Test your reflexes

2.4 Voluntary movement

KEY IDEAS

In this section, you will learn about:

+ the coordination of voluntary movement from the primary motor cortex, cerebellum and basal ganglia.

We use voluntary body movements to control parts of our body (e.g., our arms and legs), to move our head, to and visually explore the world, to control our facial expressions to reflect our emotions, and to communicate with each other by moving our lips, mouth and tongue. Voluntary movements are primarily controlled by communication between areas of our frontal lobes in the primary motor cortex, the forebrain in the cerebellum and the hindbrain in the basal ganglia (*The Brain from Top to Bottom*, 2018b). In this section, we will explore how these parts of the brain plan, coordinate and communicate using feedback loops to cause specific muscle contractions that allow us to interact with our environment.

Steps in voluntary movement

The brain processes different kinds of information at a rapid pace to initiate a voluntary movement. These voluntary movements are performed in a series of steps. The first step is to select a response that will achieve the desired goal of the movement. This is done by rapidly analysing all the possible responses and choosing the one that best corresponds with what we want to achieve. For example, if we want to pick up a glass of water, our brain would 'sift' through all the movements related to picking up an object and choose the one that best matches grasping and lifting a glass. The second step is the planning stage: working out how the movement will physically happen. It includes planning and selecting the sequence of muscle contractions needed to carry out the movement. The third step is to actually carry out the movement by activating the motor neurons that will trigger the movement (Burton *et al.*, 2019).

The basal ganglia

Before we can engage in voluntary movements, our motor cortex must gather information from other areas of the brain. This information includes things such as our body's current position, what goal the movement will achieve, a strategy for attaining this goal and memories of previous strategies we have successfully used to achieve this goal. This information-gathering process is controlled by the **basal ganglia**, a group of structures in the brain that includes the caudate nucleus, the putamen and the globus pallidus, and the subthalamic nucleus. The basal ganglia enables voluntary movement by operating a complex feedback loop. It channels information from various regions of our brain to the motor cortex. It also acts to block movements that may not suit the end goal of the movement. It receives input from the frontal, parietal and temporal lobes.

basal ganglia
a set of structures involved in the control of movement, gathering and channelling information from different areas of the brain

The cerebellum

The **cerebellum** is located in the hindbrain at the back of our brain. It stores sequences of movements that have been previously learnt. It also coordinates and integrates information about movements from other areas in the brain to help us move in ways that are smooth, well sequenced and seem effortless. The cerebellum communicates with the primary motor cortex by sending signals through a dense nerve bundle that consists of a large number of axons.

cerebellum
the area of the brain responsible for coordinating and remembering smooth, well-sequenced movements

Primary motor cortex

The primary motor cortex is located at the rear of each frontal lobe next to the central fissure. It is responsible for movement of the body's skeletal muscles, and activates the neural impulses that execute voluntary movement. The primary motor cortex is arranged so that different parts of the region are associated with motor control of different parts of the body. The primary motor cortex is divided into the left primary motor cortex and the right primary motor cortex. The left primary motor cortex is responsible for the movement of the right side of the body. The right primary motor cortex is responsible for the movement of the left side of the body. This is called contralateral organisation. If damage occurs to the right primary motor cortex, a person will be unable to move parts of their body on the left side such as their left hand and leg; the reverse will happen if the left primary motor cortex is damaged.

The part of the primary motor cortex responsible for the movement of toes is located at the top, while the area responsible for movement of the lips is located at the bottom. The extent of the primary motor cortex devoted to voluntary movement of different parts of the body is proportional to the number of neurons required to move different anatomical parts. For example, the mouth and hands require more motor neurons to move the many small muscles for fine motor activity; other parts of the body require fewer neurons and therefore have less space on the primary motor cortex.

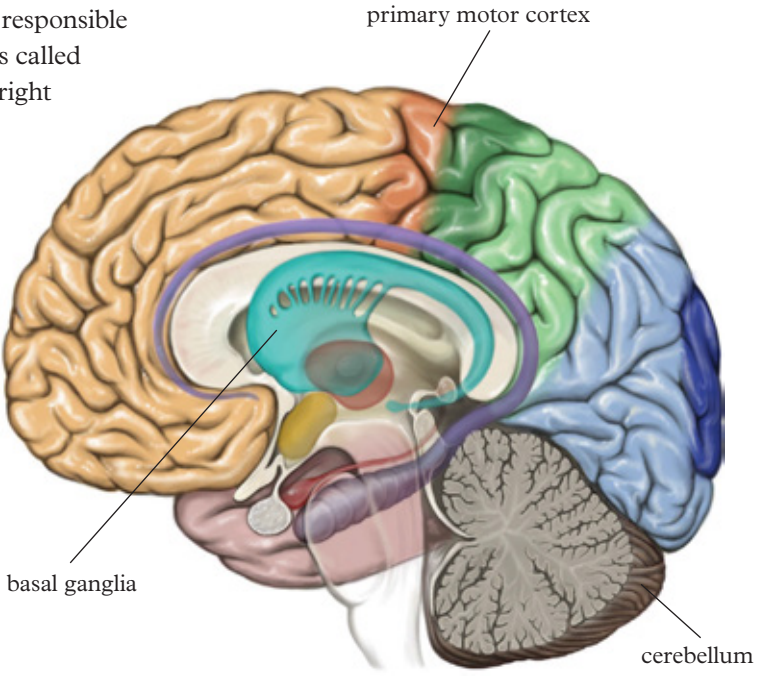


FIGURE 1 Voluntary movement is controlled by the basal ganglia, the cerebellum and the primary motor cortex.

CHECK YOUR LEARNING 2.4

Describe and explain

1 **Explain** the steps involved in executing a voluntary movement.
2 **Describe** the three regions of the brain involved in voluntary movement.
3 **Summarise** how each of the three regions is involved in voluntary movement.

Apply, analyse and interpret

4 **Differentiate** between the role of the cerebellum and the role of the basal ganglia.
5 **Determine** what the actions of someone who has damage to the primary motor cortex might be like.

Investigate, evaluate and communicate

6 **Propose** what may happen to someone who has suffered an injury to the basal ganglia.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 2.4

» **Increase your knowledge**
Voluntary movement

» **Weblink**
The brain's role in movement

2.5 Emotion and the brain

KEY IDEA

In this section, you will learn about:

+ emotion and the limbic system, amygdala and prefrontal cortex.

In Unit 2, you learnt about the role of the brain in the interpretation, production and regulation of emotion. The limbic system is located on both sides of the thalamus. It includes the hippocampus, hypothalamus and amygdala; the prefrontal cortex is also implicated in emotion. This section further explores how emotion occurs within the limbic system, amygdala and prefrontal cortex.

The limbic system

limbic system structure of the brain consisting of the amygdala, hypothalamus and midbrain; implicated in memory, emotion, behaviour and motivation

The **limbic system** is one of the oldest structures in the brain. It consists of the amygdala, hypothalamus and midbrain areas. The limbic system is implicated in memory, emotion, behaviour and motivation. As you learnt in Unit 2, LeDoux proposed that there was a short or long route to processing and acting on emotion. This is shown in Figure 1.

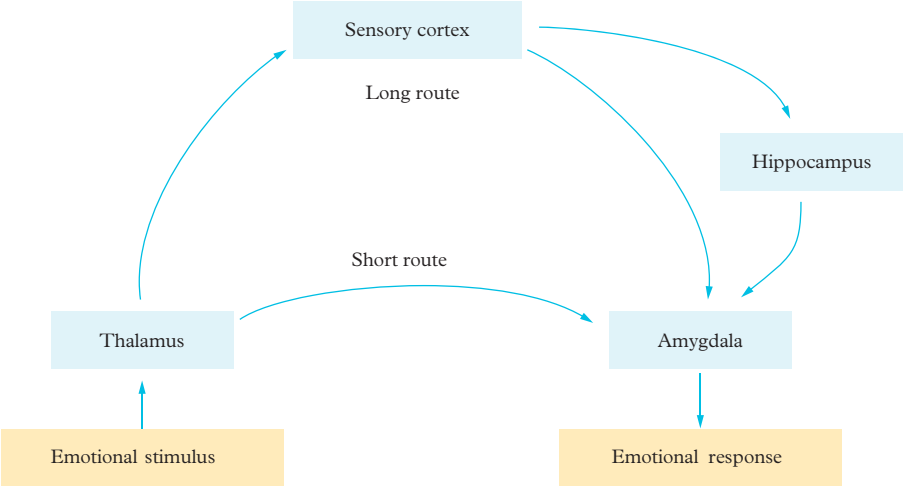


FIGURE 1 LeDoux's model of emotion with the long and short pathways

hippocampus a finger-sized curve structure that lies in the medial temporal lobes; responsible for consolidation of explicit memories and acts to transfer these to other parts of the brain for storage as long-term memory

Hippocampus

The **hippocampus** is involved in the regulation and expression of emotion. The hippocampus is implicated in memory, and when we are presented with emotionally charged stimuli, our hippocampus aids us in recalling any information relevant to the situation. When we process emotional stimuli via Le Doux's 'long route', sensory information is also processed in the hippocampus, then sent to the amygdala.

hypothalamus a structure in the forebrain that plays a major role in controlling emotion and motivated behaviours such as eating, drinking and sexual activity

Hypothalamus

The **hypothalamus** is implicated in basic survival actions such as running, fighting and reproduction. The hypothalamus is part of the **HPA axis** (the hypothalamic-adrenal-pituitary gland response, which controls our reactions to stressful situations), and is involved in physiological responses to fear-inducing emotional stimuli.

Amygdala

The **amygdala** is involved in the activation of certain emotions, particularly fear. It is also strongly involved in conditioning: a type of learning covered in Chapter 10. The amygdala is located in the temporal lobes of the brain; its role is specialised in each hemisphere. The right side is involved in how we perceive emotion, particularly negative emotion. Specifically, the amygdala is responsive to the fear stimulus and fear conditioning. As well as processing emotion, the amygdala is involved in memory recollection and storage.

The prefrontal cortex

The **prefrontal cortex (PFC)** is the part of the cerebral cortex that connects and covers the brain. Specifically, the ventral (underside) of the PFC is associated with and connects brain regions that are involved in emotional processing and production. The PFC is involved in regulating and modifying emotions. The PFC is also involved in executive functioning and deciding between good and bad actions.

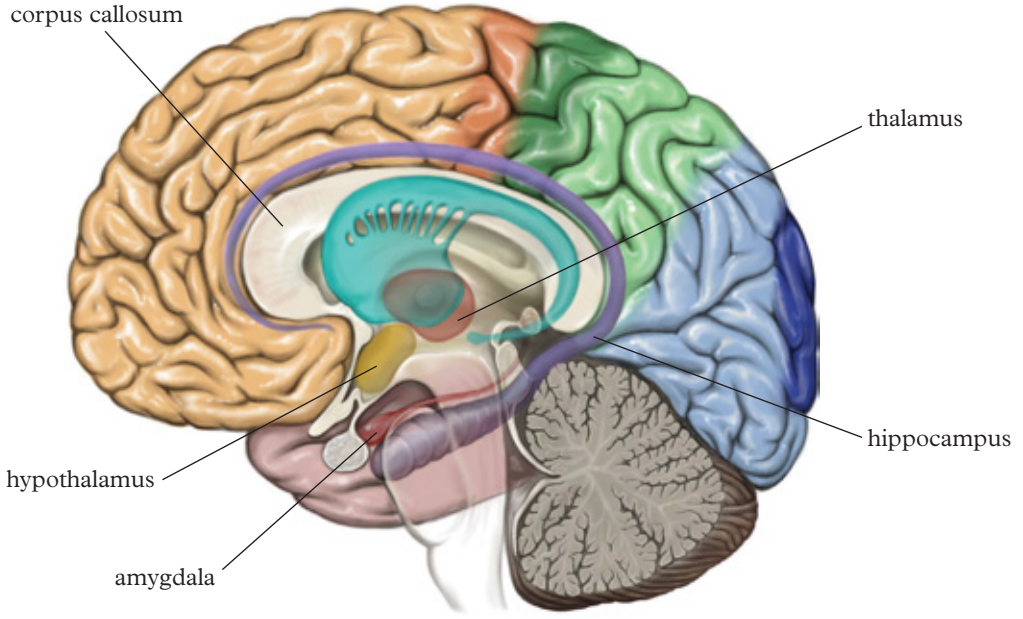


FIGURE 2 The limbic system

HPA axis
a major neuroendocrine system that includes the hypothalamus, pituitary gland and adrenal gland; these structures interact through a feedback system to regulate a number of functions such as a person's digestion, immune system, mood, emotions and their responses to stress

amygdala
an almond-shaped structure, located in the medial temporal lobe of the brain that is central to emotion, aggression and implicit learning

prefrontal cortex (PFC)
part of the cerebral cortex that connects brain regions that are involved in the processing and production of emotion

CHECK YOUR LEARNING 2.5

Describe and explain

1 **Describe** the role of the amygdala in emotion.
2 **Identify** the areas of the limbic system.

Apply, analyse and interpret

3 **Compare** the role of the hippocampus and the role of the hypothalamus in influencing emotion.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 2.5

» **Increase your knowledge**
Thinking about emotion

» **Weblink**
Emotion and the brain

SCIENCE AS A HUMAN ENDEAVOUR

2.6 Neuroplasticity helps in recovery from brain injury

KEY IDEAS

In this section, you will learn about:

- localisation of function, and the understanding that specific parts of our brain are responsible for different functions
- understanding how neuroplasticity assists in the recovery from brain injury.

Psychologists once believed that our brains were structured and that they functioned in a fixed way. They thought that the only changes to our brains occurred through normal development from childhood to adulthood, and that they would then deteriorate in old age. In Unit 1, you saw how researchers have discovered that the brain and neural networks are not fixed, but they change dynamically throughout life depending on the experiences that we have (Burton *et al*., 2018; Demarin, Morović & Bene, 2014; Su, Veeravagu & Grant, 2016). The re-wiring occurs in response to environmental experiences including disease, injury or learning experiences (Kolb & Gibb, 2008).

Neuroscientists are concerned with the issue of localisation of function – the idea that specific parts of our brains are responsible for specific functions (Burton *et al*., 2019). They are also interested in what happens to our behaviour and brains when something goes wrong.

Neuroscientists have also discovered that the brain can recover from injury through plasticity (see Unit 1). Plasticity is essentially the brain's ability to form new neural connections and neural pathways, and to fundamentally change how it is wired. There are two types of neuroplasticity: functional plasticity and structural plasticity (Cherry, 2018). Functional plasticity is when the brain moves the function of the damaged area to a different undamaged area. Structural plasticity refers to changes that occur in the physical structure of the brain as a result of learning (Cherry, 2018; Demarin *et al*., 2014).

In the case of functional plasticity, when the brain sustains damage, for example through a stroke, the areas of the brain associated with certain functions no longer work. Eventually, healthy parts of the brain may take over those functions and abilities until the damaged areas can be restored.

An example of this is the case of a 25-year-old piano player who sustained major damage to the left side of her brain after a stroke (Azari & Seitz, 2000; Pekna, Pekny & Nilsson, 2012). She was subsequently unable to use her right hand or speak properly. This makes sense when we remember our brains are organised contra-laterally (the left side controls the right side of our body, and vice versa), and the language structures (e.g., Wernicke's area and Broca's area) are located on the left-hand side of the brain. Her therapy involved repeated training of the right-hand side of her brain. Eventually she recovered her ability to speak, and the ability to use her right hand again. Remarkably, she was able to play the piano as well as she had before her stroke.

An example of structural plasticity arises from research showing that London taxi drivers have a larger hippocampus than other people (Azari & Seitz, 2000; Mohr, 2017). Plasticity is believed to activate the hippocampus to become larger due to the specialised learning that occurs from acquiring and consistently using complex spatial information to navigate the streets of London (see Chapter 8).

Neuroplasticity can therefore help explain why some patients are able to recover from serious brain injuries, such as strokes. Neuroplasticity appears to occur in a series of phases. During the first stage immediately after the injury, neurons begin to die, and neural pathways become inhibited. After a few days, neural pathways become excitatory and new synaptic connections are formed. Rehabilitation therapy appears to work best at this next stage, as the conditions are 'ripe' for the brain to learn new ways of doing things.

Although we still have much to learn about neuroplasticity, the various case studies documented here highlight the amazing ability of our brain to change, reorganise itself and learn new ways to behave. Neuroscientists will continue to investigate this process in the hope that new treatments and therapies can be developed to enrich the lives of people with brain injuries.

CHECK YOUR LEARNING 2.6

Describe and explain

1 Using what you know about the structure and function of our brain, **explain** why people who have suffered damage to the language areas of their brain may understand speech but have lost the ability to speak.

Apply, analyse and interpret

2 Based on your knowledge of neuroplasticity, **analyse** how structural and functional plasticity can each explain how stroke victims recover their ability to speak and move.

3 **Apply** your understanding of neuroplasticity to interpret why conditions might be considered suitable for recovery following a traumatic brain injury.

Investigate, evaluate and communicate

4 Based on your understanding of how neuroplasticity works, **evaluate** how neuroscientists have been able to assist blind or deaf people to regain their sense of sight or hearing, respectively.

5 **Investigate** how experiments with animals with brain lesions have helped neuroscientists understand the process of neuroplasticity in humans.

6 Adeline suffered damage to her right prefrontal cortex. **Hypothesise** what Adeline might experience difficulty with after this injury.

7 Research involving people with brain damage is limited, as it is typically from observation. **Discuss** two advantages and two disadvantages of this. In your response recall the ethics of psychological research.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 2.6
- **Weblink**
  Neuroplasticity
- **Weblink**
  Recovering from brain injury

CHAPTER 2

Review

Summary

2.1
- The nervous system comprises the central nervous system, which includes the brain and spinal cord, and the peripheral nervous system, which includes the remainder of the body (limbs, facial nerves, skeletal muscles, organs and glands).
- The brain comprises the hindbrain, the midbrain and the forebrain. The thalamus acts as a relay station for incoming sensory information onto the relevant parts of the cerebral cortex for further processing.
- The peripheral nervous system is divided into the somatic nervous system, which controls voluntary movement of the skeletal (striated) muscles, and the autonomic nervous system, which controls involuntary muscles (smooth muscles), organs and glands.
- The autonomic nervous system is divided into the sympathetic nervous system, responsible for activating the body in times when alertness and arousal are required, and the parasympathetic nervous system, which is involved in maintaining the body's regular, day-to-day levels of arousal, and homeostasis.

2.2
- The frontal lobe in each hemisphere is responsible for higher thinking processes and includes the primary motor cortex, which is responsible for body movement.
- The parietal lobe in each hemisphere contains the primary somatosensory cortex and responds to sensory receptors in the body. Association areas in the parietal lobes integrate sensory input from all senses except smell.
- The temporal lobe in each hemisphere contains the primary auditory cortex and processes sounds.
- The occipital lobe in each hemisphere receives visual information from the eyes.

2.3
- Conscious responses are controlled by the somatic nervous system. This is where you voluntarily act in response to sensory stimuli.
- There are two types of unconscious responses: autonomic, which regulate vital body functions such as blood pressure; and spinal reflexes, which use the spinal cord to bypass the brain for a quicker response.
- The process of receiving a sensation and responding to it is a reflex arc.
- There are two forms of reflex arc: the monosynaptic reflex arc and the polysynaptic reflex arc.

2.4
- Voluntary movement is performed in a series of steps. First, select a response to achieve a desired movement; second, plan how the movement will physically happen; and third, carry out the movement by activating the relevant neurons.
- The basal ganglia is a set of structures involved in the control of movement by gathering and channelling information from different areas of the brain.
- The cerebellum is the area of the brain responsible for coordinating and remembering smooth, well-sequenced movements.
- The primary motor cortex is responsible for movement of the skeletal muscles.

2.5
- Emotion is regulated, produced and interpreted in the limbic system, which comprises the hippocampus, hypothalamus and amygdala.
- The prefrontal cortex is implicated in emotion and connects the parts of the brain that are involved in emotional processing and production.

Key terms

- amygdala
- autonomic nervous system
- basal ganglia
- Broca's area
- central nervous system
- cerebellum
- cerebral cortex
- cerebrum
- corpus callosum
- fight-flight-freeze response
- frontal lobe
- Geschwind's territory
- hippocampus
- homeostasis
- HPA axis
- hypothalamus
- limbic system
- localisation of function of the brain
- monosynaptic reflex arc
- motor neurons
- neurons
- occipital lobe
- parasympathetic nervous system
- parietal lobe
- peripheral nervous system
- polysynaptic reflex arc
- prefrontal cortex (PFC)
- primary auditory cortex
- primary motor cortex
- primary somatosensory cortex
- primary visual cortex
- reflex
- sensory neurons
- somatic nervous system
- spinal cord
- sympathetic nervous system
- temporal lobe
- thalamus
- Wernicke's area

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: ★ = low, ★★ = medium, ★★★ = high.

Multiple choice

1 Identify the two parts that make up the central nervous system.

A the brain and the spinal column
B the autonomic and the somatic nervous systems
C the brain and the spinal cord
D the cerebral cortex and the spinal cord

2 Identify the two parts that make up the peripheral nervous system.

A the brain and the spinal cord
B the central and somatic nervous systems
C the sympathetic and parasympathetic nervous systems
D the somatic and autonomic nervous systems

3 Moving your leg is an action that is made by which system?

A the somatic nervous system
B the autonomic nervous system
C the sympathetic nervous system
D the parasympathetic nervous system

4 What do motor neurons enable us to do?

A Feel the silky coat of a puppy.
B Smell the scent of a flower.
C Play the piano.
D See a ball when it is thrown.

5 Sensory neurons in your toes are part of which nervous system?

A central
B peripheral
C autonomic
D sensory

6 Which of the following is a true statement about the parasympathetic nervous system?

A In normal daily life it has nothing to do; it is used to return the body functions to their normal levels after sympathetic arousal.
B In normal daily life it works all the time to ensure that the body's metabolic systems are in balance.

C It operates at a level of conscious awareness.

D It is part of the somatic nervous system that operates on the body.

Questions 7–8 refer to the following scenario:

Henry was on a hike when he saw a tiger snake. He quickly picked up a stick and tried to hit it. His friend Tom, who also saw the snake, quickly ran away to a safer place on the track.

7 Which division of the nervous system was most likely in control of their reactions to the snake?

A central nervous

B autonomic

C somatic

D limbic

8 What were Henry and Tom demonstrating?

A reticular activating system

B fight-flight-freeze response

C reflex response

D sympathetic arousal response

9 The left cerebral hemisphere generally controls the right side of the body and vice versa. This is known as _____ organisation.

A unilateral

B contra-lateral

C ipsilateral

D bilateral

10 Damage to the _____ can result in deficits in the ability to plan and problem solve.

A temporal lobe

B occipital lobe

C thalamus

D association area

Short answer

Describe and explain

★ **11** In the peripheral nervous system, the _____ nervous system involves voluntary activity whereas the _____ nervous system involves involuntary activity.

★ **12** A patient has a head injury that resulted in an inability to move his left hand. **Identify** which part of his brain is most likely to have been damaged.

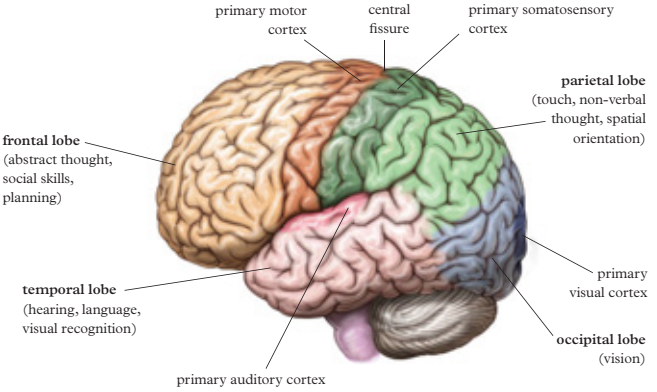


FIGURE 1 The lobes of the brain

★ **13** The lobes of the cerebral cortex play a role in processing and responding to sensory information. **Identify** and **describe** the role of the following primary cortices in processing information from our external environment:

a primary somatosensory cortex

b primary auditory cortex

c primary visual cortex.

★ **14** **Describe** each of the steps involved in producing voluntary movement.

★ **15** **Describe** the role of the amygdala in emotional expression.

★★ **16** Complete the following table to **summarise** the structure and function of the given parts of the brain:

	Structure	Function
Cerebral cortex		
Thalamus		
Primary cortices		
Association areas		

★★ **17** **Explain** the term spinal reflex. Use a diagram to illustrate a polysynaptic reflex arc.

★★ **18** **Describe** why responses controlled by the autonomic nervous system would be considered unconscious responses. Give two examples of autonomic responses.

★★ **19** **Explain** where the basal ganglia receives information from and **describe** its role in voluntary movement.

★★ **20** Briefly **explain** the structure and function of the primary motor cortex, including what is known as contra-lateral organisation.

★★★ **21** **Summarise** the role of Geschwind's territory in how we produce and interpret language.

Apply, analyse and interpret

★ **22** **Differentiate** between a monosynaptic reflex arc and a polysynaptic reflex arc.

★ **23** Noah tries to pick up a hot saucepan, but burns his hand and quickly retracts it. **Determine** the kind of response that has occurred in this instance.

★ **24** **Identify** the location and the different functions of the amygdala.

★★ **25** **Consider** why conscious responses to sensory stimuli are also known as voluntary responses.

★★ **26** **Compare** the differences between the central nervous system and the peripheral nervous system, and identify their major components.

★★ **27** **Differentiate** between the function of Broca's area and Wernicke's area in language, and **describe** what happens when either area is damaged.

Investigate, evaluate and communicate

★ **28** **Assess** why we may not always be aware of bodily functions such as breathing. Be sure to describe the part of the nervous system involved in this day-to-day bodily movement.

★★ **29** In which area of the cerebral cortex are neurons less specific in their functioning? **Determine** why this might be so.

★★ **30** **Discuss** how the sympathetic and parasympathetic nervous systems are involved in the fight-flight-freeze response, using an everyday example of when the two systems may be activated.

★★★ **31** A researcher has hired you to help her investigate whether neuroplasticity can assist in helping those with damage to their basal ganglia.

- **a** **Determine** what the symptoms of damage to the basal ganglia might be.
- **b** **Investigate** treatment options that are currently available for basal ganglia damage.
- **c** **Consider** the ethical needs and write an informed consent form for the study.
- **d** **Hypothesise** the research.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 2 Review
- **» Revision notes**
  Revision notes for Chapter 2
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 2

CHAPTER 3

Neurons & neurotransmitters

The neurons and neurotransmitters in our bodies are crucial parts of our internal and external experience. The messages we send from our brain to our body, and from our body to our brain, are dictated by the structure and proper functioning of these minuscule components. The way we crave a bar of chocolate while watching our favourite movie, how we feel hanging out with friends over the weekend, the surge of adrenalin we get when competing in an athletic event or even the pain we feel when we trip over the finish line and sprain our ankle – these are all governed by the coordinated firing of millions of minuscule neurons in our nervous system.

The way we think, feel and behave – our emotions, our responses to the world we live in, and our physical and psychological experiences – can all be broken down into a highly coordinated chemical message system controlled by neurotransmitters and neurons. In this chapter, we will investigate how these messages are relayed, examine the role of inhibitory and excitatory neurotransmitters, discuss and compare the roles of different types of neurotransmitters and their effects on our nervous system, and explore the impact that interference in neurotransmitter functioning can have on our minds and bodies.

OBJECTIVES

- → Communicate neurotransmission using a diagram.
- → Distinguish between excitatory and inhibitory neurotransmitters, with reference to glutamate (Glu) and gamma-amino butyric acid (GABA).
- → Compare the physical and psychological function of acetylcholine, epinephrine, norepinephrine, dopamine and serotonin.
- → Discuss the impact of interference in neurotransmitter function, with reference to Parkinson's disease and Alzheimer's disease (symptoms and treatments).

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

FIGURE 1 Neurotransmitters are fired between neurons to increase or decrease the body's reaction to internal or external stimuli.

SUGGESTED RESEARCH

SUGGESTED RESEARCH	**3.3** Treatments for Parkinson's disease (e.g. clinical trials testing dopamine-precursor medications for Parkinson's disease in *The Lancet* 2014)
SUGGESTED RESEARCH	**3.3** Treatments for Alzheimer's disease (e.g. the significance of beta-amyloid deposits in Alzheimer's disease in Massachusetts General Hospital 2016)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

3.1 The role of neurons in communication

KEY IDEAS

In this section, you will learn about:

- neuron structure
- neurotransmission
- neurotransmitters.

neurons
nerve cells, responsible for communication within the body

dendrites
a component of a nerve cell that receives information from other nerve cells and transports this information to the cell body

soma
largest part of a neuron: it controls the metabolism and maintenance of the neuron

axon
the part of the neuron along which the electrochemical nerve impulse is transmitted

axon terminals
located at the end of the axon, it transmits messages to the next neuron by secreting neurotransmitters

myelin
a white, fatty, waxy substance that coats some axons and insulates them, protecting them from electrical interference from other neurons; this increases the efficiency of transmission of nerve impulses

To understand how information is processed in the brain, it is important to know that it is a physiological process. Cells, called **neurons**, receive information from other neurons, process this information and then communicate it to other neurons. These cells share similarities with other cells in the body in that they are surrounded by a cell membrane, have a nucleus that contains genes and are made up of cytoplasm, mitochondria and other organelles. However, they differ in structure and the manner in which they communicate with each other.

Neuron structure

Although there are many types of neurons of all different shapes and sizes, they are generally comprised of **dendrites**, the **soma**, the **axon** and the **axon terminals**. Most axons are coated with **myelin** (a myelin sheath). Table 1 describes the different elements that make up the structure of a neuron.

TABLE 1 The structure of a neuron

Structure	Description
Dendrites	A neuron can have hundreds or thousands of dendrites that look like branches coming off the soma (the word *dendron* is Greek for 'tree'). The dendrites receive information from other neurons, which they carry from the synapse to the soma.
Soma	The largest part of the neuron is the soma or cell body. It controls the metabolism and maintenance of the neuron. In most neurons, the soma receives messages from other neurons.
Axon	The axon is a nerve fibre that extends from the soma and carries information towards the cells that communicate with that neuron. Some axons have two or more offshoots, and some can be up to a metre long.
Myelin	The axons of most neurons are covered in a myelin sheath, which is a coating of cells that facilitates the transmission of information to other neurons. Axons with myelin are white rather than grey. Myelin protects the axon from potential chemical and physical interference to the electrical impulses that travel along it. The insulation provided by the myelin sheath also enables information to travel much faster – up to 400 kph.
Axon terminals	Axon terminals are found at the end of the axon branch and function to transmit messages to the next neuron. Axon terminals have terminal buttons. These terminal buttons have sacs that secrete a chemical called a neurotransmitter whenever electrical impulses are sent down the axon (see Figure 1). Although they never actually touch, the axon terminals of one neuron link with the dendrites of the next neuron.

CHALLENGE 3.1

Synapses

Not all synapses are the same. In the brain, the synapses are often located on other parts of the cell, besides the dendrites. Additionally, in other parts of the nervous system, neurons might send their signals to the glands or muscles rather than other neurons. Consider potential evolutionary reasons for this.

The role of neurotransmitters in transmitting information

neurotransmitters chemicals that help communication across nerve synapses

synapse the connection between two neurons

synaptic transmission the process of neurons sending information to each other via neurotransmitters

Neurotransmitters are chemicals that transmit information from one neuron to the next. Neurons do not actually come into contact with each other; rather there is always a tiny space, or **synapse**, between them. The exact location of synapses along the neuron can vary, but it is easiest to think of communication between neurons beginning with information being transmitted from the synapse to the dendrites. This information, in the form of an electrical impulse, is then passed through the soma and along the axon. A neurotransmitter is then secreted from the terminal buttons on the axon terminal to a synapse shared with the dendrites of another neuron. The process of neurons transmitting information between each other is known as **synaptic transmission**.

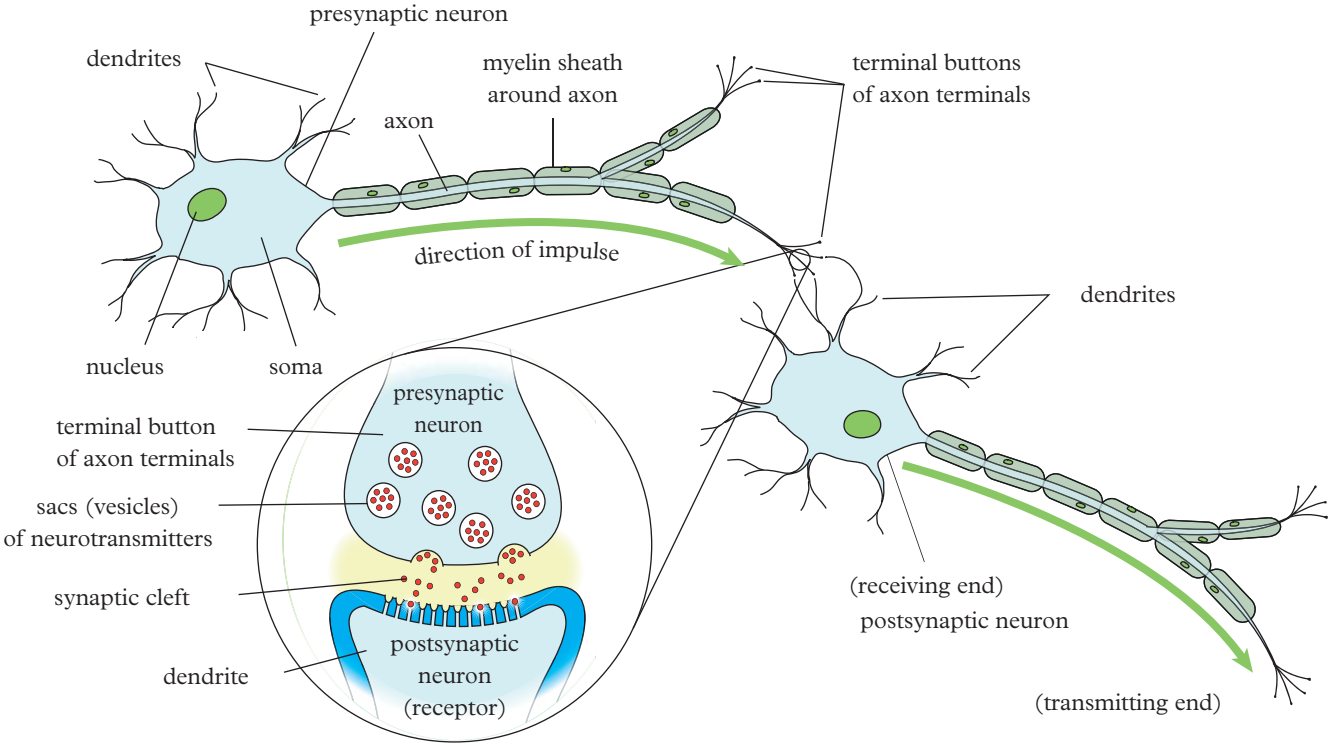


FIGURE 1 Information received by dendrites travels along the axon to the axon terminals.

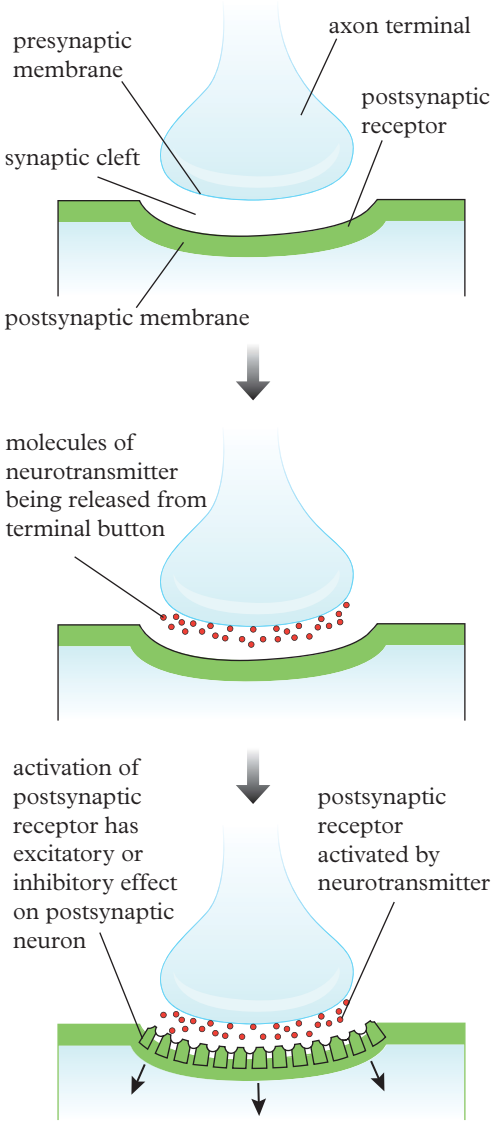


FIGURE 2 The lock and key process, where the neuron (the key), fits into the receiving postsynaptic neuron (the lock).

The lock and key process

Neurotransmitters are contained in small sacs known as synaptic vesicles within the terminal button of each neuron's terminal axon. When a **presynaptic neuron** fires, the synaptic vesicles move towards the presynaptic membrane. Some synaptic vesicles stick to the membrane and break open to release the neurotransmitter into the synaptic cleft.

Once in the synaptic cleft, some of the neurotransmitters will bind with protein molecules known as 'receptors' that are located in the dendrites of the **postsynaptic neuron**. The receptors act like locks that can only be opened with one particular 'key' or neurotransmitter. When a receptor binds with the neurotransmitter that 'fits' (that is, has the appropriate molecular structure and electrical charge), the postsynaptic neuron is either activated or inhibited.

This is referred to as the 'lock and key process' (Figure 2).

Transmitting neural information between neurons

There are two main types of synapses involved in communication between neurons: **excitatory** (which cause the neuron to fire) and **inhibitory** (those that inhibit neurons from firing).

When an axon of a neuron fires, the terminal buttons of the excitatory synapses release a neurotransmitter that 'excites' the postsynaptic neuron or causes it to reach its **action potential**. This 'excitement' increases the amount of firing of the axon of the postsynaptic neuron. In contrast, when inhibitory synapses are activated the 'firing' rate of the postsynaptic neuron is reduced, and sometimes it does not fire at all.

How much a neuron 'fires' will depend on the amount of activity of all of the synapses on the dendrites of the neuron, and also on how active the soma of the neuron is. For example, if the excitatory synapses are mostly active, the neuron will fire much more than if the inhibitory synapses are mostly active. The excitation or inhibition effects produced by a synapse only last for a fraction of a second.

presynaptic neuron
a neuron that transmits information to another neuron

postsynaptic neuron
a neuron that receives information from another neuron

excitatory synapses
cause the target cell to become excited and more likely to fire and cause an action potential

Glutamate and GABA

Glutamate can excite almost every neuron in the brain and the rest of the nervous system. It is involved in many psychological processes but has an important role in learning and memory.

GABA (gamma-amino butyric acid) has an inhibitory effect on the brain. Approximately one-third of all neurons in the brain use GABA and it is important in regulating anxiety.

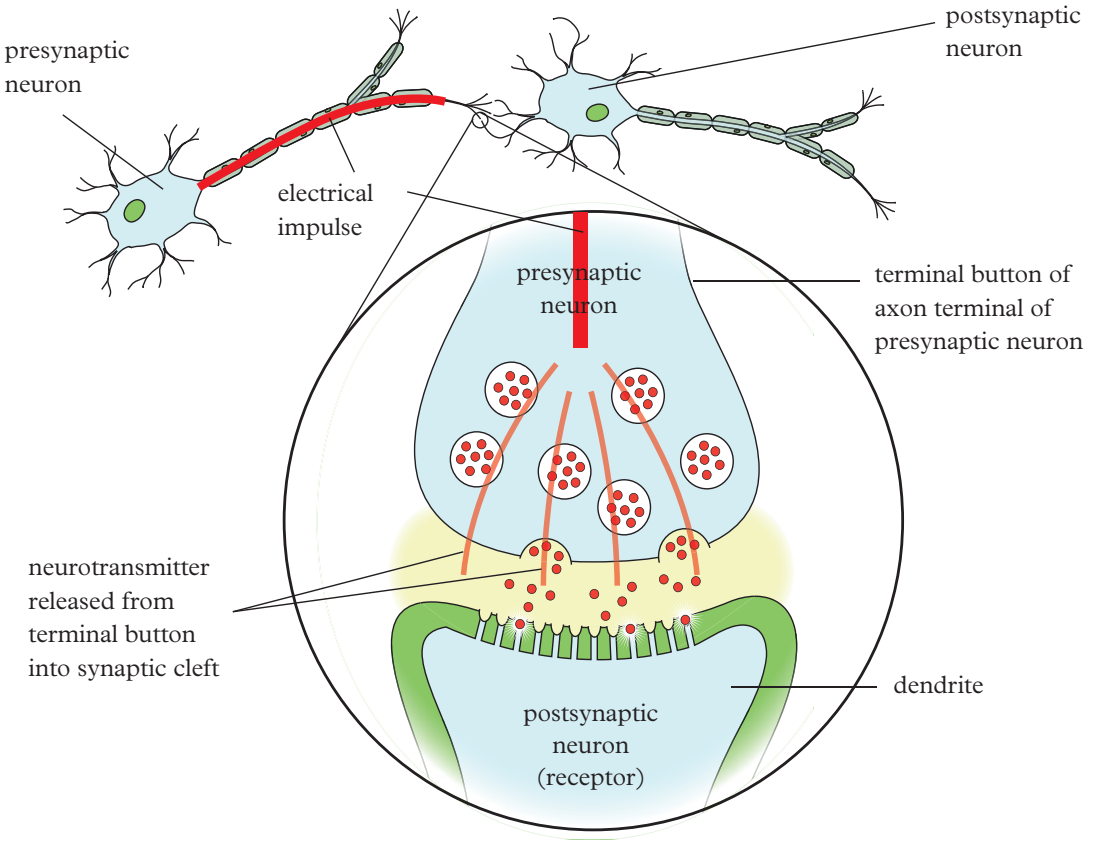


FIGURE 3 The presynaptic neuron releases neurotransmitters that fit into receptor sites on the postsynaptic neuron.

inhibitory synapses
cause the target cell to become inhibited and less likely to fire and cause an action potential

action potential
a momentary change in the electrical potential of a cell, which allows a nerve cell to transmit a signal or impulse towards another nerve cell

glutamate
an excitatory neurotransmitter in the brain involved in learning

GABA (gamma-amino butyric acid)
an inhibitory neurotransmitter imbalance of GABA is implicated in severe anxiety disorders; also involved in arousal and sleep

CHECK YOUR LEARNING 3.1

Describe and explain

1 **Describe** the structure of a neuron.
2 **Identify** the roles of dendrites, the soma and the axon.
3 **Explain** the process of synaptic transmission.
4 **Define** an excitatory synapse.

Apply, analyse and interpret

5 **Differentiate** between a presynaptic neuron and a postsynaptic neuron.
6 **Distinguish** between an excitatory synapse and an inhibitory synapse.
7 **Compare** GABA and glutamate.

Investigate, evaluate and communicate

8 Use a diagram to **communicate** neurotransmission.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 3.1
- **» Challenge**
  Worksheet
  3.1: Synapses
- **» Increase your knowledge**
  The neuron
- **» Weblink**
  The lock and key process

3.2 Different types of neurotransmitters and their effects

KEY IDEA

In this section, you will learn about:

+ the different types of neurotransmitters.

A single neuron can release more than one neurotransmitter. So far, research has identified more than 100 neurotransmitters in existence. Although hormones and neurotransmitters are different kinds of chemical messengers, some molecules function as both hormones and neurotransmitters. For instance, norepinephrine is excreted as a hormone by the adrenal glands, but it can also be excreted as a neurotransmitter by nerve endings.

Acetylcholine

acetylcholine
a neurotransmitter in the brain, spinal cord and peripheral nervous system involved in muscle contractions, learning and memory and REM sleep

Acetylcholine is a neurotransmitter found in the brain, the spinal cord and the peripheral nervous system. Acetylcholine stimulates muscular contractions, is involved in learning and memory and controls REM sleep. This neurotransmitter is responsible for the muscular contractions that help control breathing (respiratory system), digestion and the cardiovascular system. It also helps the quality and intensity of communication between neurons in the brain associated with learning (e.g., the hippocampus, the basal ganglia and the hypothalamus).

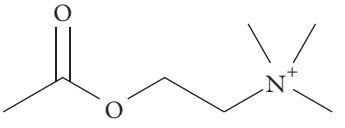


FIGURE 1 Chemical structure of acetylcholine

Acetylcholine is also involved in the process of neuroplasticity – that is, the way the neural structure of the brain changes itself in response to neural, environmental and behavioural experiences. Evidence of its role in memory and learning comes via studies of rats (Burton, Westen & Kowalski, 2019). For example, when rats are involved in certain learning activities, acetylcholine activity in their brains appears to increase.

Acetylcholine has also been linked to memory through studies of patients with Alzheimer's disease who have deficits in their memory functioning (Kandimalla & Reddy, 2017; Reddy, 2017). These patients have been shown to have depleted amounts of acetylcholine in their brains. Scientists continue to explore how best to treat Alzheimer's disease by transplanting neural tissue rich in acetylcholine into the brains of patients with Alzheimer's disease.

Epinephrine

epinephrine
a neurotransmitter and hormone involved in stress responses

Epinephrine, also known as adrenalin, is a hormone and neurotransmitter secreted by the adrenal glands. It is released in response to situations provoking anxiety, fear and emotional arousal and is regulated by the autonomic nervous system. It plays a key role in the fight-flight-freeze

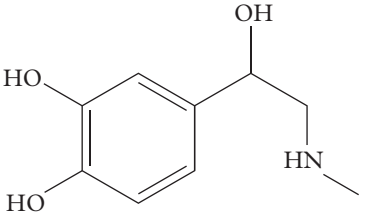


FIGURE 2 Chemical structure of epinephrine

response. Epinephrine causes increased heart rate, heightened blood pressure and increased respiratory rate. Epinephrine is released in the brain and also in the organs of the body, therefore, it functions as both a neurotransmitter and hormone (Burton, Westen & Kowalski, 2018; Carlson, 2008).

Norepinephrine

Norepinephrine, like epinephrine, affects the way the brain attends to and responds to triggers in the environments. Like epinephrine, it is both a hormone and a neurotransmitter. Norepinephrine mobilises the brain and body to act. It is responsible for increasing heart rate, triggering the release of glucose into our bloodstream, and increasing blood flow into the muscles. As a neurotransmitter, its main function is to increase alertness and arousal as well as speed up our reaction times. It is also involved in regulating our moods and our ability to concentrate. Low levels of norepinephrine are related to attention deficit hyperactivity disorder, low blood pressure (hypertension) and depression (Burton, Westen & Kowalski, 2018; Griffith, 2013).

norepinephrine
a neurotransmitter and hormone involved in stress responses, alertness, arousal, emotional regulation and attention

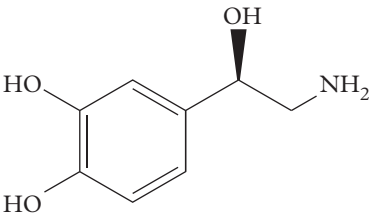


FIGURE 3 Chemical structure of norepinephrine

Dopamine

Dopamine is involved in thoughts, feelings, motivation and behaviour. Dopamine neural pathways are involved in emotional arousal, the experience of pleasure and learning to associate particular behaviours with rewards (Brookshire, 2017; Burton *et al.*, 2010; Carlson, 2008).

dopamine
a neurotransmitter involved in thoughts, feelings, motivation and behaviours

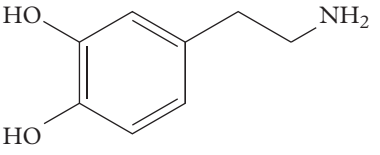


FIGURE 4 Chemical structure of dopamine

Dopamine helps control the brain's reward and pleasure centres. Dopamine release can help explain why we engage in pleasurable activities such as listening to our favourite music or eating our favourite foods. It plays a diverse role in our everyday behaviour, including how we move, what we choose to eat, and how we learn. Dopamine also plays a pivotal role in addictive behaviours (e.g., illicit drug use and addiction).

Dopamine is involved in reinforcing our behaviour. It motivates us to engage in activities over and over again in order to obtain 'pleasure'. It is why we often overindulge in food we love such as chocolate. It affects our moods as we tend to feel in a 'good mood' when we engage in pleasurable activities. Dopamine is also involved in attention as we tend to focus on things in our environment that bring us pleasure. Low levels of dopamine are related to a joyless state known as anhedonia, where we lose any sense of pleasure in activities such as eating and drinking.

Dopamine deficiency is also associated with Parkinson's disease, a disorder characterised by uncontrollable tremors, difficulty both initiating movement (e.g., standing up) and stopping movements already in progress (e.g., walking forwards). Dopamine deficiency is also linked to depression, reduced facial displays of emotion, and a general slowing of thoughts and behaviours. Finally, dopamine is also associated with addiction and sensation-seeking (or risk-taking) behaviours.

Serotonin

serotonin
a neurotransmitter in the brain involved in the regulation of mood, sleep, eating, arousal and pain

Serotonin helps regulate mood and social behaviour, appetite and digestion, sleep, memory and sexual functioning. It is often referred to as a 'feel-good' chemical as it affects our feelings of wellbeing and happiness (Burton *et al.*, 2019; Carlson, 2008; McIntosh, 2018).

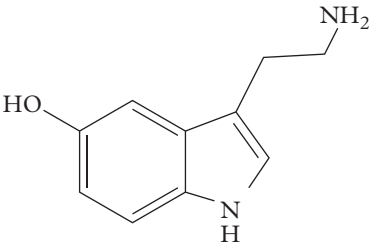


FIGURE 5 Chemical structure of serotonin

Serotonin is also thought to be involved in the constriction of smooth muscles (i.e. slow, automatically constricting muscles of blood vessels and organs). Furthermore, serotonin helps regulate our body's sleep–wake cycle and is responsible for our 'internal' body clock.

Decreased serotonin levels in the brain have been linked to depression. This is why many of the medications that are used to treat depression increase serotonin activity. For example, popular antidepressants such as fluoxetine (Prozac) work by boosting serotonin levels. Diet, exercise, exposure to sunlight, and increasing our positive mood states can help prevent depression and increase wellbeing by boosting serotonin levels. Serotonin usually plays an inhibitory role by affecting neural circuits involved in aggression, antisocial behaviour and other forms of social behaviour (Burton *et al.*, 2018).

TABLE 1 The effects of neurotransmitters and hormones

Neurotransmitter	Effects
Acetylcholine	• Memory and memory loss, learning • Muscle movement • Activation cerebral cortex • Control of REM sleep • Control of hippocampus
Dopamine	• Emotional arousal, pleasure and reward, voluntary movement, attention • Facilitation of movement, attention, learning, reinforcement of learning • Deficiency in dopamine is related to epilepsy, and an increase in dopamine is known to assist in the treatment of Parkinson's disease
Serotonin	• Mood regulation • Control of eating, sleep, arousal, pain
Gamma-amino butyric acid (GABA)	• The main inhibitory neurotransmitter that calms nervous activity • Responds to alcohol, benzodiazepines
Glutamate	• Excitation of neurons throughout the nervous system • Necessary for the changes in synapses that occur with memory formation
Norepinephrine (noradrenalin)	• Hormone released by the adrenal medulla that affects emotional arousal, anxiety, fear
Epinephrine (adrenalin)	• Hormone released by the adrenal medulla that affects emotional arousal, anxiety, fear
Cortisol	• Repairs the body
Endorphins	• Pain relief and elevation of mood (often after intense physical exercise or activity)

FIGURE 6 Exercise and a healthy diet can help prevent depression and increase wellbeing by boosting serotonin levels.

CHALLENGE 3.2

Monosodium glutamate (MSG)

Monosodium glutamate (MSG) is a savoury flavour enhancer that was first extracted in 1908 by Japanese chemist Kikunae Ikeda. After eating it, some people display neurological symptoms, such as tingling or a feeling of numbness in the face, neck and chest; this is because their glutamate receptors have been activated. Based on your knowledge of neurons, neurotransmitters and the human nervous system, discuss why this occurs.

CHECK YOUR LEARNING 3.2

Describe and explain

1 **Describe** the following neurons and their function: acetycholine, dopamine, serotonin, norepinephrine.

2 **Explain** how some neurotransmitters are also hormones.

Apply, analyse and interpret

3 **Differentiate** between dopamine and serotonin.

4 **Consider** the effects of having too much norepinephrine.

Investigate, evaluate and communicate

5 **Investigate** something that can cause an increase in the production of serotonin.

6 Select two neurotransmitters. **Predict** what might happen if someone had increased levels of these, and **discuss** how this could influence daily life.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 3.2
- **Challenge**
  Worksheet: 3.2 Monosodium glutamate (MSG)
- **Weblink**
  Types of neurotransmitters

3.3 Changes to neurotransmitter function

KEY IDEAS

In this section, you will learn about:

- Parkinson's disease
- Alzheimer's disease.

Neurotransmitters that do not function normally can cause problems for the nervous system. For instance, acetylcholine affects many things including memory. Interference in the nervous system caused by neurotransmitter malfunction is thought to stem from both environmental and genetic factors. Anything from ongoing high levels of stress to simple things such as diet (like too much sugar or caffeine) can have an impact. However, some people are just born without the ability to synthesise certain neurotransmitters.

Impaired functioning of neurotransmitters can result from neurons not manufacturing enough of a particular neurotransmitter, the release of too much of a particular neurotransmitter, the deactivation of too much of a neurotransmitter by enzymes, or neurotransmitters being reabsorbed too quickly. Parkinson's disease and Alzheimer's disease have been associated with impaired functioning of neurotransmitters. Mental health conditions such as depression, schizophrenia and drug addiction can also be related to deficits in neurotransmitters (Burton *et al*., 2019).

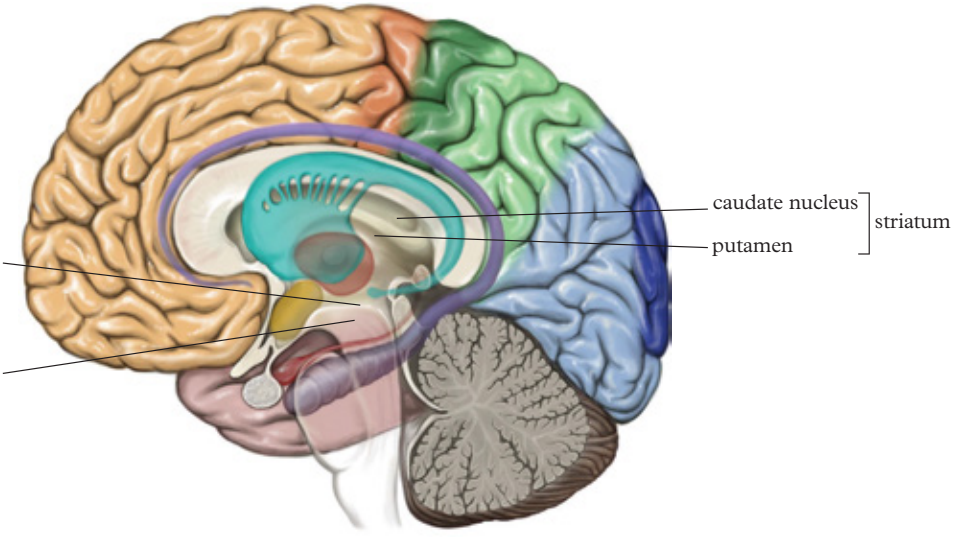


FIGURE 1 The *substantia nigra* is located in the midbrain and is affected by Parkinson's disease.

Parkinson's disease

Parkinson's disease
a progressive neurological condition, known to affect the control of movement

Parkinson's disease is a progressive neurological condition that affects more than 80 000 people in Australia. Symptoms are caused by the degeneration of dopamine-releasing neurons in the *substantia nigra*. The *substantia nigra* is part of the basal ganglia, located in the midbrain, and is responsible for reward, addiction and, most importantly to Parkinson's

disease, the coordination of movement. Dopamine is a neurotransmitter that helps control the brain's reward and pleasure centres, including the basal ganglia. Dopamine is needed to control messages as they pass between neurons in the *substantia nigra* and the striatum (responsible for balance and control of movement). Without enough dopamine, the neurons of the striatum fire uncontrollably, which essentially prevents a Parkinson's disease sufferer from adequately controlling their movements.

People with Parkinson's disease develop symptoms such as slowness of movement, rigidity and involuntary movement of the hands, arms, feet, legs, jaws or head. They might also experience difficulty starting or stopping body movements such as walking. They can also experience non-motor symptoms including reduced facial expressions, pain, depression, dementia and difficulty sleeping.

Symptoms of Parkinson's disease only develop when the drop in dopamine levels is significant enough to affect functioning. This usually equals an approximate 80 per cent drop, accompanied by a 50 per cent drop in the *substantia nigra* neurons.

A drop in dopamine also influences acetylcholine, a neurotransmitter that also affects movement. The striatum requires a balance of dopamine and acetylcholine for effective motor function. The imbalance of these neurotransmitters therefore contributes to the progression of Parkinson's disease and its symptoms.

CHALLENGE 3.3

Caffeine and Parkinson's disease

Consumption of caffeine has been found to decrease the risk of developing Parkinson's disease. A trial in Japan found that sufferers of the disease who were administered a pill equivalent to three cups of coffee a day over six weeks showed a decrease in their tremors and an increase in mobility. Consider why caffeine may show a decrease in symptoms.

Causes of Parkinson's disease

Scientists are still searching for the cause of Parkinson's disease; however it appears to be activated by a combination of factors including those outlined in Table 1.

Treatment of Parkinson's disease includes drugs that are precursors of dopamine. These precursors are then converted into dopamine so there is an increase in the level of dopamine that reaches the brain. Other treatment involves drugs that block the action of chemicals that affect dopamine.

TABLE 1 Suspected causes of Parkinson's disease

Cause	Description
Genetics	• Protein mutations have been linked to the disease where this blocks the disposal of abnormal cells.
Environmental factors	• The pesticide Rotenone (which is used in Australia to control pests on fruit and vegetables) has been found to cause Parkinson's disease in rats. • MPTP, a common contaminant found in street drugs, causes Parkinson's disease in users.
Diet	• Vitamin B (folic acid) deficiency has been linked with the development of Parkinson's disease.

CASE STUDY 3.3A

A new treatment for Parkinson's disease

Todd B. Bates, *Rutgers Today*, 4 April 2016

Scientists at Rutgers and Stanford universities have created a new technology that could someday help treat Parkinson's disease and other devastating brain-related conditions that affect millions of people.

The technology – a major innovation – involves converting adult tissue-derived stem cells into human neurons on 3D 'scaffolds', or tiny islands, of fibres, said Prabhas V. Moghe, a distinguished professor in the departments of Biomedical Engineering and Chemical and Biochemical Engineering at Rutgers University ...

'If you can transplant cells in a way that mimics how these cells are already configured in the brain, then you're one step closer to getting the brain to communicate with the cells that you're now transplanting,' said Moghe ... 'In this work, we've done that by providing cues for neurons to rapidly network in 3D.'

In their multidisciplinary study, published online today in *Nature Communications*, a dozen scientists from several Rutgers teams and Stanford discuss the 3D scaffolds and their potentially widespread benefits.

Neurons, or nerve cells, are critical for human health and functioning. Human brains have about 100 billion neurons, which serve as messengers that transmit signals from the body to the brain and vice versa.

Moghe said a 3D scaffold, developed by the scientists, consists of tiny polymer fibres. Hundreds of neurons attach to the fibres and branch out, sending their signals. Scaffolds are about 100 micrometres wide – roughly the width of a human hair.

'We take a whole bunch of these islands and then we inject them into the brain of the mouse,' he said. 'These neurons that are transplanted into the brain actually survived quite miraculously well. In fact, they survived so much better than the gold standard in the field.'

Indeed, the scaffold technology results in a 100-fold increase in cell survival over other methods, Moghe said.

And that may eventually help people suffering from Parkinson's disease, multiple sclerosis, amyotrophic lateral sclerosis (ALS), or Lou Gehrig's disease, Alzheimer's disease, spinal cord and traumatic brain injuries, and concussions, he said.

These diseases and conditions often arise from the loss of brain cells. Parkinson's disease, for example, is caused by the loss of brain cells that produce dopamine, a key neurotransmitter ...

The next step would be to further improve the scaffold biomaterials, allowing scientists to increase the number of implanted neurons in the brain. 'The more neurons we can transplant, the more therapeutic benefits you can bring to the disease,' Moghe said. 'We want to try to stuff as many neurons as we can in as little space as we can.'

The idea is to 'create a very dense circuitry of neurons that is not only highly functioning but also better controlled,' he said, adding that testing of mice with Parkinson's disease is underway to see if they improve or recover from the illness.

Eventually, with continued progress, the researchers could perform studies in people. Moghe estimated that it would take 10 to 20 years to test the technology in humans.

Alzheimer's disease

Alzheimer's disease is a neurodegenerative disease that occurs mostly in older age and involves gradual, severe memory loss, confusion, impaired attention, disordered thinking and depression (Kalat, 2008). It involves both anterograde and retrograde amnesia because the disease affects both the hippocampus and the prefrontal cortex. The earliest symptom is usually impaired declarative memory, where the patient has difficulty remembering events from the day before, forgets names and has difficulty finding the right word when speaking. Next, the patient might repeat stories or questions, and eventually will fail to recognise familiar people and family members.

Alzheimer's disease
a disease that progressively destroys neurons in the brain, causing memory loss

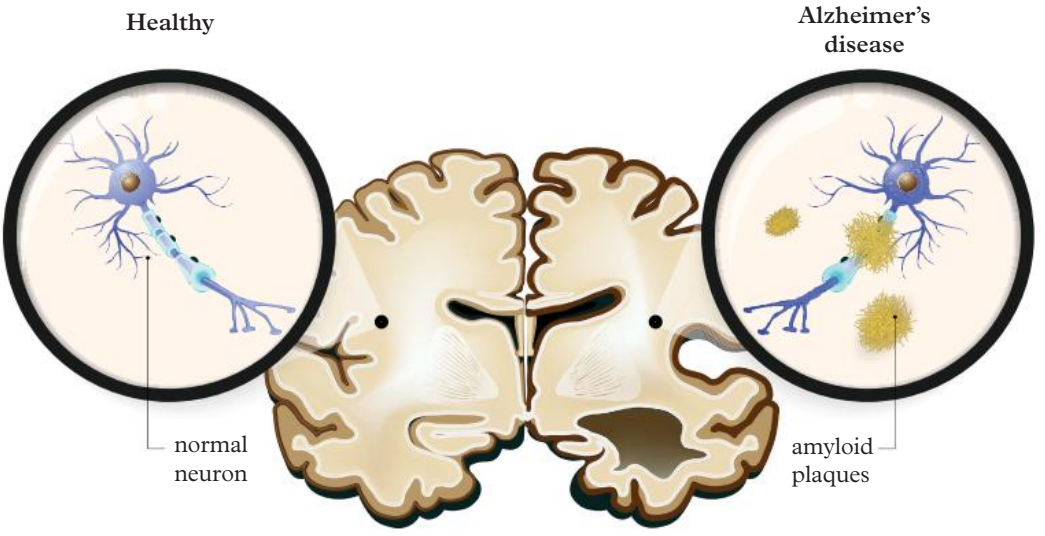


FIGURE 2 This image compares a normal functioning neuron with a neuron with amyloid plaques typically found in Alzheimer's patients.

Changes in brain tissue in Alzheimer's disease include tangled neurons and protein deposits disrupting the functioning of cells in the cortex. Alzheimer's patients also have abnormally low levels of several neurotransmitters, most importantly acetylcholine, which plays a central role in memory functioning. Neuroimaging researchers have found connections between the extent of temporal lobe damage, particularly to the hippocampus and axons connecting it to the cortex, and the degree of cognitive impairment in Alzheimer's patients. This helps explain why Alzheimer's disease has such a debilitating effect on explicit memory, including difficulty in remembering what happened moments earlier.

Causes of Alzheimer's disease can be both genetic and neurological – and both can contribute to memory loss and cognitive decline.

Causes and treatment of Alzheimer's disease

Amyloid plaques (proteins that form among axon terminals and interfere with communication between neurons) typify Alzheimer's disease. In addition, patients' brains have neurofibrillary tangles (an abnormal build-up of protein inside the neurons) and these are associated with the death of brain cells. Alzheimer's patients also have lower levels of important memory neurotransmitters, especially acetylcholine.

One of the first brain structures to be affected by Alzheimer's disease is the hippocampus. When the cells are lost here, it causes the brain to atrophy (deteriorate) and the damage to the

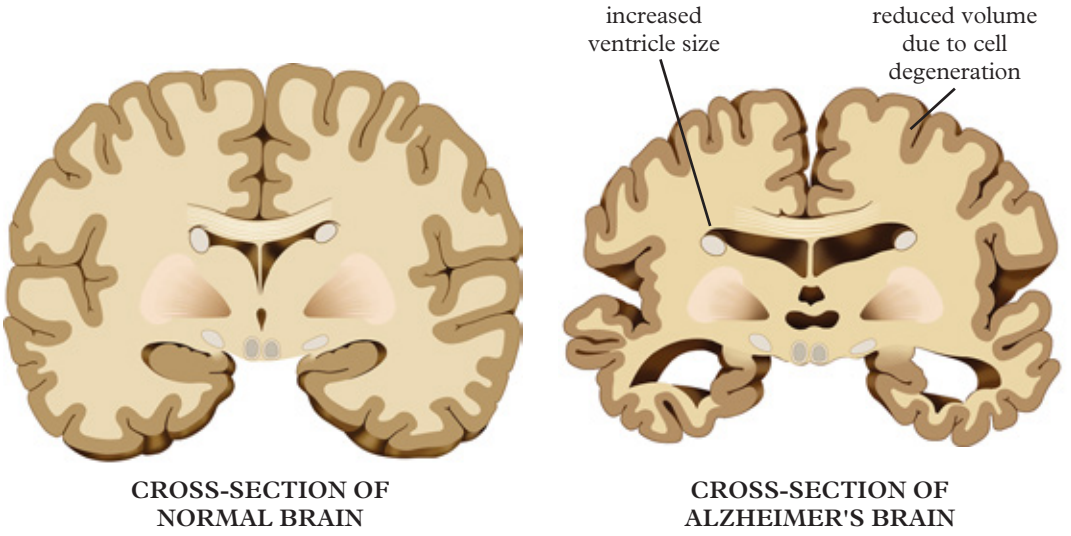


FIGURE 3 The brain on the right indicates the cell loss by the decreased size of the cortex compared to the normal brain on the left.

temporal lobes means that the hippocampus becomes isolated. This is probably why there is early memory loss (Hyman *et al.*, 1984). Plaques and tangles in the frontal lobes cause more memory problems and difficulty in attention and motor coordination. In the occipital lobes, the disrupted link between the primary visual cortex and the visual association areas in the parietal and temporal lobes can cause visual problems for the patient. The nature of the brain damage caused by Alzheimer's disease means that declarative memory in particular is impaired.

Neurotransmitters send signals across synapses and have an important role in maintaining synaptic and cognitive functions. When the appropriate signal is given by a neuron, neurotransmitters are released into the synapse and establish connections through the synaptic cleft when they bind to their appropriate receptors. Impairment to neurotransmitter functioning interrupts these messages and causes symptoms such as those experienced by people with Alzheimer's disease.

A decrease in the concentration of acetylcholine in the central nervous system is the hallmark of both progressive dementia, and Alzheimer's disease. Acetylcholine is found in cells called cholinergic neurons, which are involved in cognitive processes and motor functions. Cholinergic neurons release acetylcholine, which latches onto neighbouring neuron receptors allowing signals to be passed from cell to cell. When acetylcholine functioning is impaired, or levels are depleted, the neural pathways used in memory and learning start to deteriorate. These pathways are predominantly found in the hippocampus and the frontal and temporal lobes.

Medications are designed to replace depleted levels of acetylcholine, or prevent acetylcholine from being broken down, and in doing so they help rebuild the communication between the neural pathways involved in memory. One such drug is cholinesterase inhibitors, which prevent the breakdown of acetylcholine. While there is no cure for Alzheimer's disease, treating the symptoms can ease the suffering for the individual, as well as their family.

CASE STUDY 3.3B

Queensland scientists discover breakthrough treatment for Alzheimer's disease

Alzheimer's disease is a debilitating condition. It progressively damages the brain's intellectual functions, such as memory, to the point where people have great difficulty recognising close family and friends. The exact trigger for the disease is not yet known, and there is no cure. However, there is hope – and it's coming from close to home.

Queensland scientists recently announced they had discovered a new treatment that could help restore the memory of people with the disease. People suffering from Alzheimer's disease have been found to have abnormal clumps of protein, like plaque, built up in the brain. Researchers at the University of Queensland's Brain Institute (QBI) have developed a process using ultrasound technology to clear away this plaque. The treatment has been trialled in mice and produced significant improvements in memory tests.

Researcher Gerhard Leinenga said the novel approach held great hope for future therapeutic treatment in humans. 'Definitely if we can improve the functioning in daily life and delay the progression of the disease, then it will have a huge benefit not just to the patients but to their families and carers,' he said (Mellor, 2015).

CHECK YOUR LEARNING 3.3

Describe and explain

1 **Describe** the symptoms of Parkinson's disease.
2 **Describe** the symptoms of Alzheimer's disease.
3 **Explain** why it is important for neurotransmitters to function as intended.

Apply, analyse and interpret

4 **Compare** neurotransmission in Alzheimer's disease and Parkinson's disease.
5 Read Case study 3.3B. **Consider** the benefits of a new treatment for Alzheimer's patients.

Investigate, evaluate and communicate

6 **Explore** the damage to neurotransmitter function in Alzheimer's disease.
7 **Investigate** the interference of neurotransmitter function in Parkinson's disease.
8 **Evaluate** current treatments available for both Alzheimer's disease and Parkinson's disease.
9 Diseases such as Parkinson's and Alzheimer's cause stress not only for the person suffering but for the person's loved ones. **Assess** how finding the cause and cure for these diseases would benefit society as a whole.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 3.3
- **Suggested research**
  3.3 Treatments for Parkinson's disease
- **Suggested research**
  3.3 Treatments for Alzheimer's disease
- **Challenge**
  Worksheet: 3.3 Caffeine and Parkinson's disease

CHAPTER 3

Review

Summary

3.1
- The neuron is comprised of dendrites, the soma, the axon and axon terminals (most axons are coated in a myelin sheath).
- Communication happens through chemicals known as neurotransmitters that are released by the terminal buttons of a firing presynaptic neuron into the synapse, and then taken in by the neighbouring dendrites of the postsynaptic neuron.
- The molecules of neurotransmitters bind with the neurotransmitter receptor much like the way that only a specific key will fit a particular lock. This is known as the 'lock and key process'.
- Whether or not a neuron fires depends in part on whether the synapse is excitatory or inhibitory. Excitatory synapses will cause the neuron to fire, whereas synapses that are inhibitory reduce this likelihood.
- Glutamate is an excitatory neurotransmitter whereas GABA is an inhibitory neurotransmitter.
- More than 100 neurotransmitters have been identified. Each has a specific effect on the brain and body.

3.2
- Acetylcholine is a neurotransmitter in the brain, spinal cord and peripheral nervous system involved in muscle contractions, learning and memory and REM sleep. In contrast, epinephrine is a neurotransmitter and hormone involved in stress responses while norepinephrine is a neurotransmitter and hormone involved in stress responses, alertness, arousal, emotional regulation and attention. Alternatively, dopamine is a neurotransmitter involved in thoughts, feelings, motivation and behaviours, and serotonin is a neurotransmitter in the brain involved in the regulation of mood, sleep, eating, arousal and pain.

3.3
- A decrease in acetylcholine is implicated in Alzheimer's disease, and acetylcholine and dopamine have key roles in Parkinson's disease.
- Parkinson's disease is characterised by slowness of movement, rigidity and involuntary movement of the hands, arms, feet, legs, jaws or head. There may also be non-motor symptoms including reduced facial expressions, pain, depression, dementia and difficulty sleeping.
- Alzheimer's disease is characterised by gradual, severe memory loss, confusion, impaired attention, disordered thinking and depression.

Key terms

- acetylcholine
- action potential
- Alzheimer's disease
- axon
- axon terminals
- dendrites
- dopamine
- epinephrine
- excitatory synapses
- GABA (gamma-amino butyric acid)
- glutamate
- inhibitory synapses
- myelin
- neurons
- neurotransmitters
- norepinephrine
- Parkinson's disease
- postsynaptic neuron
- presynaptic neuron
- serotonin
- soma
- synapse
- synaptic transmission

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: ⋆ = low, ⋆⋆ = medium, ⋆⋆⋆ = high.

Multiple choice

1 What are the components of a neuron?
- **A** soma, neurotransmitter, synapse and axon terminals
- **B** soma, axon, synaptic cleft and terminal buttons
- **C** soma, synapse, dendrites and axon terminals
- **D** soma, axon, GABA and acetylcholine

2 What are most axons coated with?
- **A** GABA
- **B** adrenalin
- **C** myelin
- **D** noradrenalin

3 The _____ is the primary cell involved in the _____ of information across a synapse.
- **A** neuron; transmission
- **B** neuron; reception
- **C** soma; firing
- **D** soma; inhibiting

4 What is the direction of transmission of the neural impulse across a synapse?
- **A** postsynaptic neuron to presynaptic neuron
- **B** either presynaptic neuron to postsynaptic neuron or postsynaptic neuron to presynaptic neuron, at random
- **C** presynaptic neuron to postsynaptic neuron
- **D** either presynaptic neuron to postsynaptic neuron or postsynaptic neuron to presynaptic neuron, depending on whether the neurotransmitter is an agonist or antagonist

5 How can synaptic transmission best be described?
- **A** the path of an electrical impulse along a neuron
- **B** the process by which one neuron can transmit a message to another neuron
- **C** the space between the presynaptic neuron and the postsynaptic neuron
- **D** the formation of neurons

6 What is the name given to the information carried along a neuron, which consists of brief changes in the electrical charge of the axon?
- **A** the action potential
- **B** the axon potential
- **C** synaptic transmission
- **D** axon transmission

7 Which of the following are all neurotransmitters?
- **A** GABA, glutamate and dopamine
- **B** GABA, glutamate and synapses
- **C** GABA, dopamine and nitrogen
- **D** dopamine, glutamate and potassium

8 Parkinson's disease is associated with a reduction of dopamine-producing cells in which area of the brain?

A amygdala
B terminal button
C *substantia nigra*
D striatum

9 Changes to levels of _____ and _____ have key roles in Parkinson's disease.

A dopamine; acetylcholine
B serotonin; acetylcholine
C dopamine; melatonin
D dopamine; serotonin

10 Which of the following best characterises Parkinson's disease?

A deterioration in the myelin sheath
B memory loss
C deterioration of dopamine-releasing neurons
D immune system breakdown

11 Which of the following best characterises Alzheimer's disease?

A slowed movement, rigidity and involuntary movement of the hands, arms, feet, legs, jaws or head
B amyloid plaques, memory loss and impaired acetylcholine functioning
C deterioration of Wernicke's area
D immune system impairment

12 Which of the following best describes an excitatory synapse?

A It is less likely to result in an action potential.
B It causes the target cell to become inhibited.
C It is more likely to cause the target cell to fire resulting in an action potential.
D It inhibits the target cell and causes an action potential.

13 What is acetylcholine involved in?

A muscle contractions, learning, memory and REM sleep
B muscle contractions, learning, memory and emotional responses
C learning, memory and stress responses
D memory formation, goal-directed behaviour and flight-fight-freeze response

14 What is dopamine involved in?

A learning, memory and emotional arousal
B thought, feeling, motivation and behaviour
C thought, feeling, motivation, behaviour, reward and pleasure
D regulation of mood, sleep, eating, arousal and pain

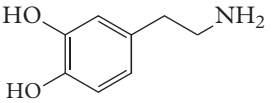


FIGURE 1 Dopamine

15 How do medications designed to treat Alzheimer's disease work?

A They replace levels of serotonin in the brain.
B They prevent acetylcholine from being broken down in the brain.
C They cure Alzheimer's disease by restoring memory functioning.
D They prevent levels of acetylcholine from breaking down and replace depleted levels of acetylcholine.

Short answer

Describe and explain

★★ 16 **Identify** and **describe** five structures of a neuron.

★ 17 **Identify** and **summarise** the main symptoms and possible treatments of Alzheimer's disease.

★ **18** **Describe** the brain structures affected by Alzheimer's disease.

★ **19** **Explain** the role of dopamine and give an example of how it can influence everyday behaviour.

★ **20** **Explain** what Parkinson's disease is and how it is affected by the presence or absence of neurotransmitters.

★★ **21** **Explain** how Alzheimer's disease is affected by the presence or absence of neurotransmitters.

★★ **22** **Explain** how neurotransmitters influence the transmission of messages between neurons.

★★ **23** **Describe** the process of synaptic transmission.

Apply, analyse and interpret

★ **24** **Consider** why myelin is important in the transmission of information.

★ **25** **Differentiate** between the effects of glutamate and GABA.

★★ **26** **Determine** the effect of the excitatory and inhibitory synapses on a neuron.

Investigate, evaluate and communicate

★ **27** **Identify** and **discuss** the possible treatments for Parkinson's disease.

★★ **28** The lock and key process is important for biological functioning. **Explain** why and **justify** your answer with an example.

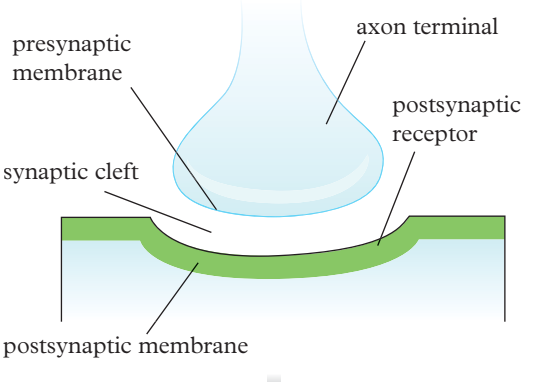


FIGURE 2 The lock and key process

29 If the neurotransmitter acetylcholine facilitates muscle movement, **predict** what might occur if neurons producing acetylcholine are damaged.

30 **Describe** serotonin and provide an example of its functions. **Explain** how it can regulate thoughts, feelings and behaviour, and **discuss** the impacts of low or high levels of serotonin.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 3 Review
- **» Revision notes**
  Revision notes for Chapter 3
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 3

CHAPTER 4

Visual perception

Imagine seeing a large, furry object with pointed ears and a bushy tail bounding towards you at night, but not being able to quickly process what this object is, or what direction it is moving in, or to draw from your memory what you should do next (perhaps run in the opposite direction!). Because of our visual perception system, most Queenslanders would quickly recognise this nocturnal object as the common brush tail possum, an Australian marsupial frequently located in Queensland cities and towns.

For humans, vision is considered one of the most important senses. We rely on vision to help make sense of the world around us. It is therefore not surprising that a large part of our brain is devoted to processing visual information. This begins as soon as light hits our eyes – a phenomenon that occurs every moment that our eyes are open. From this point, light is processed by a vast array of neurons and specialised sensory pathways in the brain. This helps us detect colour, shapes and motion so that we can create meaning out of the vast array of stimuli in our world.

Vision is not only about seeing, but about being able to organise and interpret what we see. In this chapter we will explore the six stages of visual sensation and perception, including reception, transduction, transmission, selection, organisation and interpretation.

OBJECTIVES

→ Explain the process of visual perception, with reference to:
- reception (visible light spectrum)
- transduction (photoreceptors, receptive fields)
- transmission (visual cortex)
- selection (feature detectors)
- organisation and interpretation (visual perception principles).

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

FIGURE 1 Your eyes are vital to visual perception, but without the systems in your brain, you would not be able to interpret any visual stimuli.

SUGGESTED RESEARCH

SUGGESTED RESEARCH	**4.2** Feature detector theory (e.g. sensory processing in the primary visual cortex in Hubel & Wiesel 1979)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority.

4.1 Our senses

KEY IDEA

In this section, you will learn about:

+ the basics of the five human senses.

Each of our five senses has specialised sense organs containing receptor cells that respond to a particular stimulus energy. The QCAA syllabus focuses on vision.

Reception and absolute threshold

absolute threshold
the minimum level of energy required for a stimulus outside our body to be detected by our internal senses

In order for us to receive a sensation, the appropriate stimulus energy must reach the sense organ and this must be at a level sufficient to activate the sense receptors. This means that the strength of the stimulus must reach the absolute threshold for that sense. The **absolute threshold** is the minimum amount of stimulus energy needed for an observer to perceive a stimulus, in ideal conditions, 50 per cent of the time.

One method psychologists use to measure absolute threshold is to present specific stimuli at different intensities to see what level of intensity is needed for them to be detected. If that person detects it during the experiment, for about 50 per cent of the time at a particular intensity (the point at which they actually perceive it), then absolute threshold has been reached.

FIGURE 1 A candle flame is relatively small in size, but your eyes can detect it from 50 kilometres away on a clear, dark night.

Absolute thresholds for the senses are outlined below:

- hearing: the ticking of a watch 6 kilometres away
- smell: one drop of perfume in a large house
- taste: one teaspoon of sugar dissolved in 10 litres of water
- touch: the wing of a fly falling on the cheek from a height of 1 centimetre
- vision: the flame of a candle 50 kilometres away on a clear, dark night

These are based on sound scientific research, but they may not be the same for everyone; they can vary depending on a range of environmental factors (noise, amount of light) and psychological factors (fatigue, motivation, stress, expectations). For example, if a person has had someone break into their house, they will be more highly attuned to sounds at night, and this may affect their usual absolute threshold for sound.

CHALLENGE 4.1

Candle in the dark

Your eyes can detect a candle flame up to 50 kilometres away on a clear, dark night. Consider how close you need to be to detect two other objects, one closer than 50 kilometres and one further. Propose reasons for the difference in distance and detection.

Vision as a sense

Receiving and interpreting visual stimuli involves the following processes:

1 **reception**: Stimulus energy is collected by the eye.
2 **transduction**: Stimulus energy is converted by the receptor cells into electrochemical nerve impulses.
3 **transmission**: Receptor cells send the nerve impulses to the primary sensory cortex where specialised receptor cells respond as the process of perception begins.
4 **selection**: We can't pay attention to all the millions of stimuli that we receive at the same time, so we pick out the ones that are important to us and pay attention to those.
5 **organisation**: The information reaches the brain and is organised so that we are able to make sense of it.
6 **interpretation**: Our past experiences, motives, values and context (including stimulation) give the stimulus meaning.

These processes are considered to be adaptive processes. From an evolutionary perspective, the ability to see, hear, touch, smell and taste has developed over thousands of years and through millions of changes – leaving our senses perfectly suited to our environment and helping us survive and reproduce (Tooby & Cosmides, 1992, cited in Westen *et al.*, 2009).

Just as frogs have an inbuilt 'bug-detecting' function in their visual system, which is designed to activate when a tasty insect is in view, humans have specialised areas in the brain that allow the perception of faces and facial expression. This can be seen in infants, who have an innate or inborn tendency to show greater interest in objects that look like a human face (Adolphs *et al.*, 1996).

reception
stimulus energy is collected by the sense organ

transduction
stimulus energy is converted by the receptor cells into electrochemical nerve impulses

transmission
the sending of neural signals to the primary sensory cortex where specialised receptor cells respond as the process of perception begins

selection
the process of selecting the important sensory information on which to focus attention from the millions of stimuli we receive

organisation
sensory information reaches the brain and is reorganised so we can make sense of it

interpretation
stimulus is given meaning in the brain based on our past experiences, motives, values and context

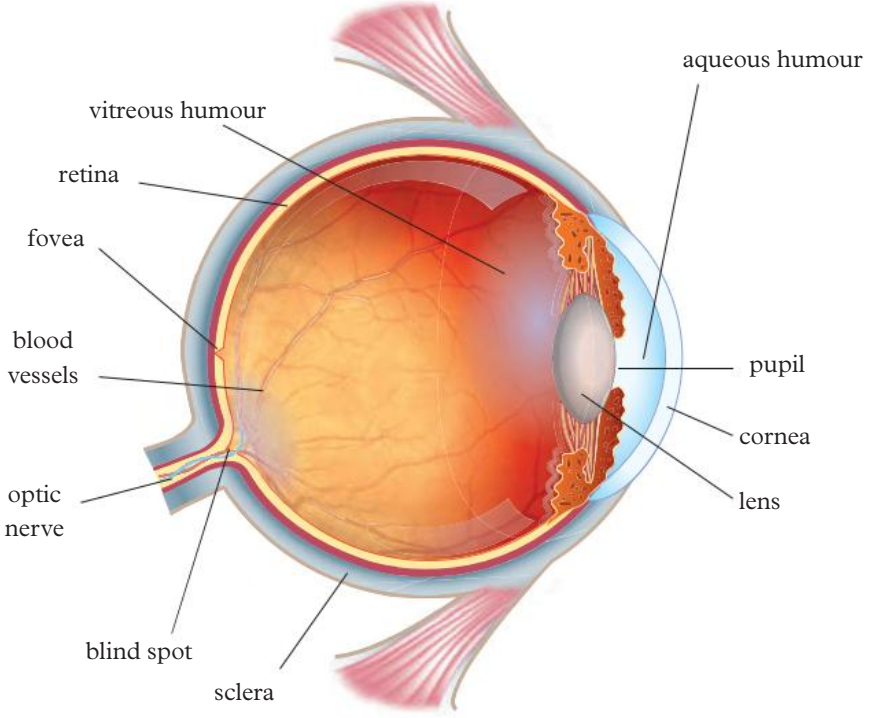


FIGURE 2 The eye

Vision as a biological process

When we see something, the image (or visual stimulus) that appears on our retina is:

- upside down
- back to front
- blurred
- crisscrossed by a network of veins
- patched by holes.

Yet when this image has been sent to the brain it is processed so that we see a crystal-clear picture (and it is positioned correctly!). The process itself – from receiving an image to ultimately interpreting what we see – is complex and has been studied extensively from a number of psychological perspectives.

FIGURE 3 This boy is able to see clearly when swimming because the goggles allow the cornea to function properly.

We are unable to see clearly underwater because the cornea of the eye is designed to refract or bend light travelling through the air, not through water. We correct this by wearing swimming goggles or a diving mask; the layer of air between the water and the cornea allows you to see more clearly.

The eye is a fantastic organ – it is very complex in construction, but we only need to know about a few of its structures.

From the time we receive an image to when we can identify what we see, six stages have been identified, some of which occur at the same time. Essentially, these six stages progress, in sequence, from being reflexive physical functions of the eye and nervous system to being psychological functions of the brain, involving memory and thought processes.

CHECK YOUR LEARNING 4.1

Describe and explain

1 **Explain** what absolute threshold is.
2 **Describe** the absolute threshold for vision.
3 **Identify** the stages of visual perception.

Apply, analyse and interpret

4 **Consider** what may happen to people if there was no absolute threshold.

Investigate, evaluate and communicate

5 **Discuss** the importance of the brain for sight, and **compare** this with the importance of the eye.

obook assess

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 4.1

» **Challenge**
Worksheet: 4.1
Candle in the dark

» **Weblink**
The biology of vision

4.2 Six stages of vision

KEY IDEAS

In this section, you will learn about:

- vision as sensation – reception, transduction and transmission processes
- vision as perception – selection, organisation and interpretation processes.

We do not consciously process visual stimuli. Right now, you are not telling your eyes to read the words on the page or to notice the colour of the images. Your brain is processing the visual stimuli (this book) without thinking. As discussed in Section 4.1, there are six stages of vision. These can be separated into sensation and perception.

Sensation

sensation
the process whereby our sensory organs or receptors receive information about the environment and transmit it to the brain

photoreceptors
a layer of specialised nerve cells that detects visual stimuli; they make up the retina located at the back of the eye and convert (transduce) visual light energy (electromagnetic radiation or light waves within our visual spectrum) into electrochemical energy (nerve impulses)

rods
the photoreceptors providing peripheral vision in black and white; they work in dim light

cones
the photoreceptors providing clear vision in colour; they work in bright light

Sensation is the process of our sensory organs receiving information from the environment and then sending it to the relevant parts of the brain. There are three processes of sensation that are specific to vision: reception, which applies to the visible light spectrum; transduction, which involves photoreceptors and receptive fields; and transmission, which takes place in the visual cortex of the brain. Each process is discussed below.

Reception

Light enters the eye through the cornea, a tough transparent tissue covering the front of the eye. It then passes the pupil – the hole in the middle of the coloured part of the eye (the iris). The lens then focuses the light on the retina. The retina contains the **photoreceptors**, which are light-sensitive cells called **rods** and **cones**. Photoreceptors are responsible for detecting visual stimuli. The rods are photoreceptors that are particularly sensitive to black and white, and we typically use these at night. The cones are involved in providing clear colour vision, and rely on bright light to function. They are used more than the rods in daylight.

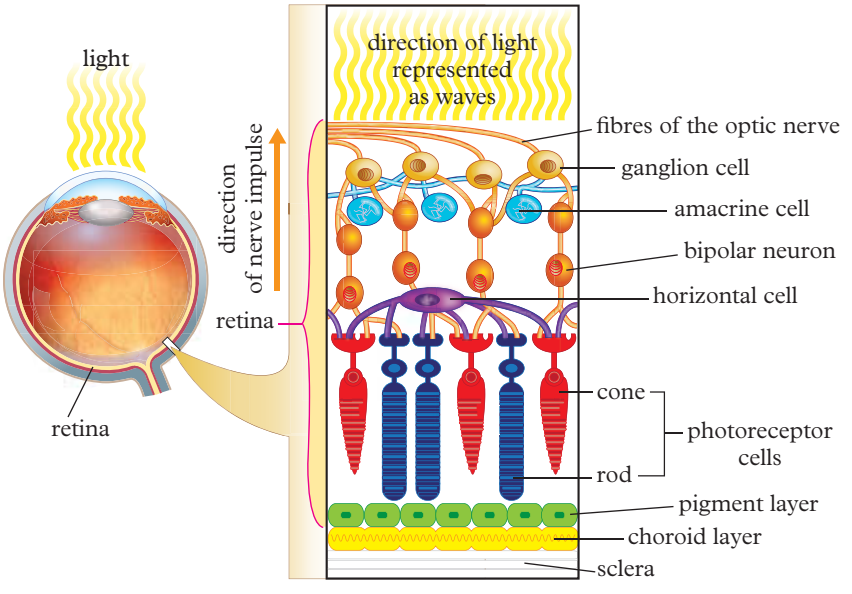


FIGURE 1 Structure of the retina

Transduction

The electromagnetic energy that we know as light energy is converted by the rods and cones into electrochemical nerve impulses. This allows the visual information to travel along the fibres of the **optic nerve** to the brain. The optic nerve communicates information from the eyes to the occipital lobes.

optic nerve the two tracts of neurons that transmit visual information from the eyes to the occipital lobes of the brain

Photoreceptors (rods and cones) are organised into groups, and these groups form **receptive fields**. When your retina identifies visual stimuli, it passes this information via rods or cones to bipolar cells, and then to the **retinal ganglion cell**. You can have an 'on-centre' or 'off-centre' receptive field.

receptive field a particular region of the visual space

retinal ganglion cell a type of neuron that is located near the surface of the retina; visual information from the photoreceptors is received by the retinal ganglion cells

Photoreceptors in visual sensation and perception

As already mentioned, light enters the eye through the cornea and passes through the pupil. The lens focuses the light onto the retina, which contains photoreceptors (light-sensitive cells). The retina is nerve tissue that covers more than 50 per cent of the inner surface of the back of the eye. It contains two types of photoreceptors: rods and cones.

Rods

There are 125 000 000 rods in each eye.

- Rods are responsible for vision in low light (that is, they are very sensitive to light).
- They are responsible for peripheral vision (out of the corner of the eye).
- They are concentrated at the edges of the retina.
- They have low **visual acuity** (they can't register detail).
- They can register only in black and white.
- They are most sensitive to light with a wavelength of approximately 500 nanometres.

visual acuity the clarity or sharpness of vision

Cones

There are 6 500 000 cones in each eye.

- Cones are concentrated in the middle of the retina.
- They are responsible for detecting visual details.
- They are responsible for colour vision (and black-and-white vision in daylight).
- They require high levels of light to enable them to respond.

Transmission

The next task for the rods and cones is to send the nerve impulses along the optic nerve to the primary visual cortex in the occipital lobes, at the very back of the brain where specialised receptor cells respond as the process of visual perception continues.

Perception

Three processes of **perception** – selection (feature detectors), organisation and interpretation (both based on visual perception principles) – are specific to vision.

perception the process whereby the brain organises and interprets sensory information

Selection

Millions of stimuli enter the eye and it is impossible to process them all at once, so we are selective about what we give our attention to. At this stage of the process, the image is broken up by specialised cells called **feature detectors**. Feature detectors are cells that individually respond to lines of a certain length, lines at a certain angle or lines moving in a certain direction. Feature detector cells are found in the optic nerve and in the primary visual cortex.

feature detectors cells in the optic nerve that individually respond to lines of a certain length, angle or direction to break up an image for visual perception

FIGURE 2 When people are whale watching, they process the stimulus (humpback whale) when light enters the eye via the cornea. They are able to identify the stimulus as a whale when they reach the interpretation stage. This happens so quickly we are unaware it is happening.

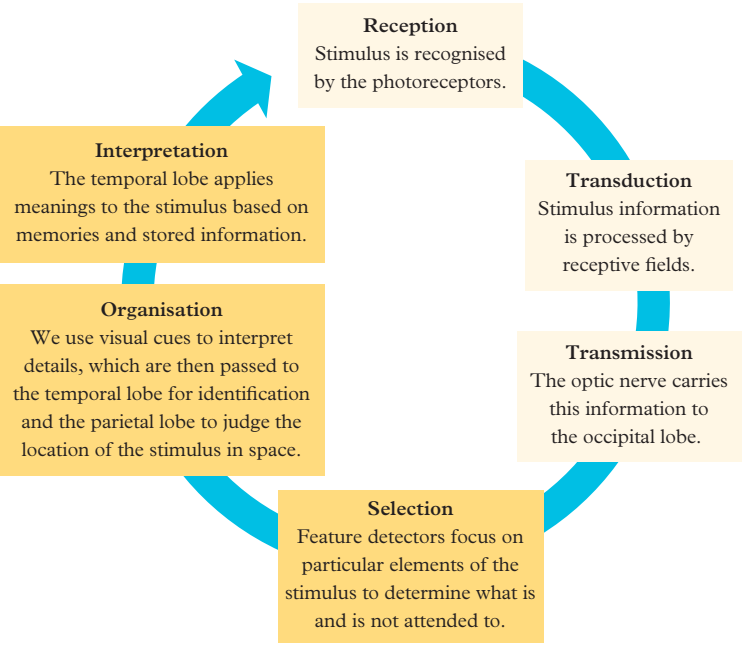


FIGURE 3 The light yellow section shows the process of sensation, while the dark yellow section shows the process of perception.

Organisation

Our visual cortex in the brain recognises information so that we can make sense of it. We do this by using the following visual perceptual principles (you will learn more about these in Chapter 6):

- perceptual constancies
- Gestalt principles
- depth cues.

Once the image is re-assembled using these principles, it travels along two pathways simultaneously: to the temporal lobe, to identify the object; and to the parietal lobe, to judge where the object is in space (in relation to our visual field and ourselves).

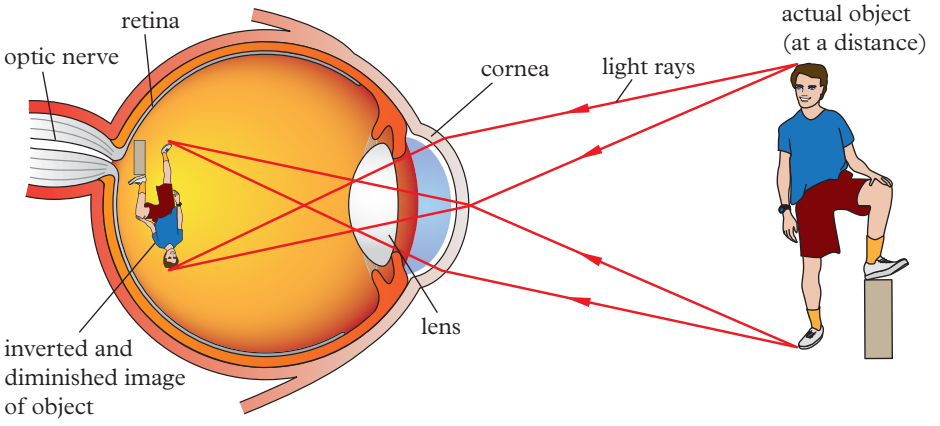


FIGURE 4 The movement of light entering the eye. Stimuli are represented upside down and the brain corrects this.

Interpretation

This is the process whereby the visual stimulus is given meaning. The temporal lobes identify the stimulus by comparing incoming information with information already stored in memory.

Past experiences, motives, values and context help us understand what we are looking at by contributing to our perceptual set (discussed in Chapter 5). While information is sent to the temporal lobes, it also travels to the parietal lobes, which assist in judging where the object is in space (in relation to our visual field and us).

Patients who have damage or tumours in parts of the temporal lobe responsible for identifying a visual stimulus may be unable to recognise an object or a familiar face (this is called prosopagnosia). Patients who have damage to the parietal lobe will be able to recognise an object, but they may constantly bump into furniture or misjudge picking up their knife and fork.

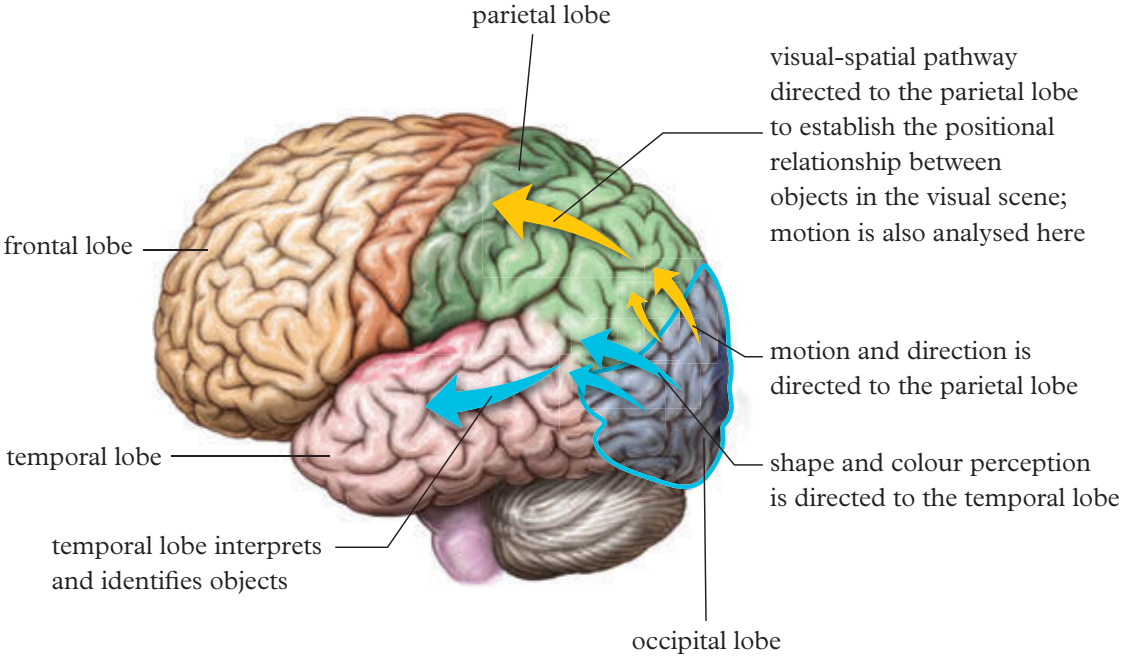


FIGURE 5 The brain makes sense of what we see.

Process of visual perception

Reception and light energy

The process of light entering the eye is an important part of our ability to receive and interpret visual stimuli.

The light energy must be within the visible part of the electromagnetic spectrum. Light waves, between wavelengths of 360 and 760 nanometres, form the visible spectrum (1 nanometre = 1 billionth of a metre). The energy that enables us to see is called **light energy**, the visible part of the electromagnetic spectrum.

light energy the visible part of the electromagnetic spectrum

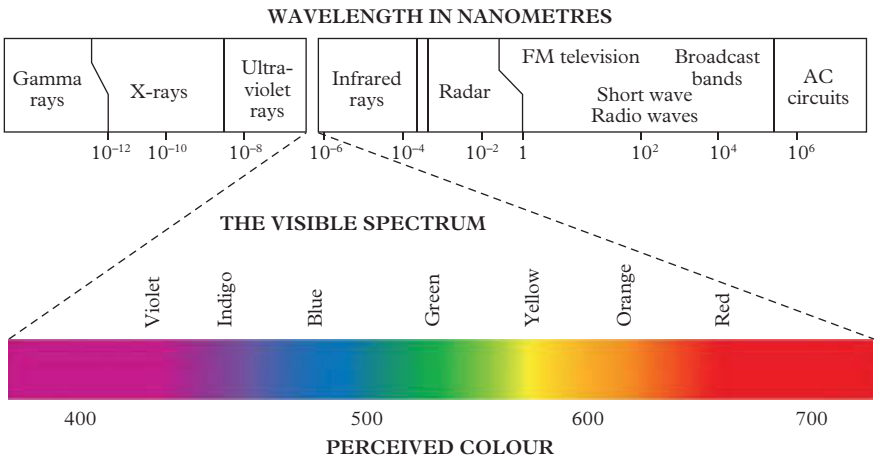


FIGURE 6 The visible spectrum is part of the electromagnetic spectrum. The wavelengths are shown in nanometres. The human eye can see a limited part of the electromagnetic spectrum, which is why there are colours that the human eye can't see.

CHALLENGE 4.2

Animal vision

By inserting a tiny electrode into the brain or retina of an animal, they discovered how receptive fields in ganglion cells respond to an image after it has been transduced (converted to nerve impulses). Holding the animal's head still and flashing light to different sections of the visual field, they were able to identify and map the receptive fields of ganglion cells of the retina (Westen *et al.*, 2009). Consider the use of animals, in regards to ethics, in discovering this information.

CHECK YOUR LEARNING 4.2

Describe and explain

1 **Describe** the following processes:
   - **a** reception
   - **b** transduction
   - **c** transmission
   - **d** selection
   - **e** organisation
   - **f** interpretation

2 **Explain** the range of the visible light spectrum in nanometres.

3 **Identify** the differences between rods and cones.

Apply, analyse and interpret

4 You have soccer practice after school during winter and your coach wants you to play until it's almost dark. **Determine** which photoreceptor is better suited to low-light conditions.

5 Grandma is busy knitting you a pair of woollen socks. She is sitting in her lounge with her spectacles on and a bright light next to her. She needs to focus on what she's doing. **Determine** which photoreceptors are best suited to activities that require clear vision in bright light.

Investigate, evaluate and communicate

6 **Evaluate** the importance of interpretation in perceiving visual stimuli. **Compare** this with the importance of transmission.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 4.2
- **» Suggested research**
  4.2 Feature detector theory
- **» Challenge**
  Worksheet: 4.2 Animal vision
- **» Weblink**
  The role of photoreceptors

CHAPTER 4

Review

Summary

4.1

- For a visual stimulus to be perceived by a person, it must reach absolute threshold. This is the minimum amount of light energy needed for an observer to perceive a stimulus in ideal conditions 50 per cent of the time.
- The six stages of sensation and perception:
  1. **Reception**: Stimulus energy is collected by the eye.
  2. **Transduction**: Stimulus energy is converted by the receptor cells into electrochemical nerve impulses.
  3. **Transmission**: Receptor cells send the nerve impulses to the primary sensory cortex where specialised receptor cells respond as the process of perception begins.
  4. **Selection**: We can't pay attention to all the millions of stimuli that we receive at the same time, so we pick out the ones that are important to us and pay attention to those.
  5. **Organisation**: The information reaches the brain and is organised so that we are able to make sense of it.
  6. **Interpretation**: Our past experiences, motives, values and context (including stimulation) give the stimulus meaning.

4.2

- The six stages of vision can be separated into sensation (reception, transduction and transmission) and perception (selection, organisation and interpretation).
- The energy that enables us to see (light energy) is the visible part of the electromagnetic spectrum – wavelengths between approximately 360 and 760 nanometres (1 nanometre = 1 billionth of a metre).
- The retina, which covers more than 50 per cent of the back of the eye, contains two types of photoreceptors: rods and cones. The 125 000 000 rods in each eye are responsible for vision in low light and for peripheral vision; they only register black and white. The 6 500 000 cones in each eye are responsible for visual details, and colour vision (and black-and-white vision in daylight).

Key terms

- absolute threshold
- cones
- depth cues
- feature detectors
- interpretation
- light energy
- optic nerve
- organisation
- perception
- photoreceptors
- reception
- receptive field
- retinal ganglion cell
- rods
- selection
- sensation
- transduction
- transmission
- visual acuity

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: * = low, ** = medium, *** = high.

Multiple choice

1 What does the absolute threshold refer to?

A the lowest intensity of stimulus energy that can be detected

B the lowest intensity of stimulus energy that can be detected 100 per cent of the time

C the lowest intensity of stimulus energy that can be detected 50 per cent of the time

D the greatest intensity of stimulus energy that can be detected

2 What is the correct sequence of processes in sensation and perception?

A reception; transmission; transduction; selection; interpretation; organisation

B reception; selection; transmission; transduction; organisation; interpretation

C reception; selection; organisation; transmission; transduction; interpretation

D reception; transduction; transmission; selection; organisation; interpretation.

3 Which of the following statements about visual receptors is incorrect?

A Rods can respond in low levels of light but not in bright light.

B Cones can respond in bright light but not in low levels of light.

C Rods and cones both distinguish black and white.

D Rods and cones both distinguish colours.

4 Which of the following statements concerning the stimulus energy for vision is incorrect?

A Electromagnetic energy of about 380 nanometres is perceived as violet.

B Electromagnetic energy of about 760 nanometres is perceived as red.

C Electromagnetic energy of about 380 nanometres is not visible to humans.

D Electromagnetic energy of about 800 nanometres is not visible to humans.

5 Rods are most responsive to electromagnetic energy of which colour?

A violet/blue

B blue/green

C green/yellow

D orange/red

6 Where are feature detector cells found?

A in the cornea and retina

B in the optic nerve and primary visual cortex

C in the retina and primary visual cortex

D in the cornea, retina, optic nerve and primary visual cortex

7 Which is true of depth cues?

A They are processes that occur during the sensation stages of visual processing.

B They are cells that respond to lines that move in a particular direction.

C They are responsible for the acuity of peripheral vision.

D They allow interpretation of two-dimensional images into three-dimensional images.

8 What is transmission?

A where light energy is converted into electrical impulses

B where information reaches the brain and is transmitted into sensory memory

C where stimulus energy is collected by sense organs

D where sensory cells send nerve impulses to the primary sensory cortex

9 Which of the following statements is incorrect?

A The actual image on our retina is upside down and back to front.

B Light initially enters the eye through the retina.

C The retina contains light-sensitive cells called photoreceptors.

D Images on our retina are blurred and patched by holes.

10 In relation to vision, sensation involves which of the following processes?

A interpretation, organisation and reception

B transmission, reception and transduction

C transduction, reception and selection

D selection, organisation and interpretation

Short answer

Describe and explain

★ **11** **Explain** what feature detectors are.

★ **12** **Identify** the two types of photoreceptors that are contained in the retina.

★ **13** **Identify** the two neural pathways involved in the visual organisation process and explain their roles.

★ **14** Complete the following table to **summarise** the stimulus energy and location of receptors involved in visual perception.

Sense	Stimulus energy	Main organ	Location of receptors
Vision		Eye	

★ **15** **Identify** the two neural pathways involved in the visual organisation process and explain their roles.

★ **16** **Define** the term receptive field.

★★ **17** The processes that are carried out by the photoreceptors during visual perception include reception, transduction and transmission.

a **Explain** what is meant by transduction.

b **Explain** what is meant by transmission.

★★ **18** The processes involved in visual perception include selection, organisation and interpretation. **Explain** what is meant by organisation in visual perception.

★★ **19** Label the following diagram, and **describe** the function of each element.

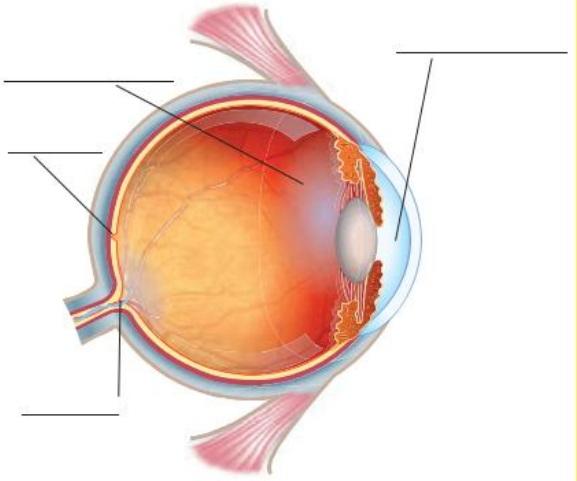


FIGURE 1 The eye.

★★★ **20** **Construct** a flowchart to **demonstrate** the process of visual perception, including each stage.

Apply, analyse and interpret

★ **21** **Consider** why people with damage to their temporal lobes experience problems with their vision. Then, **reflect** on the nature of the challenges that these people would face.

★ **22** **Distinguish** between perception and sensation in relation to vision.

★ **23** **Compare** transmission and transduction.

★★ **24** **Identify** the two neural pathways involved in the visual organisation process and **compare** their roles.

★★ **25** **Explain** what a rod is and what a cone is, then **differentiate** between them.

★★ **26** **Organise** the following list in the correct order for the process of interpreting visual stimuli:

- photoreceptors
- ganglion cell
- sclera
- horizontal cell
- light waves
- fibres of the optic nerve.

★★ **27** Jake was looking at a tree in the distance. Jake's friend told him that his eyes were actually seeing the tree upside down, but that his visual system was correcting this image for him. **Reflect** on the process that Jake's friend was referring to, and briefly **explain** how this occurs.

★★ **28** Shoko recently got her driver's learner permit and has been practising driving to and from school in daylight hours. Recently, she has also begun to drive to her netball game, which is at 8:00 pm on a weeknight. While driving at night Shoko has discovered that it is harder to see. **Consider** your understanding of photoreceptors in visual perception. Based on your understanding, **determine** why Shoko is finding it harder to see at night.

Investigate, evaluate and communicate

★ **29** Briefly **discuss** the role of cones in the transduction process.

★★ **30** **Assess** why vision is impaired under water.

★★★ **31** **Explain** why humans are not able to see well at night and **discuss** which structures in the visual system affect this process.

★★★ **32** The parietal lobe helps us judge where an object is located in space. **Investigate** this further, and **comment** on how this process works.

★★★ **33** Visual perception involves the integration and coordination of several systems in the brain. Each lobe plays a different part in perception.

a **Consider** what role the frontal lobe contributes to visual perception.

b **Infer** what role the hippocampus has on visual perception.

c **Describe** what would happen to someone's vision if their right occipital lobe was damaged.

d In a brief essay, **evaluate** what may happen to someone's vision if they sustained a brain injury to their left temporal lobe.

Check your obook assess for these additional resources and more:

» **Student book questions**
Chapter 4 Review

» **Revision notes**
Revision notes for Chapter 4

» **assess quiz**
Test your understanding with this self-correcting multiple-choice quiz

» **Flashcard glossary**
Key terms in Chapter 4

CHAPTER 5

Influences on visual perception

The brain applies various procedures and rules, both learnt and innate, to enable us to make sense of what we see. Our eyes are often referred to as a camera. However, this metaphor is too simplistic for how our visual system actually works. Rather than simply taking pictures of images or objects in our environment, our visual system, along with an intricate and complex set of neural activities, also incorporates how we feel, our experiences, our memories and our responses to visual stimuli. Our brain puts all of this information together as a picture, which guides our behaviour.

Our physical make-up and normal biological processes also influence how we see. Imagine trying to read through your grandparents' reading glasses with a 'younger' set of eyes. People with normal eyesight will likely find this difficult.

Additionally, we need to consider how our cultural experiences affect our visual perceptions. How might a Yirrganydji child reared on traditional Aboriginal land in the coastal culture of Tropical North Queensland perceive the urban jungle of New York?

This chapter will discuss how our visual perception is influenced by biological, psychological and sociocultural factors.

OBJECTIVES

- → Determine biological influences on visual perception, including physiological make-up, ageing and genetics
- → Explain psychological influences on visual perception, including:
  - perceptual set (past experience, context, motivation and emotional state)
  - visual perception principles (Gestalt, depth cues and visual constancies)
- → Evaluate the impact of social influences on visual perception, with reference to cultural skills (Hudson 1960; Deregowski, Muldrow & Muldrow 1972)

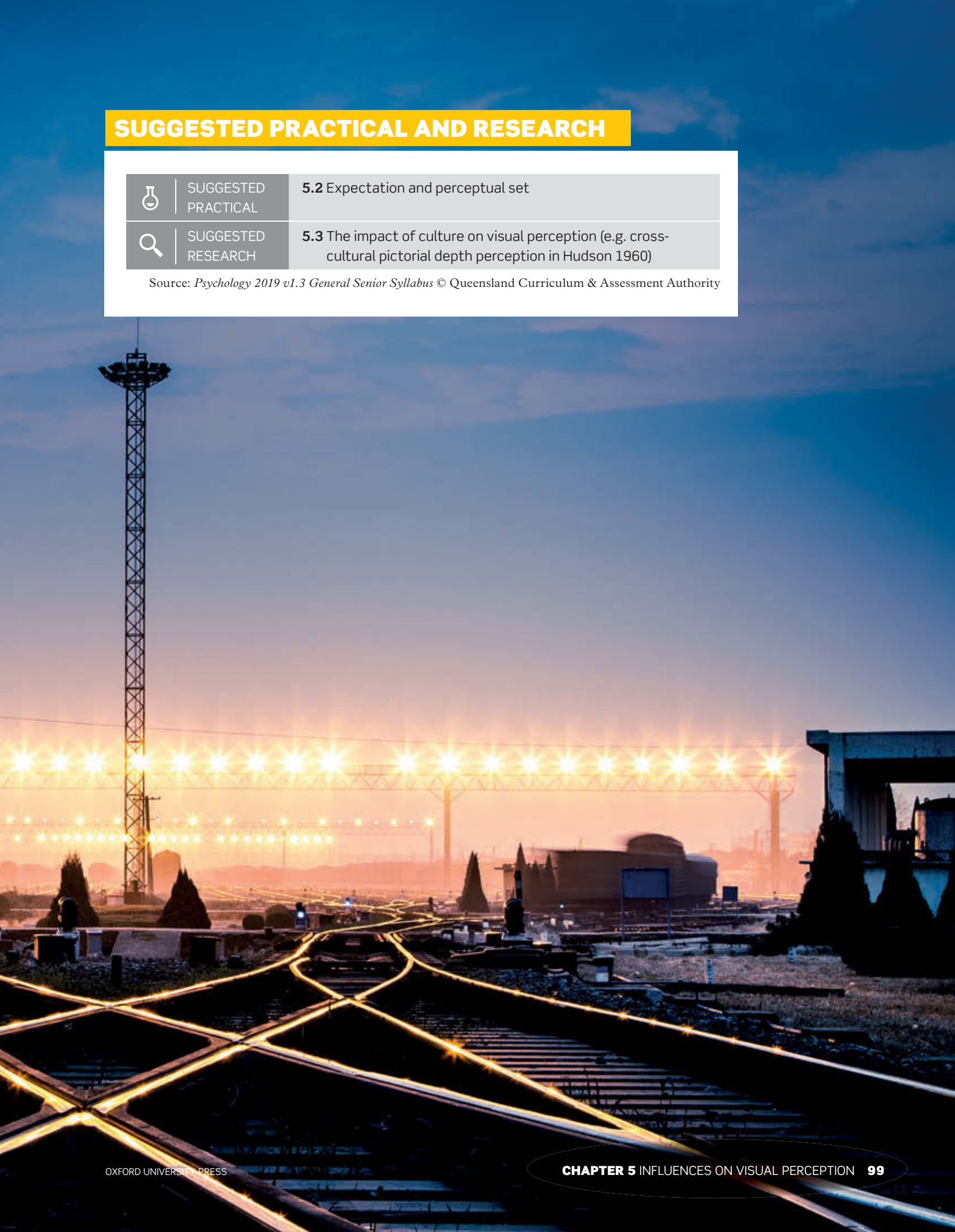
Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

FIGURE 1 People can judge the distance and depth of this image because of perceptual cues, such as linear perspective, which is a pictorial depth cue.

SUGGESTED PRACTICAL AND RESEARCH

SUGGESTED PRACTICAL	**5.2** Expectation and perceptual set
SUGGESTED RESEARCH	**5.3** The impact of culture on visual perception (e.g. cross-cultural pictorial depth perception in Hudson 1960)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority



5.1 Biological influences on visual perception

KEY IDEAS

In this section, you will learn about:

- the effects of our physiological make-up on visual perception
- the effects of ageing on visual perception
- the effects of genetics on visual perception.

The way we perceive visual information is influenced by a variety of factors. This section discusses the different types of biological influences on visual perception, including physiological make-up, ageing and genetics.

Physiological make-up

Our visual sensory and perception system is highly complex. Chapter 4 discussed the components of the system, including the eye and neural pathways in our brain. How and what we see is highly dependent on how these structures and neural pathways function in relation to sensory input as well as each other. If any of these structures is damaged, deteriorates or is negatively impacted during prenatal development in the womb, our ability to visually perceive the world is compromised (Moschos, 2014).

Various physiological disorders are directly related to damage or impairment of structures in the visual system. For example, colour blindness/deficiency (where a person is unable to distinguish between certain colours) develops due to structural issues of the retina, in particular the cones.

achromotopsia
a lack of cone vision that causes people to see only black, white and grey

This particular disorder is directly related to the physiological structure of the eye. If our cones are impaired or missing, we are unable to perceive light waves, which compromises our ability to perceive colour.

FIGURE 1 How someone with achromotopsia would see the Brisbane city skyline

Similarly, congenital **achromotopsia** is characterised by a lack of cone vision (see Chapter 4). People with achromotopsia perceive only black, white and grey, as demonstrated in Figure 1. Cerebral achromotopsia can result from damage or trauma to the cerebral cortex, for example, when a person suffers a stroke.

Therefore, achromatopsia is not always caused by cone abnormalities (Cowey & Heywood, 1997; Zhou, He & Li, 2018); it can also result from damage to the neural pathways between the eye and the brain as well as damage to specific areas in the brain that help us perceive colour.

Ageing

Age influences both our physical and psychological abilities. Not only do our physical and muscular appearances change with age, but so does our ability to perceive and interpret stimuli from our environment. Reading or driving can become increasingly difficult as you age. The maturing of our sensory perceptions, particularly our vision and hearing, can affect our everyday life experiences and interactions. Biological ageing can affect our visual perception system, including the development of **presbyopia**, **floaters**, **cataracts**, **glaucoma** and **age-related macular degeneration**.

presbyopia
a condition that develops as the lens loses elasticity and causes difficulties in focusing on objects that are close

floaters
clumps of matter that appear as small specks or spots in central vision

cataracts
cloudy spots in the lens that cause vision to become blurred when proteins in the lens break down

glaucoma
a disease affecting the optic nerve that interferes with the transmission of peripheral visual information to the brain

age-related macular degeneration
a build-up of grainy deposits in the centre of the retina causing deterioration of central vision

Presbyopia

Presbyopia occurs when the eye's lens starts to lose flexibility and begins to stretch over time. This makes it difficult to focus on objects that are close, such as printed text or text on a computer screen. This generally begins at age 50 and is irreversible. Symptoms include requiring bright light to see clearly, difficulty seeing in the dark, headaches and eye discomfort (e.g. eye strain and fatigue).

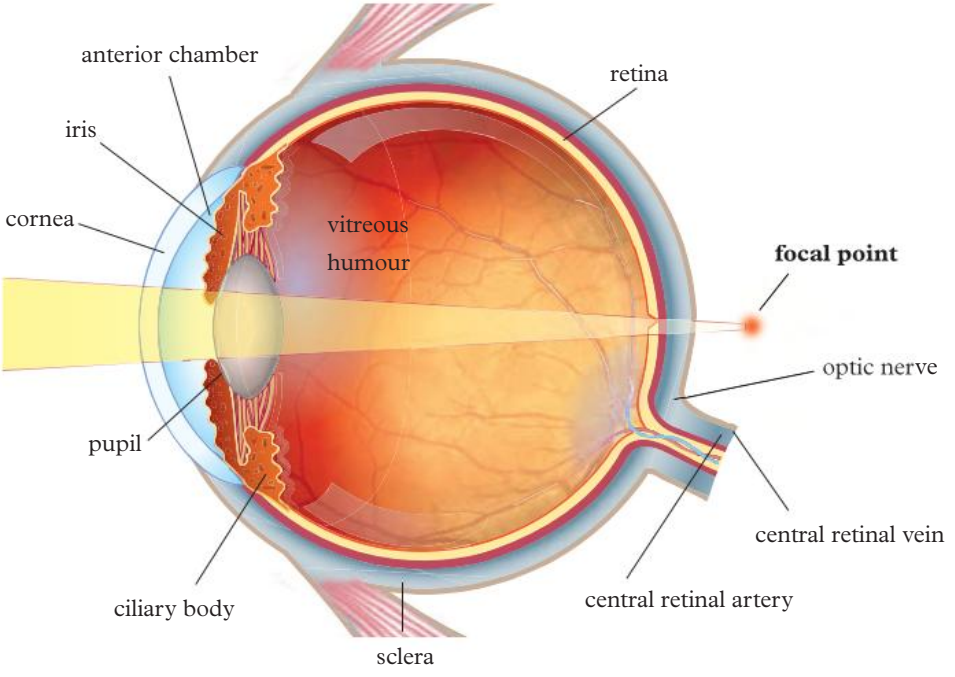


FIGURE 2 For people with presbyopia, the focal point is out of the normal range because the lens has lost its elasticity.

Presbyopia develops because the lens begins to lose elasticity and progressively loses the ability to bend and focus light rays onto the retina (see Chapter 4). The condition cannot be reversed, but it can be treated by wearing eyeglasses or contact lenses (see Vision Web, 2010; Heine, 2017).

Floaters

Floaters, or spots, are tiny, gel-like clumps of matter that float in the vitreous fluid that surrounds our eyes. Appearing as little specks in our vision, they usually occur as part of the natural ageing process during our mid-40s. Floaters are caused when the vitreous humour around our eyes deteriorates and forms little crystals.

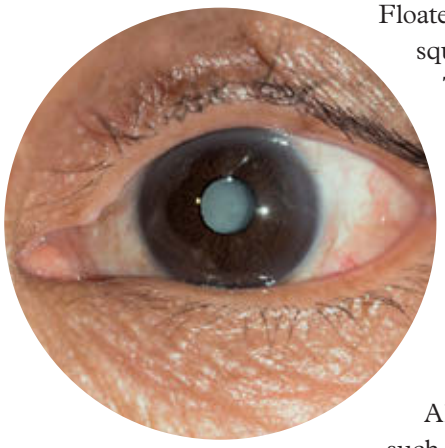


FIGURE 3 Cataracts can be seen when the lens of the eye begins to become cloudy.

Floaters are harmless in nature, but they can be annoying. Imagine seeing tiny specks or squiggly lines that moved quickly out of sight whenever you tried to focus on them. They become very noticeable when we look at a bright object, such as a lamp (National Eye Institute, 2009; Vision Eye Institute, 2017; Vision Web, 2010).

Cataracts

Cataracts occur when the eye's lens starts to become cloudy due to the breakdown of proteins. This is thought to happen naturally as we age. The lens and cornea are responsible for focusing light on the retina, which then converts and transmits light stimuli to the brain. Cataracts interrupt this process, resulting in blurred vision as well as difficulty seeing at night or in bright light (Yosar, 2016a). Although ageing can contribute to the development of cataracts, lifestyle factors – such as smoking and poor diet, together with chronic diseases like diabetes and high blood pressure – also play a role. Treatment may involve controlling blood sugar levels, eating well and abstaining from smoking. Wearing stronger eyeglasses and undergoing surgery can also be effective treatment options as the disease progresses.

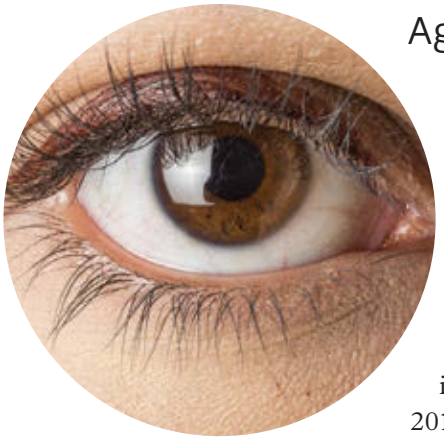


FIGURE 4 A healthy eye has a clear lens.

Age-related macular degeneration

Age-related macular degeneration (AMD) is a disease caused by the build-up of grainy deposits in the macula – located in the centre of the retina – which results in inflammation and degeneration of the macula's photoreceptor cells. This causes a blurry 'spot' in the centre of vision and makes it difficult to see finer details. For example, someone with AMD may only be able to see someone's hair or ears when looking at a face. AMD is one of the leading causes of vision loss in the world and has no known cure. It often begins around the age of 50 and gradually deteriorates as sharp, central ('straight ahead') vision declines. Other risk factors for AMD include family history, smoking and nutritional deficits (Fritsche *et al.*, 2014; Heine, 2017; Vision Web, 2010).

Glaucoma

Glaucoma is a disease that affects the optic nerve and results in the loss of peripheral vision, which can lead to blindness if left untreated (Yosar, 2016b). Damage to the optic nerve causes disruption to the transmission of visual information from the eye to the brain. This is often associated with increased intra-ocular pressure (pressure in the eyeball) from the watery substance produced in the eye (the aqueous humour).

Glaucoma is one of the most common eye problems in the world, notably affecting people over 70 years of age (Goldberg, Graham & Healey, 2002). In Australia, more than 150 000 elderly people are believed to experience glaucoma. Disturbingly, many people are unfamiliar with this disease and do not seek treatment, increasing the chances of eventual blindness. Although there is no cure, if it is detected early, treatment, such as medicine and laser surgery, can delay the progression of this disease (National Eye Institute, 2015).

Genetics

Much of who we are and what we experience is determined by our genetic make-up, and our visual perception system is no exception. Some inherited visual disorders are treatable if diagnosed early. Others are not easily treated and, in certain instances, can eventually lead to blindness.

Inherited visual disorders

Inherited visual disorders are disorders passed from parents to children through their genetic make-up. Genetics play a key role in transmitting many common vision problems and eye diseases from one generation to the next. Some of these problems occur in infancy and childhood, while others appear later in adulthood (Cleveland Clinic, 2018; Mathebula, 2012). Many inherited visual disorders can be treated by conducting vision therapy, undergoing surgery or wearing prescription glasses or contact lenses. Scientists continue to map the genes responsible for visual disorders. Genetic studies using twins have shown that refractive errors are particularly common among family members, which strongly suggests a genetic link in the development of these conditions (Hammond *et al.*, 2001; Hendriks *et al.*, 2017).

inherited visual disorders
visual disorders passed down from parents to children due to genetic factors

Common inherited vision problems that occur in childhood include cross-eyes (strabismus), lazy eye (amblyopia), refractive errors (near-sightedness or myopia, and far-sightedness or hyperopia) and astigmatism. For adults, some cases of eye disorders, such as glaucoma and age-related macular degeneration, can also be attributed to genetic factors. These conditions often lead to blindness.

Congenital visual disorders

Congenital visual disorders are disorders of the visual system that are present at birth (Association of British Dispensing Opticians, 2018). Although quite rare, these disorders can develop from genetic factors or from diseases and deficiencies that arise during pregnancy. Examples of congenital disorders include congenital cataracts, congenital glaucoma, congenital achromatopsia and optic nerve hypoplasia (underdevelopment of the optic nerve). Some of these disorders can be treated with surgery, medication or rehabilitation. Unfortunately, with the rarest of these disorders – such as microphthalmos, where babies are born with small eyes with anatomic malformations – sight cannot be restored.

congenital visual disorders
visual disorders present at birth

Colour vision deficiency

Colour blindness, more accurately known as **colour vision deficiency**, is an inherited disorder in which people's perception of colours differs from what most people see (Burton, Westen & Kowalski, 2019). Colour is perceived through our rods and cones (Chapter 4). Rods are sensitive and allow us to see in dim conditions, while cones are specifically sensitive to

colour vision deficiency
a genetically inherited disorder affecting how people perceive colour

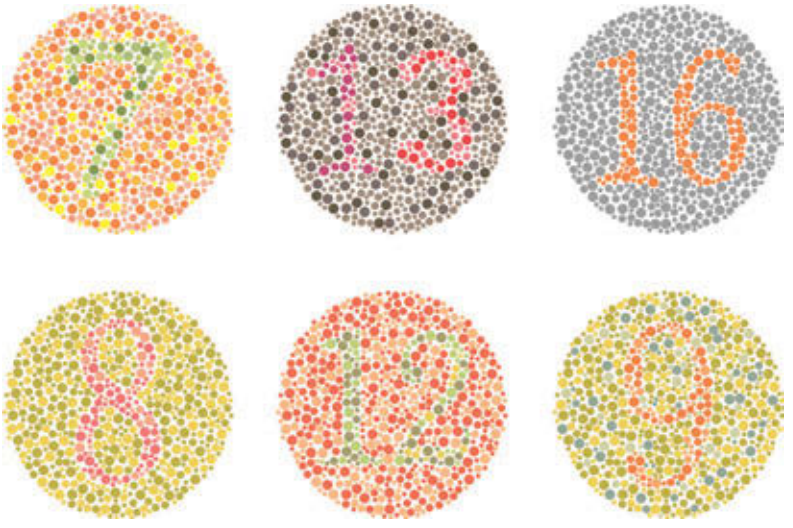


FIGURE 5 The Ishihara test is often used to test colour blindness. Can you see what numbers are represented here?

long (red), medium (green) and short (blue) wavelengths of light. Colour deficiency occurs if one or more of these cones is missing or functions incorrectly. There are three types of colour deficiency: monochromacy, dichromacy and trichromacy. Monochromacy is the most severe form of colour deficiency, whereby people are entirely blind to colours because genetic abnormalities restrict them to one type of cone: the type that detects brightness but not colour. Dichromacy occurs when only two of the three cones are functioning. Trichromacy is the most common form of colour deficiency, occurring when any one of the three cone pigments responsible for perceiving colours is altered. This results in an impaired sense of colour, rather than total colour blindness.

Men are more likely to suffer from colour deficiency than women. This is because the disorder is caused by a mutation of a gene located on the X chromosome, of which men only have one. Women are less likely to inherit the disorder because they have two X chromosomes: the second X chromosome compensates for any deficiency in the other. Colour deficiencies can present at birth or they may begin during childhood or adulthood. People might also be unaware that they have the condition, particularly when born with it.

Retinis pigmentosa

retinis pigmentosa
a genetic degenerative disease affecting the retina

Retinis pigmentosa is a genetic degenerative disease of the retina causing night blindness and gradual loss of peripheral vision (National Eye Institute, 2014). It is an inherited disease caused by harmful changes to genes that relay information on how to produce proteins required by photoreceptor cells. Genetic changes can restrict the growth of these proteins. The genetic changes can also cause the proteins to become toxic or dysfunctional. Genetics can further cause the rods, and eventually the cones in the retina, to die. Symptoms usually appear in childhood, with difficulty seeing at night being a prominent indicator. This makes sense when we remember that rods allow us to see in dim lighting. Detection is possible through electroretinogram testing, visual field testing and genetic testing. There is no known cure for the disease, however, low-vision visual aids (e.g. magnifying lenses) can help people make the most of their existing vision.

CHECK YOUR LEARNING 5.1

Describe and explain

1 **Explain** the ways in which ageing can impact visual perception, and identify two disorders associated with ageing.
2 **Describe** what congenital visual disorders are.
3 **Summarise** why people with retinis pigmentosa find it difficult to see in dim light.
4 **Describe** a way in which our physiological make-up can affect our visual perception system.
5 Provide an example of a physiological disorder that is not caused by abnormalities in the structure of the eye. **Explain** why this disorder is not considered congenital.

Apply, analyse and interpret

6 **Compare** the different forms of colour blindness.
7 **Differentiate** between floaters and cataracts.
8 **Distinguish** between inherited disorders and congenital disorders.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 5.1
- **» Video**
  Biological influences on the visual field
- **» Weblink**
  Test your eyes! Colour-blind test
- **» Weblink**
  The impacts of vision impairment

5.2 Psychological influences on visual perception

KEY IDEAS

In this section, you will learn about:

- how perceptual sets influence how we see visual stimuli
- visual perception principles – including Gestalt principles, depth cues and visual constancies.

Many factors can combine to predispose us to perceive the world in a certain way: expectations created by our previous experiences, the environment in which a stimulus is seen, our motivation and even our emotional state.

perceptual set a predisposition to attend to certain aspects of the visual scene, or to interpret stimuli in a particular way, according to certain preconceptions

Perceptual set is a predisposition to perceive stimuli in a specific way – that is, interpreting what we see according to certain preconceptions. Perceptual set comprises a predisposition to attend to only certain features or aspects of our field of view (selection).

CHALLENGE 5.2A

The farmyard

Researchers found that when they presented a picture of a farmyard to a group of subjects and then asked them to describe it from memory, the subjects were able to do so quite well. However, when shown the picture in Figure 1, the subjects were surprised by the giant octopus outside the barn – it is out of context, so they concentrated on this and failed to pay attention to the other items in the picture. Consider a scenario where this may be important.

Several factors can influence perceptual set:

- **Past experiences**: Previous experiences can affect visual perception, especially if the experience holds significant personal meaning. The same stimulus can be interpreted differently by different people.
- **Context**: The environment in which a perceived stimulus is observed; context sometimes has an immediate effect on our expectations.
- **Motivation**: Often we see what we want to see. On a long drive, if running low on petrol, a sign reading 'FOOD AHEAD' might be interpreted as 'FUEL AHEAD'.
- **Emotion**: We could interpret someone's facial expression as laughing or crying, depending on how we are feeling ourselves.

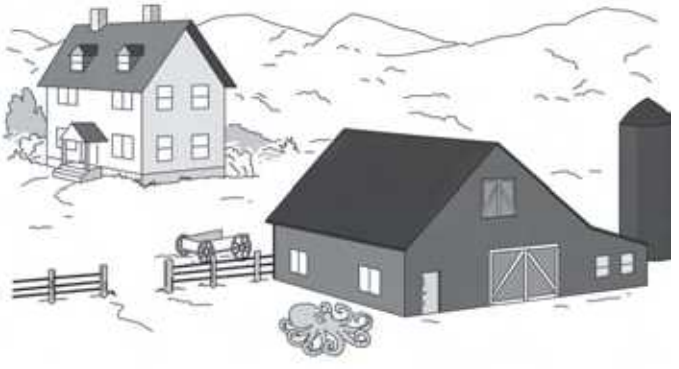


FIGURE 1 Quickly look at this illustration. Then close your eyes and recall what you saw.

One example that illustrates how visual stimuli can affect our perceptual set is Bugelski and Alampay's (1961) famous rat-man experiment (Figure 2, p. 108).

FIGURE 2 Can you see the rat and the man?

One group of participants was shown a line of face sketches and then the ambiguous rat-man stimulus – the majority identified it as an old man. The other group was shown a line of animal sketches and then the ambiguous stimulus – the majority identified it as a rat or mouse. This shows how perceptual set, created by prior experience, influences perception.

Visual perception principles

At any given moment, vast amounts of visual stimuli enter the eye – far more than we can pay attention to. The brain selects and organises visual information according to a number of visual perceptual principles.

Perceptual constancies

perceptual constancies the tendency to maintain a stable perception of a stimulus, although the properties of the image on the retina may change

size constancy the constant perception of an object's size, even though the size of the image on the retina alters as the object moves nearer to or further from us

shape constancy an object is perceived to maintain its known shape despite the changing perspective from which it is observed

Perceptual constancies enable us to maintain a stable perception of a stimulus, although the image on the retina may change (e.g., size or shape). The more familiar we are with the observed object, the more likely it is that we will maintain perceptual constancy of it. Perceptual constancies are usually learnt early in childhood.

Size constancy

Size constancy refers to our ability to maintain a constant perception of an object's size, even though the size of the image on the retina alters as the object moves nearer to or farther from us. For example, when we look at a friend from a distance of 5 metres, he produces a retinal image twice the size of the one he produces when he is 10 metres away. But because we are familiar with his height, we don't change our perception of him – instead, we use the size of the image as a cue to provide information about how far away he is (see Figure 3).

Shape constancy

Shape constancy refers to the fact that an object is perceived to maintain its known shape despite the changing perspective from which it is observed. This is a learnt skill – for example, a toddler may have difficulty perceiving a familiar toy if it is viewed from an unusual angle. Objects that are familiar to us can be accurately interpreted when viewed from any direction. For example, as a door opens, the retinal image of it changes shape from a rectangle to a trapezium, but we easily maintain our perception of a rectangular door.

FIGURE 3 The young man casts a larger image on the retina as he moves closer to us, but we know he remains the same size; so we use this information to establish his distance from us.

Gestalt principles

Gestalt is a German word that means 'good form'. Gestalt psychology developed in the early twentieth century and is based on the principle that 'the whole is greater than the sum of its parts'. In terms of sight, it concerns the tendency for our visual system to perceive what we see as a meaningful whole. How can this be? This answer is described in the **Gestalt principles of visual perception**.

Gestalt principles of visual perception
used to organise and interpret perceptual stimuli; including figure–ground organisation, closure, similarity and proximity

Figure–ground organisation

The first Gestalt principle of visual perception that develops in infants is **figure–ground organisation**. The figure is the part of the visual field being attended to and focused on; its surroundings are the ground. The figure and the ground are separated by an imagined contour. The contour is 'owned' by the figure. In children's drawings, we often see a black line around a figure, emphasising the separation of figure and ground. Rubin's vase (Figure 4) is an example of figure–ground organisation. Depending on whether the yellow colour or black colour is assigned as the figure or the ground, you can see a vase or two faces looking at each other.

figure–ground organisation
a Gestalt principle of perceptual organisation wherein images are organised into the central object of attention (figure) and a background (ground)

Camouflage

Camouflage is where the Gestalt principle of figure–ground is used to break up the contour of the figure, meaning that figure and ground will blend, making the figure more difficult to see. We see camouflage in nature, for example, with leopards, tigers and giraffes – the army also uses camouflaged uniforms to help soldiers blend into their surroundings and avoid detection (Figure 5).

camouflage
where the Gestalt principle of figure-ground is used to 'blend' the contour of the figure (which usually stands out) against the ground (background), making it more difficult to see

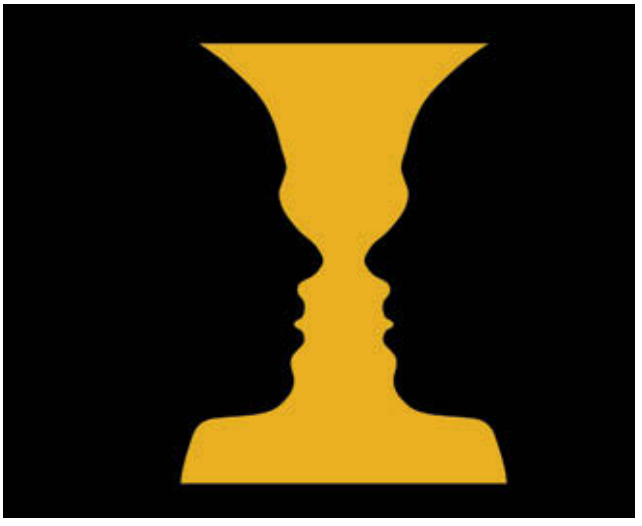


FIGURE 4 Rubin's vase is a special case of figure–ground organisation.

FIGURE 5 Can you see the soldier in camouflage? The contour is broken up and enables the figure to blend in with the background.

Closure

Closure occurs when we perceive an object as being whole, despite it actually being incomplete. Many company logos use such incomplete figures in their designs (see Figure 6).

closure
when an object is perceived as being whole despite actually being incomplete

FIGURE 6 The Gestalt principles of figure–ground and closure are used when we perceive the World Wildlife Fund logo as a giant panda.

A	B
X X X X X	X O X O X
O O O O O	X O X O X
X X X X X	X O X O X
O O O O O	X O X O X

FIGURE 7 We tend to perceive rows of 'X' and 'O' in Group A, and columns of 'X' and 'O' in Group B.

A	B
X X X X X	X X X X X
X X X X X	X X X X X
X X X X X	X X X X X
X X X X X	X X X X X
X X X X X	X X X X X

FIGURE 8 We tend to perceive Group A as rows and Group B as columns.

similarity
the principle that elements that are similar in appearance will tend to be seen as a unit

depth perception
the ability to accurately judge three-dimensional space and distance, using cues in the environment

proximity
the individual parts of a stimulus pattern are close together, allowing those parts to be perceived visually as a whole

binocular depth cues
depth cues that use both eyes to gauge distance and space

monocular depth cues
depth cues that use one eye independently or both eyes together to gauge distance and space

retinal disparity
the binocular depth cue that arises as the brain compares and contrasts the two slightly different images obtained because of the distance between the two eyes

Similarity

Similarity is when the individual parts of a stimulus pattern are similar (for example, size, shape or colour). We tend to group them together as a meaningful 'whole' – a single unit. In Figure 7, we tend to perceive rows of 'X' and 'O' in Group A, and columns of 'X' and 'O' in Group B.

Proximity

Proximity is when the individual parts of a stimulus pattern are close to each other. We tend to group them together as a meaningful 'whole' – a single unit. We can choose how to perceive a group of shapes, such as those in Figure 8 (as rows or columns), but we tend to perceive the ones in Group A as rows and Group B as columns.

Depth perception

Depth perception is the ability to accurately judge three-dimensional space and distance by using cues in the environment. Depth cues are vital, because we exist in a three-dimensional world but can only use two-dimensional images on our retinas to judge depth and distance.

Just as there are many examples of Gestalt principles, so there are of depth cues: there are many depth cues in addition to those listed here. These examples show us how depth and distance are perceived. Depth cues may be classified as **binocular depth cues** (using both eyes) or **monocular depth cues** (using one eye alone, or both eyes together).

Binocular depth cues

Retinal disparity

Retinal disparity occurs because our eyes are set about 6–7 centimetres apart (pupillary distance). When an object is within about 20 metres of a viewer (with the strongest depth cue occurring within 7 metres), each eye receives a slightly different image on the retina as a result of the different angles of view from each eye to the object being observed. The brain fuses these two images together in stereoscopic vision: the more different the two images, the closer the object will be to the viewer.

The process of retinal disparity is artificially recreated in 'magic eye' pictures from two flat, two-dimensional patterns viewed from about 20 centimetres. Each eye observes a slightly different view of the same scene and the brain fuses the two images together in the same way it would when observing a real (three-dimensional) scene.

convergence
a binocular cue for depth perception; the automatic turning of the eyes inwards as we watch an object approaching

accommodation
the process by which the ciliary muscles of the eye change the curvature of the lens to focus an image on the retina

CHALLENGE 5.2B

Retinal disparity

Retinal disparity can be demonstrated with the following simple test. Hold a pen at arm's length and look past it at the other side of the room. Close one eye and then the other and watch how far the pen 'jumps' from side to side. Now bring the pen closer – about 40 centimetres from your eyes – and repeat the process. Summarise your findings.

Convergence

Convergence is a binocular depth cue that is best illustrated in the following example: as an object comes closer to us, our eyes turn inwards to keep the object centred on the retina. Again, this cue operates for objects within about 7 centimetres. The brain reads the amount of turning from the tension of the muscles that move the eyes and uses this to make judgments of distance. The more our eyes turn, the closer the object is to the viewer. This is demonstrated in Challenge 5.2B.

FIGURE 9 This lady is experiencing convergence as she focuses on the pencil moving towards her face.

Monocular depth cues

Two types of monocular depth cues enable us to judge depth and distance using one eye: accommodation and pictorial cues.

Accommodation

Accommodation involves the eye's lens (located behind the iris) changing shape so that it can focus light rays onto the retina. Small muscles called ciliary muscles control whether the lens bulges (for closer objects) or flattens (for more distant objects). At the same time, the tension in the ciliary muscles is received by the brain to confirm the location of the object being viewed; the greater the tension, the closer the object.

Pick up a pen and close one of your eyes. Move the pen as close to you as you can while maintaining focus. You should be able to focus on an object between 8 and 10 centimetres away (depending on your eyesight). Keep focusing on the pen until you feel the tension within your eye. That's your ciliary muscles at work keeping your brain informed.

pictorial depth cues
a monocular depth cue used by artists to create a three-dimensional perception of something that exists on a two-dimensional surface

linear perspective
a monocular depth cue that parallel lines appear to converge as they retreat into the distance

Pictorial depth cues

Pictorial depth cues are used by artists to create a three-dimensional perception of something that exists on a two-dimensional surface.

- **Linear perspective** (first described by Leonardo da Vinci) is one of the most basic skills an artist uses to create apparent depth. Parallel lines are made to converge as they extend along the page to an imaginary point (where in theory they meet) at the horizon, as shown in Figure 10.

FIGURE 10 Linear perspective shows parallel lines converging in the distance.

interposition
a monocular depth cue, in which objects further from the observer are partially obscured by those in the foreground

texture gradient
a monocular depth cue in which texture in the foreground is seen in finer detail than that further away

- **Interposition** (overlap) is based on the partial blocking or obscuring of one object by another. The obscured object appears to be further away than the object obscuring (overlapping) it. This is an effective cue for determining which objects are closer than others, but it is not as effective for actually judging distance.
- **Texture gradient** is used to make surfaces in a picture appear to recede into the distance. Artists draw less and less detail as a surface is more and more distant, the same way we see it in real life. This is illustrated by the photo of the Marcoola Boardwalk on the Sunshine Coast, Queensland, as shown in Figure 11. In the foreground, we can see every detail of the wood and the railing, but as the boardwalk gets further away it becomes much less detailed.

FIGURE 11 The Marcoola boardwalk on the Sunshine Coast – the interposition caused by the trees overlapping, the linear perspective from the boardwalk rails and the relative size of the trees allow people to judge depth.

- **Relative size** is based on our tendency to perceive the object producing the largest retinal image as being the nearest, and the object producing the smallest retinal image as being the farthest. For this cue, it is necessary to know the real size of the objects so that accurate comparisons can be made. Think about watching a game of rugby from behind your team's goal – you realise that the players at the opposite goal are far away; you don't think they are tiny!
- **Height in the visual field** shows depth by portraying objects farther away as being closer to the horizon. In a picture, objects in the sky – such as aeroplanes, clouds and birds – will be perceived as farther away as they become lower in the visual field (closer to the horizon). On the other hand, objects on the ground – such as trees, houses and people – will be perceived as farther away as they become higher in the visual field (closer to the horizon).

relative size
a monocular depth cue based on our tendency to perceive the object producing the largest retinal image as being the nearest, and the object producing the smallest retinal image as being the farthest

height in the visual field
a monocular depth cue that shows depth by portraying objects further away as being closer to the horizon

CHECK YOUR LEARNING 5.2

Describe and explain

1 **Describe** how past experience influences perception.
2 **Explain** the effects of motivation and emotion on perception.
3 **Describe** size constancy and shape constancy.
4 **Summarise** how Gestalt principles work.
5 **Explain** why we find it difficult to see animals when they are camouflaged in their environment.
6 Provide an example of similarity. **Explain** why this example is seen as a single unit.
7 **Identify** which perceptual set would be used in the following scenarios:
   a Joe is really happy because he has been sailing. Joe looks across at another boat and sees a child. Joe decides the child is laughing.
   b Rachel is walking down her childhood street. Ahead, she sees the words 'Harry's café', however, when she gets closer she realises it says 'Hair styles'.

Apply, analyse and interpret

8 **Compare** Gestalt principles and depth cues.
9 **Differentiate** between monocular and binocular depth cues.
10 **Distinguish** between convergence and retinal disparity.

Investigate, evaluate and communicate

11 **Construct** a picture using the following pictorial depth cues. Label your picture with the pictorial cues. Make sure you **explain** and **evaluate** each one's effectiveness to illustrate your understanding.
   a linear perspective
   b interposition
   c texture gradient
   d relative size
   e height in the visual field

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 5.2
- **» Suggested practical**
  5.2 Expectation and perceptual set
- **» Challenge**
  Worksheet: 5.2A The farmyard
- **» Challenge**
  Worksheet: 5.2B Retinal disparity

5.3 Social influences on visual perception

KEY IDEA

In this section, you will learn about:

+ the effects of culture and other social factors on visual perception.

As discussed earlier in this chapter, many things influence how and what we see. Some of these are caused by changes in imagery and can result from changes that occur with age and genetics. It should not be a surprise that visual perception is also influenced by our social and cultural understanding.

When you see certain symbols or signs in your daily life, you are able to interpret their meanings based on the culture you have grown up in. When you meet someone, you shake their hand because that is typical behaviour in Australia; in many European countries, it is customary to kiss each other on both cheeks to say hello or goodbye; and in Japan, people often bow to each other as a sign of respect. All of these are normal in each respective society, and the way we perceive visual stimuli is no different.

FIGURE 1 Which of these animals is being hunted by the warrior?

Studies have found that cultural norms and expectations can influence how we interpret images. An image similar to Figure 1 was used by researchers to discover that members of some African tribes do not see two of the pictorial cues (relative size and height in the visual field) to estimate depth and distance. The tribe members were surprised at what they thought was a picture of a hunter attempting to spear a very small rhinoceros.

We as Australians know that a rhinoceros is much bigger than a zebra, so we apply our knowledge to judge that the zebra is much closer to us – at about the same distance as the hunter. We apply the depth cue of 'height in the visual field' to judge that the hunter is about to spear the zebra, not the rhinoceros, which is in the distance. Cross-cultural research has allowed psychologists to understand that even though every human being with normal vision receives exactly the same visual information, our individual and cultural experiences can influence our interpretation of what we see because of what we have seen before. You will learn more about cross-cultural psychology in Unit 4.

Deregowski's (1972) research found that the way that some Africans piece together information from a picture suggested that 'some form of learning is required to recognise pictures'. This reinforced previous findings that found some African tribes were unable to recognise three-dimensional depth cues in a photo of a profile of a human face: specifically, one participant was unable to understand where 'the other eye' had gone from the profile of the face (Deregowski, 1972). Deregowski's report built on research conducted by Hudson (1960).

Two-dimensional and three-dimensional perception

In 1957, Hudson tested 85 Bantu factory workers from different tribal backgrounds, educational levels and degrees of urbanisation. All participants were shown a series of 14 pictures that were unambiguous representations of a variety of situations where Bantu values were compared to Western values (Hudson, 1960).

Hudson found that there was a difference between two-dimensional and three-dimensional perception between African tribal members and the general population. Further, Hudson's study found that 'pictorial representation of a three-dimensional scene requires the observance and acceptance of certain artistic and graphic conventions', and that 'pictorial depth perception depends upon response to these conventional cues in the two-dimensional representation'. Using an image similar to Figure 1, Hudson found that education and cultural assumptions influenced how images were perceived. Those who had a higher education level were more likely to recognise that the 'hunter' was aiming for the 'zebra' than the rhinoceros. Furthermore, Hudson found that children who were attending school predominantly perceived images three-dimensionally, whereas children who were not attending school predominantly saw two-dimensional images.

From Hudson's and Deregowski's research, the effect of culture on visual perception is clear. Through formal education and cultural norms, people are able to learn how to interpret images that are relevant to their culture and society. The research suggests that pictorial depth cues are influenced not just by our visual systems, but by cultural and societal norms and expectations.

CHECK YOUR LEARNING 5.3

Describe and explain

1 **Explain** the role of height in the visual field and relative size in relation to Figure 1.

Apply, analyse and interpret

2 **Consider** the ethical implications involved in these studies, and the impact they have had on perceptual understanding.

Investigate, evaluate and communicate

3 **Evaluate** the impact of social and cultural expectations on visual perception, referencing the research of Hudson and Deregowski.

4 **Create** a methodology to test variations in cultural influence on visual perception.

5 **Discuss** the importance of understanding the differences in cultural influence on visual perception.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 5.3
- **» Suggested research**
  5.3 The impact of culture on visual perception
- **» Video**
  Social influences on visual perception
- **» Weblink**
  Culture and sight

SCIENCE AS A HUMAN ENDEAVOUR

5.4 Solving a puzzle: past experiences decide what we see

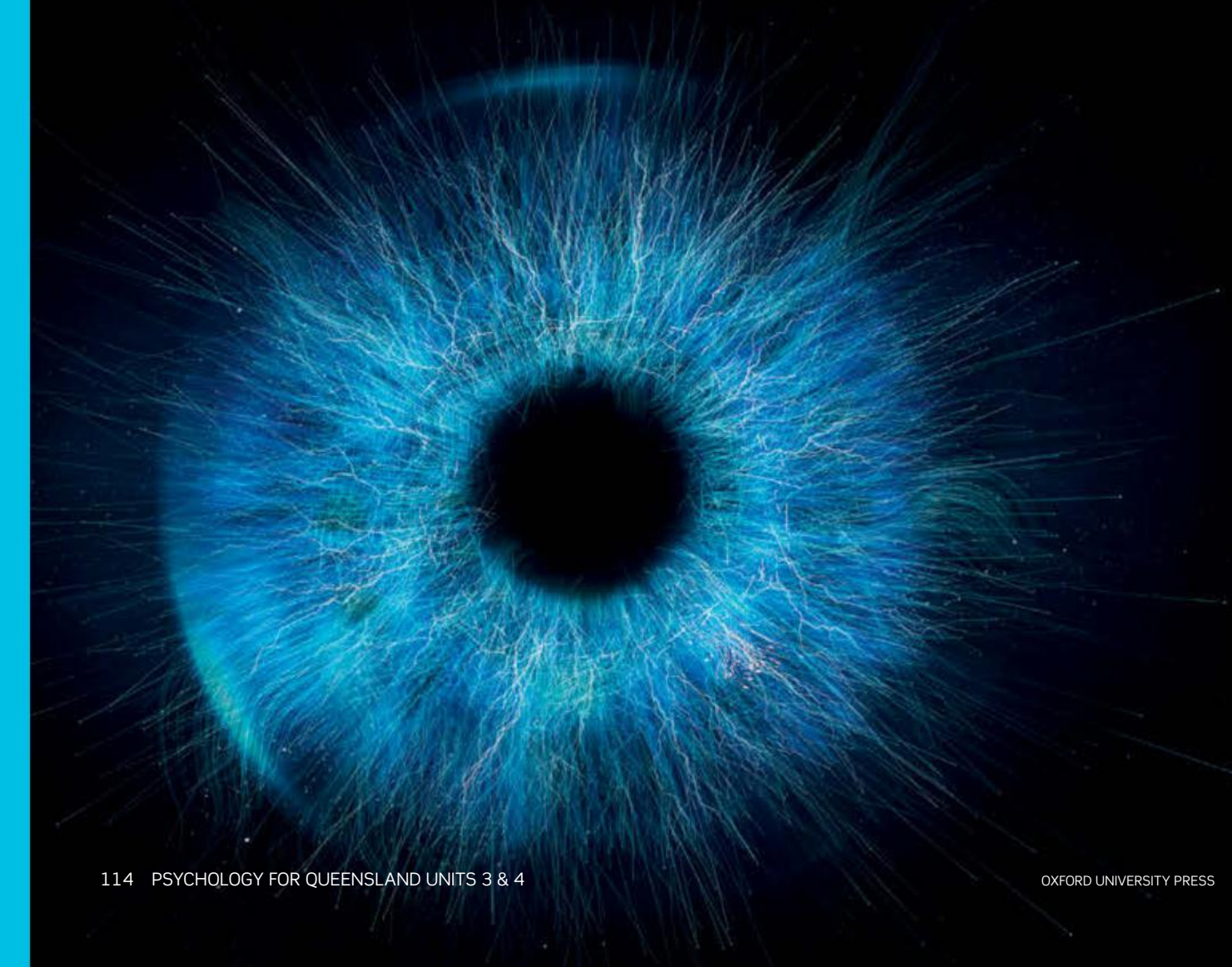
KEY IDEA

In this section, you will learn about:

+ the influence of memories, feelings, past experiences and evolution on how humans perceive visual stimuli.

Until the 1980s, many psychologists and scientists believed that vision relied entirely on the eye and visual cortex. There was little thought given to the influence of interpretation and perception on vision. Research has now shown that visual perception involves various areas of the brain working together to interpret stimuli through the eyes.

In Unit 2, you learnt how people's prior experiences or fears can influence how a stimulus is interpreted. For example, someone with a phobia of spiders may misinterpret black cotton on the floor as a threat and run away. In this instance, it is unlikely that the individual's visual system has failed; rather, it is more likely that their fear, which provided prior knowledge, has influenced how they interpreted what they saw.



In a 2018 study by Gonzalez-Garcia, Flounders, Change, Baria & He, it was found that visual perception was extensively influenced by prior experiences. The study argued that for people to recognise present stimuli, they must combine their current visual pathway with previous experiences. The study used fMRI imaging to see what areas of the brain were active while processing visual stimuli, specifically while viewing a collection of Mooney images (low information, two-tone images typically of a face). See Figure 1.

Each image was shown briefly and blurred. After viewing the images, participants were asked if they could identify the object that was shown. As participants identified the images, the fMRI images revealed that, when shown a clear image of the Mooney picture, participants could name the object easily. But when an image was not clear, participants had to call on past memories and experiences to identify the image, which led to both false and correct identifications.

This study showed that two brain networks are used to identify an image: the default-mode network (DMN), and the frontoparietal network (FPN). These systems had previously not been associated with visual interpretation and perception.

The study provided further evidence that human visual perception and interpretation was largely reliant on cognitive processes – not specifically the eye or biological processes, as previously thought. As mentioned earlier in this chapter, visual acuity is strongly influenced by psychological and social factors such as cultural expectations and prior experience.

FIGURE 1 An example of a Mooney face

CHECK YOUR LEARNING 5.4

Describe and explain

1 **Describe** the relationship between interpretation, perception and visual acuity.

Apply, analyse and interpret

2 Trey was playing football in the park with his friends when he jumped at the sight of a snake. Trey's friends laughed, because it was actually a stick. Upon closer inspection, Trey realised it was a stick too and questioned why he had been so quick to believe it was a snake. When Trey was 5 years old, he lived on a property in rural Queensland populated with many snakes.

Apply your understanding of visual acuity and past experiences to Trey's scenario.

Investigate, evaluate and communicate

3 **Evaluate** the 2018 study by Gonzalez-Garcia, Flounders, Chang, Baria & He and **propose** a modification.

4 **Assess** the following claim: 'Without access to cognitive systems, humans would not be able to assign meaning to anything they see, and would therefore not be able to visually perceive sensory stimuli'.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 5.4
- **» Video**
  The research investigation
- **» Weblink**
  Cognitive influence on vision

CHAPTER 5

Review

Summary

5.1
- With age, people can develop presbyopia – a condition that develops as a result of the lens losing elasticity, which makes it difficult to focus on close objects.
- As people age, they may find 'floaters' appear in their vision. These are clumps of matter that form in the vitreous fluid around our eye.
- Cataracts form when proteins in the lens break down and cause the lens to become cloudy.
- Glaucoma is a condition where the optic nerve is damaged and the transmission of peripheral information to the brain is interrupted.
- Age-related macular degeneration occurs with age as grainy deposits build up in the centre of the retina and affect central vision.
- We can inherit visual disorders, such as colour blindness, which is carried on the X chromosome. We can also inherit retinis pigmentosa, which causes problems with night vision.

5.2
- Our perceptual set is a predisposition to attend to certain aspects of a visual scene or interpret information in a particular way. This is influenced by our past experiences, the context of the visual scene, our motivation and our emotions.
- Size constancy is our ability to maintain a constant perception of an object's size, despite the size of the image on our retina altering as the object moves closer to or farther from us.
- Shape constancy is our ability to maintain the shape we know an object is, despite changing perspectives.
- There are four Gestalt principles of visual perception:
  - figure–ground organisation: where we tend to focus on the central object of an image (figure) and a background (ground)
  - closure: where we perceive an object as whole, despite it actually being incomplete
  - similarity: where elements that are similar in appearance tend to be seen as a unit
  - proximity: where we perceive close parts of a visual stimulus to be a whole.
- Depth perception is the ability to judge three-dimensional space and distance based on environmental cues.
- Two of the most prominent binocular depth cues include:
  - retinal disparity, where we contrast the slightly different images because of the distance between our eyes
  - convergence, where our eyes will turn inwards to watch an object approaching.
- Monocular depth cues use one eye to judge depth and distance. The eye does this via accommodation where the eye changes the curvature of the lens to focus an image on the retina via pictorial depth cues.
- Pictorial depth cues include linear perspective, interposition, texture gradient, relative size and height in the visual field.

5.3
- Visual perception is influenced by our social and cultural understanding. Studies found that two-dimensional and three-dimensional perception can vary between cultures based on cultural norms and understanding.

Key terms

- accommodation
- achromotopsia
- age-related macular degeneration
- binocular depth cues
- camouflage
- cataracts
- closure
- colour vision deficiency
- congenital visual disorders
- convergence
- depth perception
- figure–ground organisation
- floaters
- Gestalt principles of visual perception
- glaucoma
- height in the visual field
- inherited visual disorders
- interposition
- linear perspective
- monocular depth cues
- perceptual constancies
- perceptual set
- pictorial depth cues
- presbyopia
- proximity
- relative size
- retinal disparity
- retinis pigmentosa
- shape constancy
- similarity
- size constancy
- texture gradient

Revision questions

The difficulty of the short answer questions is indicated by the number of stars: ★ = easy, ★★ = medium, ★★★ = hard.

Multiple choice

1 Identify which of the following statements about size constancy is correct.

A Size constancy refers to the fact that our pupils grow bigger or smaller as an object moves nearer to or farther from us.

B Size constancy refers to how one object compares in size to another.

C Size constancy means that even though an object moves nearer to or farther from us, our perception of its size remains constant.

D Size constancy refers to how our eyes actually take in more visual stimuli than we pay attention to.

2 Define the Gestalt principle of camouflage.

A an animal classification for those whose appearances match their environment

B where the contour of the figure is broken so that it blends in with the ground, obscuring the figure

C an army uniform

D where the figure is distinct from the ground

3 Identify which of the following correctly pairs the names of two sets of visual perceptual principles with examples from those sets.

A Gestalt principles – linear perspective; depth cues – convergence

B perceptual set – expectancies; Gestalt principles – closure

C depth cues – retinal disparity; Gestalt principles – orientation constancy

D Gestalt principles – figure–ground organisation; depth cues – texture gradient

4 As I was driving along the freeway, a huge truck came hurtling up behind me. It seemed to take ages for the long body to get past as it overtook me. Afterwards, it gradually disappeared up the road in front of me. Which of the following principles would I have applied to help me realise that the truck remained the same size, although its image on my retinas changed?

A shape constancy and size constancy

B size constancy and orientation constancy

C brightness constancy and orientation constancy

D brightness constancy and size constancy

5 Distinguish between the Gestalt principles of similarity and proximity.

A They are two different names for the same concept.

B Similarity is when parts of a stimulus pattern are a similar distance from each other; proximity is when parts of a stimulus pattern are the same colour.

C Similarity is the part of a stimulus pattern that sits in rows, while proximity is the part that sits in columns.

D Similarity is when parts of a stimulus pattern are physically similar so that we perceive them as a whole; proximity is when parts of a stimulus pattern are close together so that we perceive them as a whole.

6 Identify the binocular depth cues.

A linear perspective and convergence

B retinal disparity and accommodation

C relative size and linear perspective

D convergence and retinal disparity

7 As she was driving to Perth from Melbourne, Jodi called out, 'Look, Mum, there are hundreds of rabbits!' As they gradually got closer, Jodi said, 'Oh! They're actually big kangaroos!' What caused Jodi's initial error of perception?

A previous experience with rabbits, causing a perceptual set that led to selection of specific parts of the scene being attended to

B previous experience with rabbits, causing a perceptual set that led to a particular interpretation of the scene

C the context in which the animals were seen, causing a perceptual set that led to selection of specific parts of the scene being attended to

D the context in which the animals were seen, causing a perceptual set that led to a particular interpretation of the scene

8 Select which of the following statements is true of glaucoma.

A It is degeneration of the optic nerve, affecting peripheral vision.

B It is an age-related condition that can be cured if diagnosed early.

C It is an age-related condition that affects the cornea and lens.

D It is age-related degeneration of the optic nerve, affecting central vision.

9 Identify the definition of age-related macular degeneration.

A the degeneration of the cornea, which affects peripheral vision

B a break-down of proteins in the lens, which affects central vision

C a build-up of grainy deposits in the retina, which affects central vision

D a build-up of proteins in the lens, which affects central vision

10 Culture has been shown to influence our visual system in which of the following ways?

A Formal education has no impact on our visual system but societal and cultural norms do.

B Formal education, cultural norms and expectations, and our visual systems influence depth cues.

C Prior learning is not essential to recognise pictures.

D People from all cultures interpret depth cues in similar ways.

Short answer

Describe and explain

★ 11 **Explain** the Gestalt principle of similarity, and **use** a visual example to support your answer.

★ 12 **Explain** how senses other than taste influence our perception of flavour.

★ 13 **Explain** why people from traditional hunter-gatherer societies may have difficulty interpreting three-dimensional images. **Use** an example to illustrate this.

★ 14 **Describe** retinis pigmentosa.

★ 15 **Describe** how closure works.

★★ 16 **Explain** what a perceptual constancy is.

★★ **17** **Explain** what is meant by the term 'perceptual set'. Provide an example for the:

a sense of vision

b perception of flavour.

★★ **18** **Identify** and briefly **describe** the different types of colour blindness/deficiency.

Apply, analyse and interpret

★ **19** **Compare** the main distinction between congenital and inherited visual disorders.

★ **20** **Contrast** perceptual constancies and Gestalt principles.

★ **21** **Distinguish** between motivation and emotion in relation to perceptual set.

★ **22** **Consider** possible social influences on how teenagers in Australia interpret certain visual stimuli and how this may differ from teenagers in other countries.

★★ **23** Eli noticed that his grandfather's eye has become cloudy. **Determine** what is affecting Eli's grandfather's eye and explain what causes it.

Investigate, evaluate and communicate

★★ **24** Jack and his cricket team were practising fielding by catching a ball that the coach hit high in the air. After a few team members had dropped catches, the coach insisted that all players hold their hands in front of their face and watch the approaching ball through the gaps between their fingers. Jack was surprised that his success rate improved using this new technique. **Propose** why his performance improved.

★★ **25** Your Aunty Kathy is complaining about the squiggly lines that float through her vision as she focuses on the white wall she is painting. **Propose** what this condition might be and **explain** its biological cause.

★★ **26** **Explain** how our physiological make-up can impact our visual perception system. **Justify** your answer with an example.

★★★ **27** Your grandfather is having trouble reading the drinks menu at the café. **Explain** what may cause this, and **evaluate** why this happens. **Investigate** treatment options if any are available.

★★★ **28** **Predict** whether people would be more likely to see a rat or a man in the rat-man illusion (Figure 2, p. 108) after viewing either the first row or the second row of the following images.

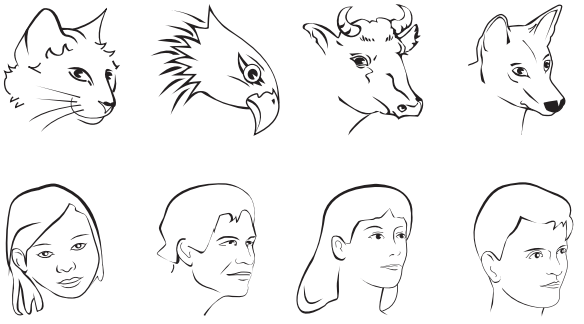


FIGURE 1 Do you think either row would affect someone's perceptual set?

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 5 Review
- **» Revision notes**
  Revision notes for Chapter 5
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 5

CHAPTER 6

The fallibility of visual perception

Illusions are mistaken perceptions of visual stimuli. In vision, we may misjudge length, curvature, position, speed or direction in an illusion, but it is the brain that is tricked, not the sense organs! Illusions are generally referred to as optical illusions, giving the impression that the eye is the reason for the illusion. However, this is not the case – it is due to the way our entire visual system perceives and interprets an image that results in a mismatch between the actual object and our perception of the object. Simply put, visual illusions are all about how the brain works, not how the eye works.

There are many examples of popular visual illusions. In this chapter we will explore the mechanics of visual illusions, including why our visual perceptions sometimes fail to match the physical reality of images in the outside world (Nierenberg, 2009).

OBJECTIVE

→ Analyse the fallibility of visual perception, with reference to the Müller-Lyer, Ames room, and Ponzo visual illusions, as well as ambiguous and impossible figures.

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

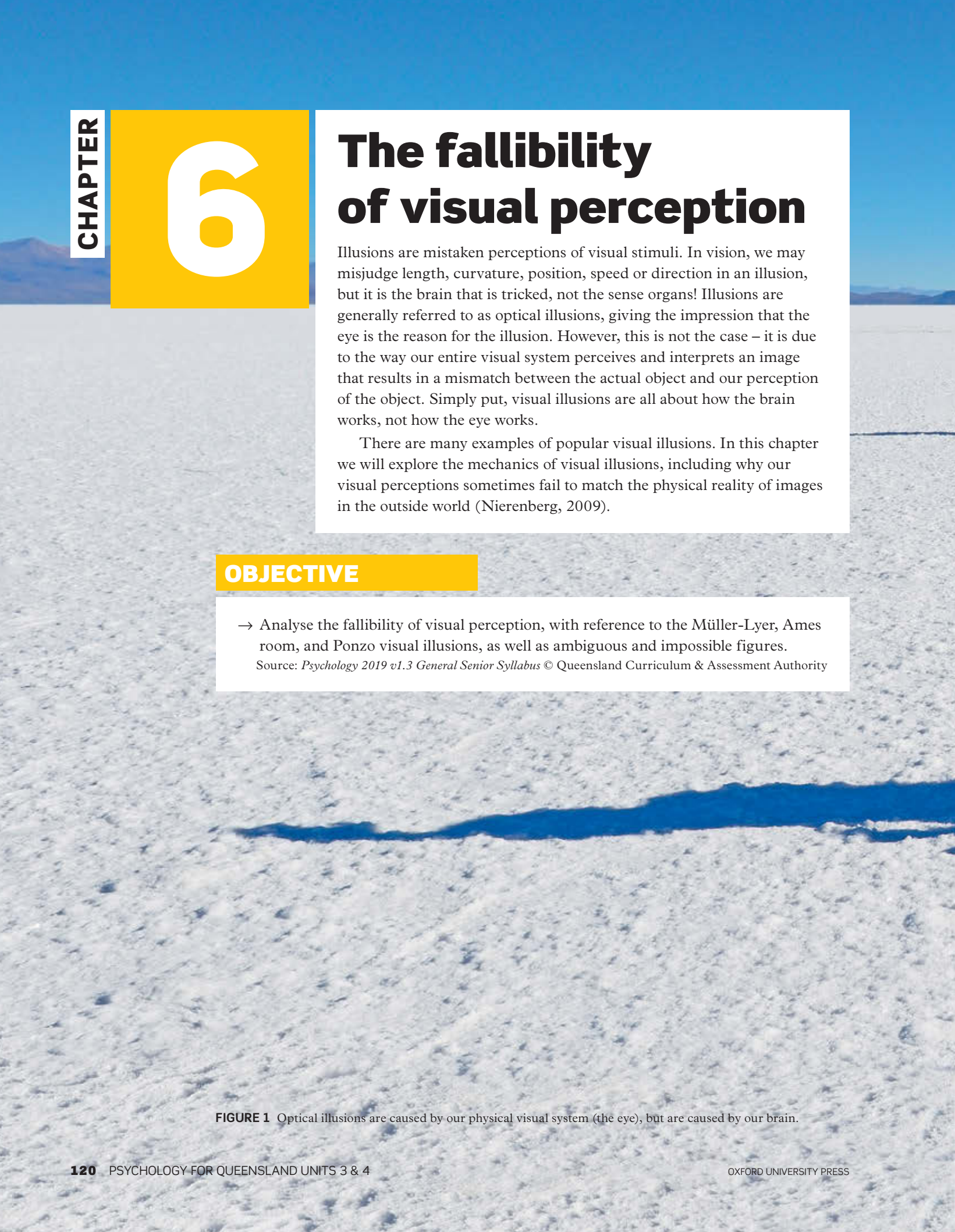


FIGURE 1 Optical illusions are caused by our physical visual system (the eye), but are caused by our brain.

6.1 Illusions

KEY IDEAS

In this section, you will learn about:

- the fallibility of visual perception
- the Ponzo illusion, the Müller-Lyer illusion and the Ames room illusion.

visual illusion
a figure structured so that perception will consistently differ from objective reality

illusion
a phenomenon in which perceptions consistently differ from objective reality

Ponzo illusion
an illusion where people perceive two lines of the same length as different

Study tip

Try to find visual examples of each illusion (e.g. the room in Figure 3).

A **visual illusion** occurs when perception consistently differs from objective reality – it is consistent from person to person and from time to time. **Illusions** are caused by psychological factors, as opposed to other distortions of perception, which can be caused by biological factors.

The Ponzo illusion

In the **Ponzo illusion** (Figure 1) the upper horizontal line in each diagram is perceived to be longer than the lower horizontal line. Why? We mistakenly perceive this because of the depth cues of linear perspective and height in the visual field – both of which make the upper line appear to be further from us. Because it casts the same-size image on the retina, we perceive the 'more distant' line to be longer.

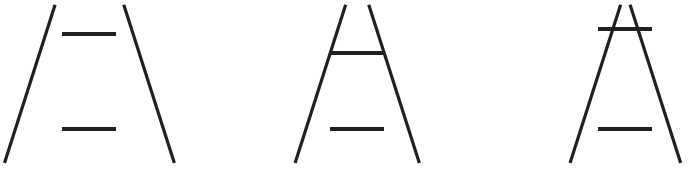


FIGURE 1 The Ponzo illusion

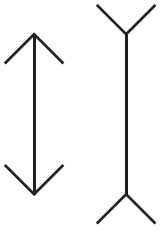


FIGURE 2 The Müller-Lyer illusion: which vertical line is longer?

carpentered world hypothesis
a theory applied to the Müller-Lyer illusion that proposes that our familiarity with the right angles and straight lines of the built environment informs our interpretation of linear perspective in pictorial depth perception

The Müller-Lyer illusion

The Müller-Lyer illusion (Figure 2), consists of two lines of equal length, each having opposite-shaped patterns on the ends. One line has regular arrowheads; the other has inverted arrowheads (feather-tails). The line with feather-tails is perceived as being longer than the arrow-headed line. The following are two different theories to explain the Müller-Lyer illusion.

The carpentered world hypothesis

British psychologist Richard Gregory proposed the **carpentered world hypothesis** (Figure 3) – he believed that the Müller-Lyer illusion involves the 'misapplication of size constancy'. In a three-dimensional world, we maintain a constant perception of the size of a familiar object by considering its distance from us. Gregory argues that we mentally make a three-dimensional form of each figure, using familiar features of buildings to do so. This causes the observer to perceive the arrow-headed line as the leading vertical edge of a building's outside wall (closest to the observer). The line with the feather-tails is perceived as being further away (the inside corner of a room). Because the feather-tailed line is perceived as being the more distant of the two, and each line produces an equal length image on the retina, we interpret the line with feather-tails to be longer.

Evidence to support this theory came when the illusion was shown to country-dwelling Zulu people who live in round huts with rounded doors and windows. They did not perceive the lines to be different lengths as they had never learnt to judge distance from corners and angles. Zulu people living in cities in South Africa were fooled by the illusion like everyone else.

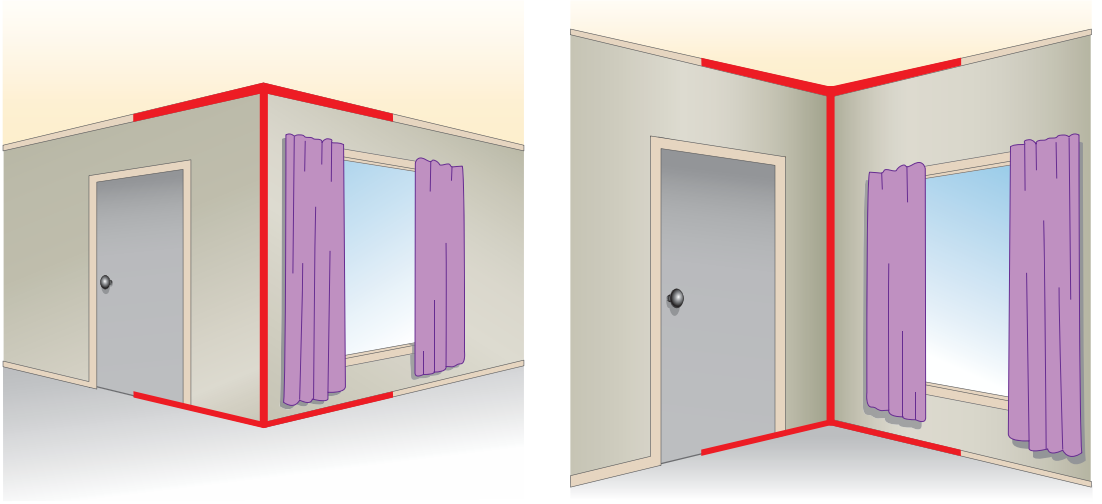


FIGURE 3 Which room has the higher walls? The Müller-Lyer illusion is affected by our depth judgments.

The perceptual compromise theory

Ross Day, an Australian psychologist, proposed the **perceptual compromise theory**.

perceptual compromise theory
an explanation for the Müller-Lyer illusion, proposing that we perceive the line with feather-tails as being longer than the arrow-headed line because our minds apply the Gestalt principle of closure

1. Both parallel lines cast identical-sized images on the retina.
2. The arrowhead or feather-tail lines at the ends of the figures create 'open' figures that cause us to apply the Gestalt principle of closure.
3. This creates a more 'solid' figure as shown by the blue lines in Figure 4.
4. Because of the perceptual compromise made, we perceive each figure to be the length of the average between the internal (black) line and the external (blue) lines.
5. As a result of this, the vertical line on the left is perceived to be much shorter than the vertical line on the right, each being perceived to be as along as the distance between the green lines shown in Figure 5.

Evidence in support of this theory is that the illusion occurs even when the ends of the lines are 'U'-shaped or completed circles, as shown in Figure 6. Most illusions are psychological distortions of perception, but there is one type of illusion that has a physiological basis.

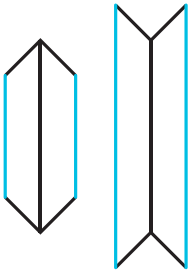


FIGURE 4 The blue lines show how our mind applies the Gestalt principle of closure so that the vertical line on the right appears longer.

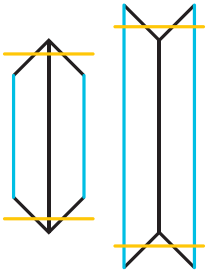


FIGURE 5 Our mind averages out the black and blue lines, and we perceive the length to be as shown by the distance between the yellow lines.

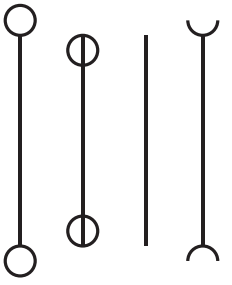


FIGURE 6 If the arrowheads and feather-tails are replaced with 'U' shapes and circles, the illusion still occurs.

CHALLENGE 6.1A

What size is a full moon?

Isn't it amazing how we often look at the full moon on the horizon and it appears to be huge – yet that same night, if we look at the moon when it's high in the sky, it looks normal size!

Investigate the 'moon illusion' and consider the different theories about why this occurs.

Ames room illusion

The Ames room is an illusion that causes an individual to perceive people or objects of similar size as vastly different in size. The illusion demonstrates that we maintain shape constancy (in this case, a room) at the expense of size constancy; this is because the Ames room is constructed in the shape of a trapezoid, but when viewed through a peephole (restricting vision to one eye), it appears square. It is necessary to prevent the use of both eyes, so that binocular depth cues (the strongest) do not influence your perception.

Figure 8 shows that the rear wall of the Ames room is farther away from the viewer in the far-left corner compared with the far-right corner (the far-left corner is twice as far away from the peephole). Furthermore, to make the illusion seem more real, the ceiling is not parallel to the floor. It slopes upwards from right to left: this means the height of the room in the far-left corner is double that of the far-right corner.

As a person walks from the left corner to the right corner, the observer maintains shape constancy and sees the person as walking across the room in a straight line, rather than towards the back of the room.

This occurs because the human brain is prevented from maintaining size constancy because of the eye's reliance on monocular depth cues. This causes the person to appear to grow rapidly in size as they cross the room; your brain has to choose to maintain room-size constancy or human-size constancy.

Your brain literally chooses to ignore human-size constancy and instead focuses on the room-size constancy.

CHALLENGE 6.1B

How tall is a hobbit?

The Ames room illusion was extensively used in the filming of *The Lord of the Rings* and *The Hobbit* movies to make dwarves and hobbits appear smaller than elves and humans! This was most notable in the scenes featuring the interiors of the Hobbiton houses.

Think about how filming an illusion could change an illusion.

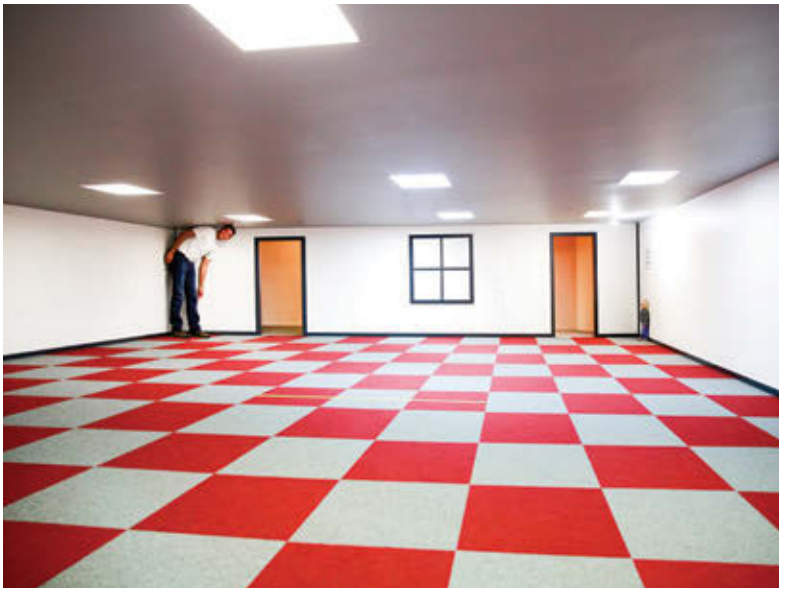


FIGURE 7 The Ames room is not really rectangular, but because of our lifetime of experience with rectangular rooms, we perceive it to be bounded by right angles. In fact the 'smaller' person is simply twice as far from the observer as the 'larger' person.

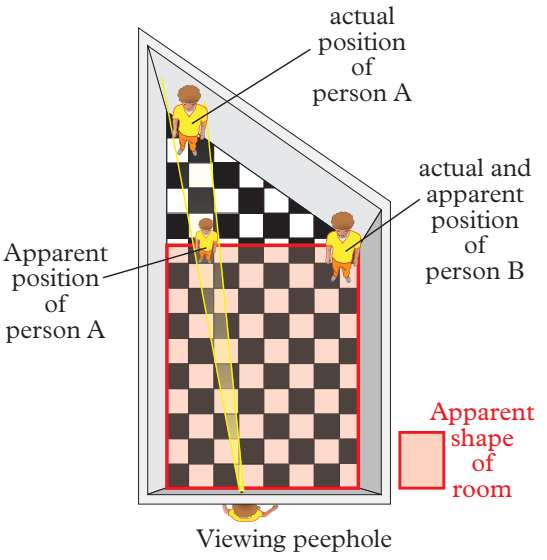


FIGURE 8 The actual shape of the Ames room

CHECK YOUR LEARNING 6.1

Describe and explain

1 **Explain** how the Müller-Lyer illusion works.
2 **Describe** the Ponzo illusion.
3 **Identify** the depth cues that the Ames room interferes with.

Apply, analyse and interpret

4 **Compare** the Müller-Lyer illusion with the Ponzo illusion.
5 Think about the apparent and actual positions of people in the Ames room. **Apply** your understanding of psychological influences on perception.

Investigate, evaluate and communicate

6 **Create** your own variations of the Müller-Lyer illusion and Ponzo illusion, and try these on your classmates.
7 **Predict** what would happen if the viewing peephole of the Ames room were bigger.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 6.1

» **Challenge**
Worksheet: 6.1A What size is a full moon?

» **Challenge**
Worksheet: 6.1B How tall is a hobbit?

6.2 Ambiguous and impossible figures

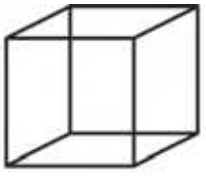
KEY IDEAS

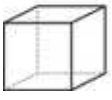
In this section, you will learn about:

- how perception of visual stimuli can be manipulated
- impossible and ambiguous figures.

FIGURE 1 The Penrose triangle seems to have no start or finish point, and bends at angles that seem incorrect.

FIGURE 2 The work of M.C. Escher involves playing with visual perception.





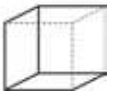


FIGURE 3 The Necker cube challenges our sense of direction. Depending on how we look at the cube, it may appear to face upwards or downwards.

As seen in Section 6.1, there are many ways that our perception of visual stimulus can be manipulated by changes in length or angles. Our visual perception can also be tricked by ambiguous or impossible figures. Pictures can show something that exists, such as the Brisbane skyline, or they can show something that does not exist, such as Hobbiton.

Impossible figures

Impossible figures work by exploiting perceptual cues so that we are forced to see images that should not be possible, or should not be able to exist. Impossible figures are two-dimensional images that are visually interpreted as representing three-dimensional objects. Typically, we realise that we are viewing a two-dimensional object rapidly; however, we will still struggle to completely remove the image of the three-dimensional object. Some examples of impossible figures can be seen in Figures 1, 2 and 3.

For example, Figure 2 is a digital rendering of M.C. Escher's *Waterfall*. This artwork takes advantage of the Penrose triangle (Figure 1), to create the illusion between the different 'levels' in the illustration.

The Necker cube (Figure 3) was first created in 1832. It has no visual cues to suggest its orientation, though we do not interpret it as two squares with diagonal lines, we interpret it as a cube. Figure 3 displays how the lines can be interpreted as either having the cube facing up or down, depending on whether we believe that the lower-left or upper-right corner is the front of the cube. Typically, people tend to see the lower-left face as being the front, most likely because we typically view images as though we are looking down.

The reasons why we continue to see these images despite knowing that they are not physically possible continue to be questioned. Studies have suggested that we have a strong set of visual cues, and that despite knowing they are making us see things 'incorrectly', we rely on these cues so strongly that we still interpret the image as correct.

Ambiguous figures

An **ambiguous figure** is a type of optical illusion. They work by exploiting similarities in the image and aspects of the way our visual system interprets between two or more distinct changes. They induce multi-stable perception – where we are able to see two or more different but unchanging images.

Gestalt principles are thought to be the reason that we are able to view ambiguous figures. Gestalt principles allow us to group information quickly, and from that

our brain is able to quickly fill in any 'gaps' in visual information. Because our brain fills in the 'gaps' we quickly view an ambiguous image as a whole image. We use the principle of continuation to ensure that we can see the edges of the image, the principle of similarity to group anything in a visual stimulus together, and the principle of proximity to assess the spatial distance. The figure-ground principle is also used as we use this to assess what part of the image would be in the foreground.

impossible figure
a type of optical illusion involving a two-dimensional figure which people interpret as three-dimensional

In *My wife and my mother-in-law* (Figure 4) we can only see one of the characters at a time. However, when we shift our perception, we are able to switch between the young girl and the old woman. We shift our perception by focusing on different parts of the image. The eye of the old woman is the ear of the young lady; similarly, the line that is the old woman's mouth is the young lady's necklace.

ambiguous figure
a type of optical illusion that exploits visual similarities

Rubin's vase (Chapter 5, page 107) is another classic example of an ambiguous figure; depending on what you choose to focus on, you can either see two faces or a vase. Deciding which colour is the foreground or the background will determine what you see.

Ambiguous and impossible figures highlight the way visual perception operates, particularly that our visual system works as interconnection between different brain regions and different systems to produce a final image. As a result of this, our brain can be mistaken.

FIGURE 4 My wife and my mother-in-law

CHECK YOUR LEARNING 6.2

Describe and explain

1 **Explain** what an impossible figure is.
2 **Describe** an ambiguous figure.

Apply, analyse and interpret

3 **Compare** impossible figures and ambiguous figures.
4 **Differentiate** between an optical illusion, such as the Müller-Lyer illusion, and an ambiguous figure.
5 **Consider** the effectiveness of the ambiguous figure in Figure 4. How does it work?

Investigate, evaluate and communicate

6 **Evaluate** the role of Gestalt principles in visual illusions.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 6.2

» **Weblink**
Impossible figures

» **Weblink**
Ambiguous figures

CHAPTER 6

Review

Summary

6.1

- A visual illusion is a figure structured so that perception will consistently differ from objective reality, whereas illusions are a phenomenon in which perceptions consistently differ from objective reality.
- The Ponzo illusion is an illusion whereby upper horizontal lines in a series of diagrams are perceived to be longer than the lower horizontal lines because we mistakenly perceive depth cues of linear perspective and height in the visual field – making the upper line appear to be further from us.
- The Müller-Lyer illusion consists of two lines of equal length with regular arrowheads on one end, and inverted arrowheads on the other. We perceive the line with inverted arrowheads as being longer than the arrow-headed line.
- The Ames room illusion shows that we maintain shape constancy of a room at the expense of size constancy, which can be partially explained by how we perceive depth cues.
- Our perception of visual stimuli can be manipulated by changes in length or angles.

6.2

- Impossible figures work by exploiting perceptual cues so that we are forced to see images that should not be possible, or should not be able to exist.
- Ambiguous figures are examples of optical illusions that work by exploiting similarities in the image and aspects of the way our visual system interprets between two or more objects in an image.
- Ambiguous and impossible figures highlight the way our visual system works as interconnection between different brain regions and different systems to produce a final image.

Key terms

- ambiguous figure
- carpentered world hypothesis
- illusion
- impossible figure
- perceptual compromise theory
- visual illusion

Revision questions

The relative difficulty of the short answer questions is indicated by the number of stars beside each question number: * = low, ** = medium, *** = high.

Multiple choice

1 Which of the following statements about visual illusions is correct?
- **A** They are caused by both psychological and biological factors.
- **B** They occur when perception is consistent with visual reality.
- **C** They occur when perception consistently differs from objective reality.
- **D** They occur when the sense organs misinterpret stimuli.

2 What does perceptual compromise explain?
- **A** ambiguous figures
- **B** the Ames room illusion
- **C** the Müller-Lyer illusion
- **D** the Ponzo illusion

3 Which of the following statements applies to the Ames room illusion?
- **A** We maintain size constancy at the expense of shape constancy.
- **B** We maintain shape constancy at the expense of size constancy.
- **C** It relies on binocular depth cues to maintain the illusion.
- **D** It is explained by the carpentered world hypothesis.

4 Which of the following statements in regard to ambiguous figures is correct?
- **A** They are explained by the visual misinterpretation of two-dimensional images.
- **B** They induce multi-stable perceptions.
- **C** They exploit differences in the image and aspects of our visual interpretation.
- **D** They are an example of how our sensory organs misinterpret information.

5 What is the Necker cube?
- **A** an ambiguous figure
- **B** a Gestalt principle
- **C** an example of an exploitation of our perceptual cues
- **D** an example of a perceptual compromise

Short answer

Describe and explain

★ 6 **Explain** why visual illusions should not be referred to as optical illusions, using an example of impossible figures to support your answer.

★★ 7 **Describe** how the carpentered world theory relates to the Müller-Lyer illusion. Use an example from a cultural perspective.

★★ 8 **Summarise** perceptual compromise theory, applying Gestalt principles as part of your answer.

Apply, analyse and interpret

★ 9 **Use** an example to **differentiate** between a visual illusion and an illusion.

★ 10 **Compare** an ambiguous figure with the Ames room.

Investigate, evaluate and communicate

★★ 11 **Design** a methodology that investigates the impact of psychological influences on perceiving an optical illusion.

★★★ 12 **Explain** how Gestalt principles are thought to apply to our perception of ambiguous figures. **Justify** your explanation by using an example of an ambiguous figure to help your explanation.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 6 Review
- **» Revision notes**
  Revision notes for Chapter 6
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 6

CHAPTER 7

Understanding memory

Imagine being asked to remember the names of 50 strangers you have just been introduced to. This is not an easy task for most of us. Alternatively, imagine you have a photographic memory and can remember something forever after seeing it once? This is a reality for people like fictional character Mike Ross in the TV series, *Suits*.

Memory is a psychological concept that involves encoding, storing and retrieving (or recalling) information. Memory involves taking something we have observed and converting it into a form we can store, retrieve and apply in our everyday lives (Burton *et al*., 2019). Oscar Wilde said, 'Memory … is the diary that we all carry about with us'.

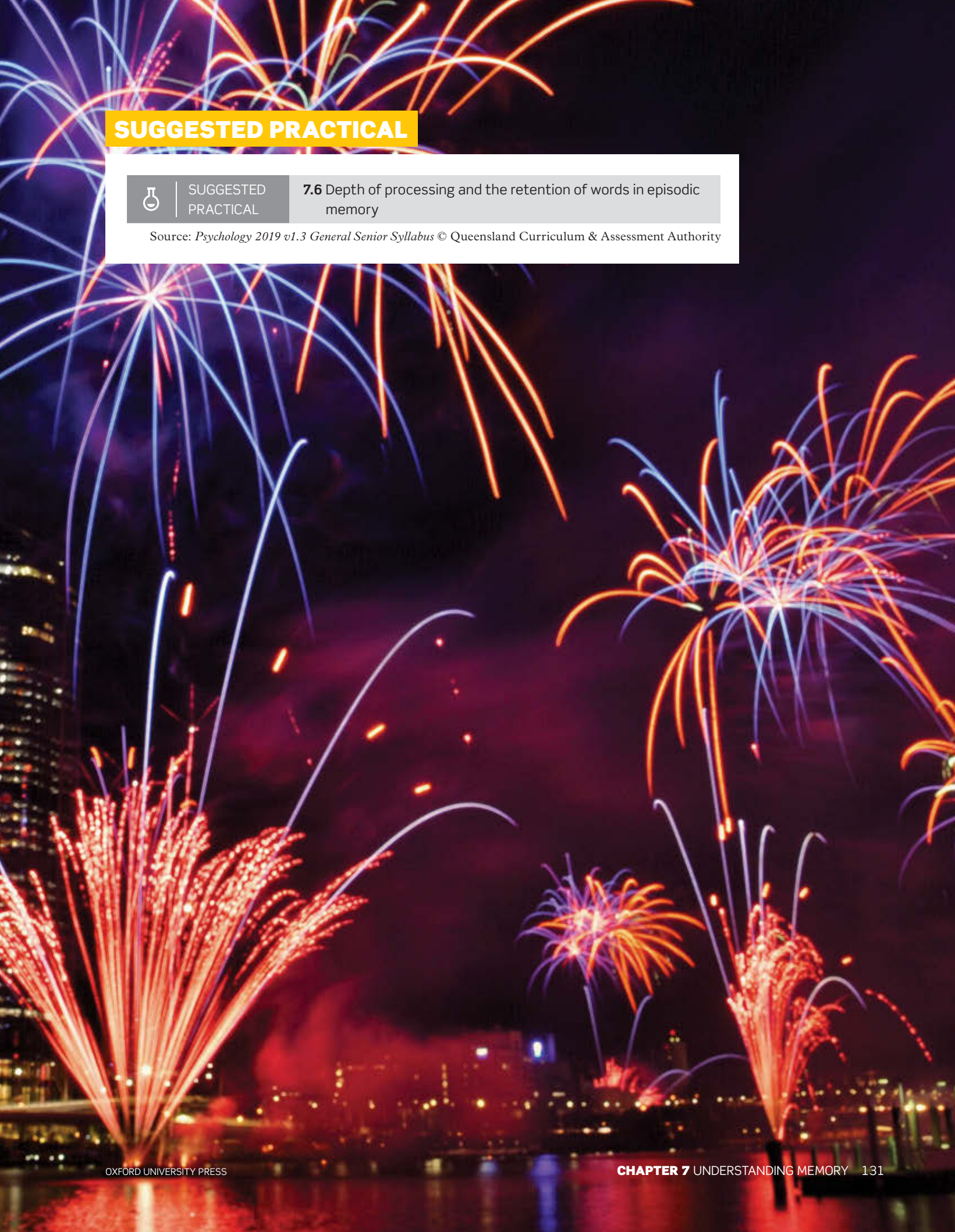
The various models that are used to describe memory are complementary, and no single model explains all of human memory. By considering several models together, we can build up a picture of what human memory is and how it works. The models do not describe the physical reality of memory, but they help our understanding, communication and research in the field.

OBJECTIVES

- → Recognise the duration and capacity of sensory memory (including iconic and echoic), and short-term and long-term memory.
- → Evaluate two models of memory, including:
  - the working model of memory (Alan Baddeley & Graham Hitch 1974), including the central executive, phonological loop, visuospatial sketchpad and episodic buffer
  - the levels of processing (LOP) model of memory, including the role of encoding in long-term memory.
- → Explain how information is stored in long-term memory with reference to implicit (procedural) and explicit (episodic and semantic) memory.

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

FIGURE 1 Seeing an image of fireworks might remind you of New Year's Eve, as hearing them might remind you of thunder. This is because our brain uses cues to retrieve memories, and emotive memories are stronger.



SUGGESTED PRACTICAL

SUGGESTED PRACTICAL	**7.6** Depth of processing and the retention of words in episodic memory

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

7.1 The processes of memory

KEY IDEAS

In this section, you will learn about:

- how memory works, including encoding, storage and retrieval
- the multi-store model of memory.

To understand the different models of memory, it is helpful to be familiar with the memory process. In fact, it is similar to the way we use a computer. Memory depends on three sequential processes: **encoding**, **storage** and **retrieval**.

encoding the process of putting information into a form that will allow it to fit with your personal storage system

storage maintaining encoded information in a memory store

retrieval the process of getting information back from long-term memory to be used in working memory

Encoding

Encoding refers to the process of putting information into a form that will allow it to fit with your personal storage system. For example, if you strike the 'F' key on your computer and press 'Enter', an electronically coded message representing 'F' goes into the computer. The same happens when we put an idea into the brain, but for us the idea is changed into an electrochemical code.

Storage

Storage is keeping information in the brain so that we can use it later on – like saving it to the hard drive of a computer. We store the information in an organised way to make it easier for us to recover memories when we need them.

Retrieval

Retrieval is the process of getting information back from memory so that we can use it – like opening a file on a computer and having a document appear on the screen. Retrieval relies on using the right cues so that we can get to the correct location in our brain; again, it is like using the correct folder and file name to open a computer file.

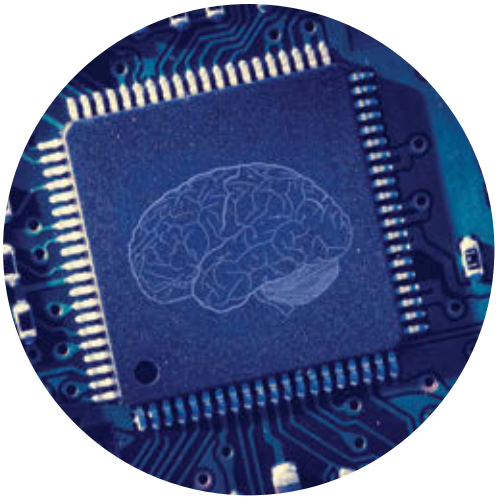


FIGURE 1 Retrieval is getting information back from memory so that we can use it.

The analogy of the computer for memory fits quite well for encoding and retrieval, but it is inadequate for storage. The brain does not store a memory like an object in one place. Each memory is spread out over a huge population of cells throughout different regions of our brain. Storage is also a dynamic process whereby human memories change over time and – unlike a computer hard drive – human memories are rough copies rather than exact replicas of information.

Multi-store model of memory

The analogy of a computer as a model for human memory has been a useful and popular way to help researchers understand memory. This analogy is also useful because, as research progresses, it can be modified and adapted to include new findings.

The most common version of this analogy for memory was originally proposed by Atkinson and Shiffrin (1968) who called it the **multi-store model of memory**.

multi-store model of memory a model that suggests that memory is comprised of three memory stores: a sensory store, a short-term memory store and a long-term memory store

The multi-store model of memory describes three stores of memory:

- sensory
- short-term
- long-term.

These three stores function simultaneously and interact with each other.

Sensory memory is a very brief memory store (like a computer's buffer). Information enters this register and may then be transferred to short-term memory if the person pays attention to it.

Short-term memory is a limited store of actively conscious memory (like the computer's RAM). Information is then transferred to long-term memory if it has been encoded.

Long-term memory is a store of information that is virtually limitless in capacity. It needs retrieval to bring it back into conscious awareness.

These three levels of memory are separate but they work together to create our ability to encode, store and retrieve information.

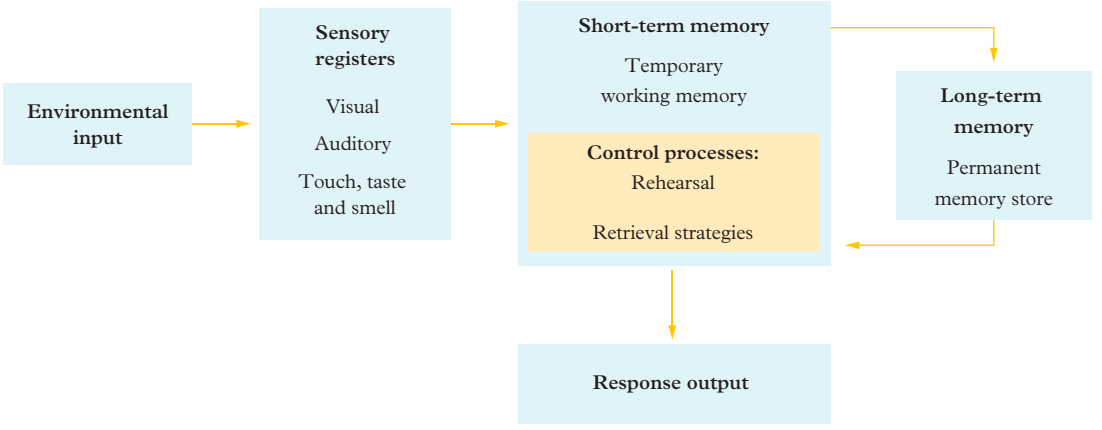


FIGURE 2 The Atkinson and Shiffrin multi-store model of memory

CHECK YOUR LEARNING 7.1

Describe and explain

1 **Explain** the process of encoding, storage and retrieval.

2 **Describe** the multi-store model of memory.

Apply, analyse and interpret

3 **Compare** the limitations of a computer hard drive versus human long-term memory.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 7.1

» **Increase your knowledge**
The computer model of memory

» **Weblink**
How do we remember?

7.2 Sensory memory

KEY IDEAS

In this section, you will learn about:

- the functions of sensory memory
- how iconic and echoic memory works.

sensory memory a store for incoming, fleeting sensory information

According to the multi-store model of memory, **sensory memory** register is the first stage of memory. Sensory memory relates to memory within our sense organs. It is where information in our environment is received by our senses. If the information is unique, different, interesting, relevant or in some other way attracts our attention, then it is transferred to short-term memory. Sensory memory is different from short-term and long-term memory because it has an unlimited capacity but only a very brief duration.

We have a sensory store for each of the five senses. Each sensory store is able to hold information for anything between a fraction of a second to several seconds (it varies from one sense to another). The information held in sensory memory has not yet entered our awareness and, if we don't pay attention to it, it never will! We say that the energy is briefly stored in its raw form before the traces fade or decay.

Functions of sensory memory

iconic memory a sensory register for the fleeting storage of visual information, it lasts about 0.3 seconds and explains why we can see a moving picture from a series of still photos

echoic memory auditory memory in the sensory memory register

Sensory memory prevents us from being overwhelmed by the huge amounts of incoming sensory information. Its duration is very brief, but long enough for our brain to determine whether it is important enough to be transferred to our short-term memory. Our senses are bombarded with information every second of our normal waking consciousness. It is impossible for us to pay attention to all of this information, so our sensory registers act like filters for what is relevant to what we are doing or thinking at any given moment. The brief duration (rapid decay) of sensory memory is necessary. Otherwise, we would be unable to process new incoming information. The rapid decay also allows us to perceive our world as smooth and ongoing, and to hear sounds just long enough to understand whole words and sentences.

Just imagine what it would be like if sensory memory were not brief – while you were listening to the end of your teacher's lesson on psychology, you would still be hearing the first words she uttered – there would be chaos in your mind!

Two examples of sensory memory that relate respectively to our visual and auditory sensory systems are **iconic memory** and **echoic memory** (see Table 1).

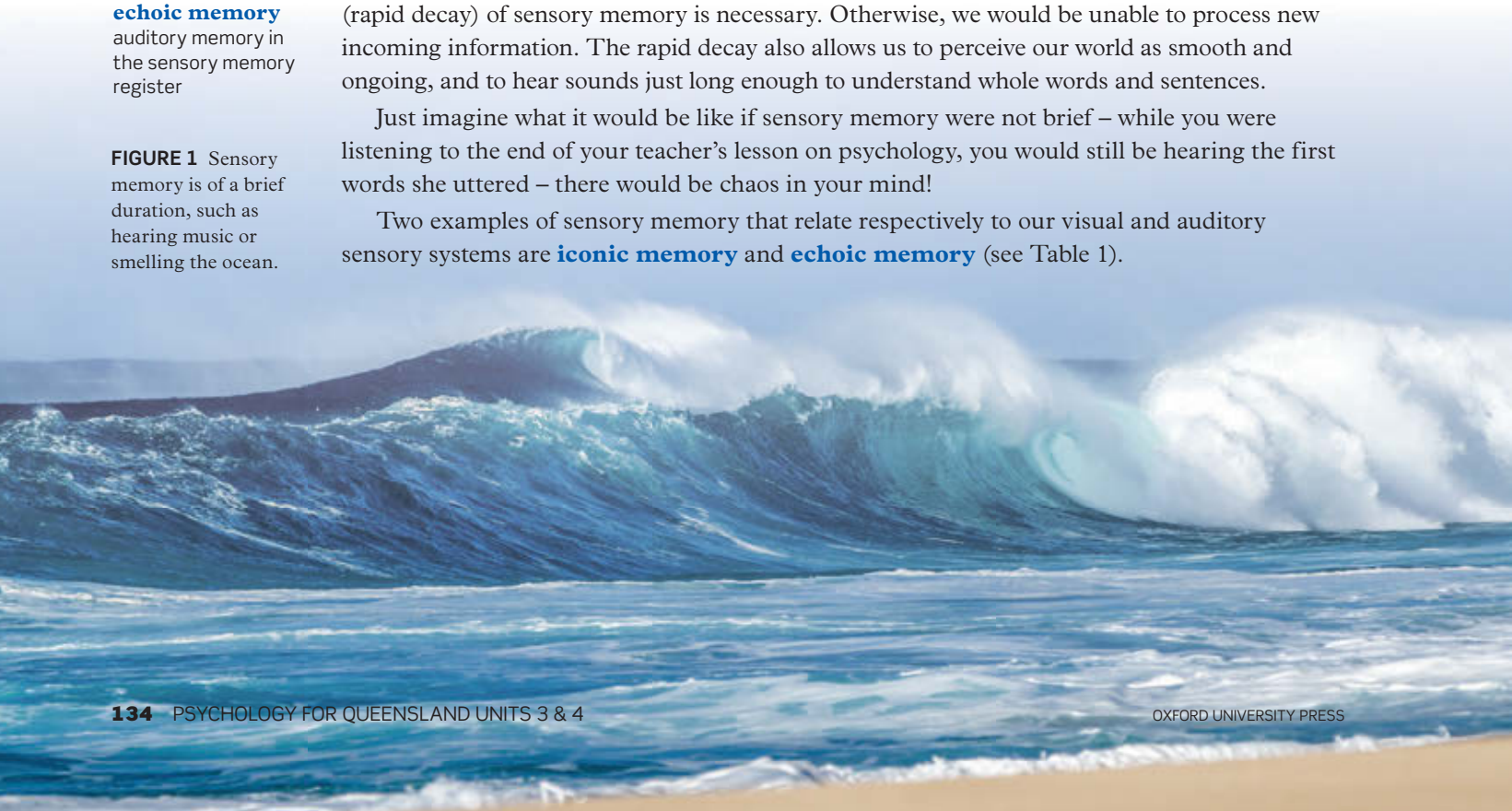


FIGURE 1 Sensory memory is of a brief duration, such as hearing music or smelling the ocean.

TABLE 1 The characteristics of iconic memory and echoic memory

Type of sensory memory	Properties		Form of encoding	Forgetting	Example
	Duration (seconds)	Capacity			
Iconic memory	0.3	Unlimited	Visual	Fades rapidly	Waving a sparkler in the dark and briefly experiencing an after-image
Echoic memory	3–4	Unlimited	Acoustic	Fades rapidly	Retaining the sounds of words long enough to understand the whole word or phrase that has been spoken

Source: Sperling, 1960

Iconic memory

Iconic memory refers to our visual sensory memory. *Icon* is from the Greek word meaning 'image'. Iconic memory lasts for about 0.3 seconds. This explains why we can see moving pictures from a series of still shots projected onto a movie screen. We are still storing the image of one still shot when it is replaced by the next frame, so the illusion of movement is created. This is why movies run at 24 frames per second. Research on people with reading disorders, such as dyslexia, suggests that the duration of their iconic memory is too long and, therefore, the images of words and letters persist too long to enable them to process the next words in a reading passage (DiLollo, Hanson & McIntyre, 1983).

FIGURE 2 Think about how your iconic memory reacts to a sparkler being waved in the air.

CHALLENGE 7.2

Iconic memory

Shut your eyes and try to describe what after-image remains. It is likely that you will be unable to describe all of it because it has faded faster than you have the time to remember.

Hold a pencil loosely between your thumb and index finger and shake it. The pencil will appear to be floppy because of the after-image it leaves on the sensory receptors in the retinas of your eyes. Consider the evolutionary advantages of iconic memory.

CASE STUDY 7.2

Sperling's study of iconic memory

In his experiment on memory, Sperling was able to demonstrate the existence of iconic memory by using a tachistoscope, a device that flashes visual stimuli onto a blank screen for a specific, very brief period of time.

Sperling asked participants to remember as many symbols (letters or numbers) as they could from a grid of 12 that he displayed for one-20th of a second with the tachistoscope. He found that participants could remember about four of the symbols before the remaining items had faded from their sensory memory. Sperling concluded that iconic memory has a *duration* of approximately one-20th of a second. However, participants said that they saw more symbols than they could report before they faded. Therefore, Sperling also tested the *capacity* of the iconic memory.

He also presented the 12-item grid for one-20th of a second, followed by a high-, medium- or low-sounding tone that signalled to the participants which of the three rows of four symbols to attend to and report. He found that the mean number of symbols reported was three out of four for the specified row.

Sperling further tested the duration of the iconic memory by allowing a delay between the presentation of the grid in the tachistoscope and the sounding of the tone. He found that the longer the delay, the more symbols were forgotten, with only 50 per cent recalled after a 0.3 second delay and 33 per cent after a 1 second delay.

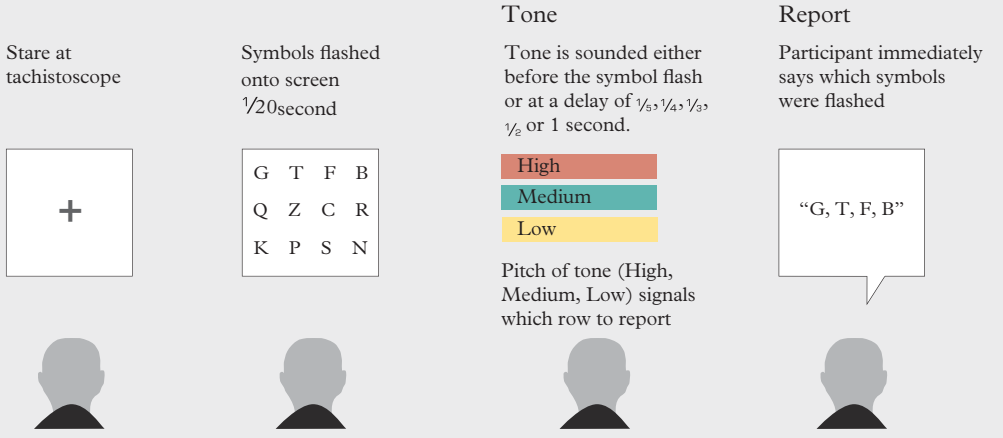


FIGURE 3 Participants relied on the after-image of the symbols projected by the tachistoscope to report what symbols they could remember.

TABLE 2 Steps in Sperling's study

Step 1	Step 2	Step 3
Use the tachistoscope to flash the grid to participant.	Ring the tone to signal to the participant which row to attend to.	Participant recalls the symbols from the relevant row in the grid.
G T F B Q Z C R K P S N	High tone for top row Medium tone for middle row Low tone for bottom row	If medium tone is sounded: ? ? ? ? Q Z C R ? ? ? ?

Echoic memory

Does this scenario sound familiar?

Person 1: Which class do you have after lunch?

Person 2: Sorry, what did you say – oh, Psychology.

This is the most common example of echoic memory. Sperling's studies on iconic memory led to further investigations on other sensory memory processes. Cognitive psychologist Ulric Neisser popularised the term 'echoic memory' in 1967. Echoic memory refers to our auditory (sound) sensory memory and is essentially the auditory equivalent of visual sensory memory.

Echoic memories are typically stored in our sensory memory for a slightly longer period than iconic memories: about three to four seconds. This is necessary because we need to register information in its entirety before we can make it meaningful; hence the delayed reaction.

FIGURE 4 Echoic memory lasts just long enough for us to retain the detail of what has been said and to link it with what is said next.

We may appear not to hear a question, but as we focus, we realise we can actually make sense of what was said and are able to give an answer – often interrupting the speaker, who is in the process of repeating the question! This occurs because the sound is 'held' long enough in echoic memory.

If we then consciously attempt to remember the question, the information is moved to short-term memory. If not, it is lost.

CHECK YOUR LEARNING 7.2

Describe and explain

1 **Explain** the function of sensory memory.
2 **Describe** the duration of sensory memory.
3 **Demonstrate** what happens to information that is not attended to in sensory memory. You may want to use an example.

Apply, analyse and interpret

4 **Compare** the capacity and duration of iconic memory and echoic memory.
5 **Critique** Sperling's study of iconic memory and echoic memory. **Consider** the ethics and methodology.

Investigate, evaluate and communicate

6 **Modify** Sperling's study (Case study 7.2) to test the reliability of echoic memory.
7 Read Case study 7.2. **Create** a report based on this research.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 7.2
- **» Challenge**
  Worksheet: 7.2 Iconic memory
- **» Weblink**
  The role of sensory memory

7.3 Short-term memory

KEY IDEA

In this section, you will learn about:

+ the function, duration and capacity of short-term memory.

short-term memory
a store that receives information from the long-term and sensory stores; with a limited capacity of 5–9 pieces of information, and a duration of approximately 12–20 seconds

Short-term memory is often likened to the RAM in a computer because it is where mental manipulation takes place. Short-term memory allows us to retain information for enough time to use it; for example, looking up a telephone number and keeping it in your awareness long enough to dial it.

Incoming sensory information that is sufficiently attended to may pass into the short-term memory. We routinely draw information from the long-term memory to the short-term memory to evaluate and understand information that we are working on at a given moment; for example, reading comprehension questions or mental arithmetic. Although we know that both visual short-term memory and auditory short-term memory exist, auditory short-term memory has been more intensively researched.

FIGURE 1 Our short-term memory is limited to 5–9 pieces of information. This is why writing down a shopping list for trips to the supermarket is useful.

CHALLENGE 7.3A

Test your short-term memory

Complete the following activities about short-term memory capacity:

1 Have a partner read aloud each row of the digits below, with you repeating them immediately. Your partner should proceed through this list until you make errors in two successive sets of digits. This will provide you with an indication of your memory span. Consider whether there was any interference in your ability to retain the information.

9, 3
7, 4, 6
5, 0, 3, 7
2, 6, 8, 1, 4
7, 3, 9, 0, 2, 5
8, 5, 3, 0, 1, 6, 2
9, 5, 3, 2, 4, 8, 0, 6
2, 5, 7, 1, 0, 8, 3, 6, 4
9, 2, 5, 7, 3, 1, 0, 8, 4, 6

2 Read each row of letters, then look away and try to repeat them.

L J G V Q
A F T E H O
J O Q R D W Y
M D F T U W C H
A S D T H J Q Y O

As the number of letters in each row increases, you will find it more difficult to retain all of them.

One limitation is that short-term memory is influenced by how long it takes to say a word or sound. For example, the letter 'a' is quicker to say than the letter 'w'. Similarly, short-term memory capacity is reduced when people try to remember complex visual patterns because they have to retain so much detail in each pattern. Work with a partner to design your own experiment, using words rather than letters or numbers. You can research online. Remember to think about the number of syllables in each word. Make sure to include:

- an aim for the experiment
- an experimental hypothesis
- the independent and dependent variables
- results presented in a table (you may also include a graph)
- a conclusion for your experiment.

Duration and capacity of short-term memory

Short-term memory is distinguished from sensory memory and long-term memory because it has only a brief duration of approximately 12–30 seconds and a brief capacity of only 5–9 pieces of information. When this capacity is reached, new information can only be put into the short-term memory by displacing existing information.

For short-term memory to last its potential of approximately 12–30 seconds, there must be no interference.

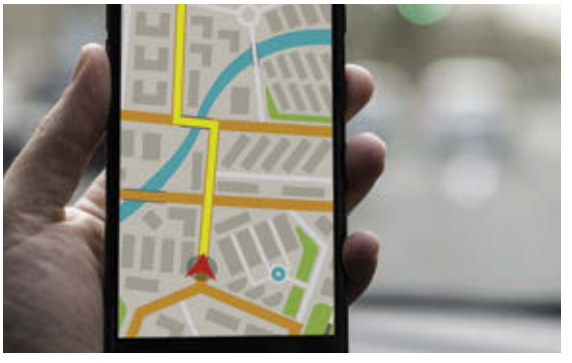


FIGURE 2 We use maintenance rehearsal to remember directions after we've looked them up.

maintenance rehearsal
a strategy for keeping information in short-term memory or for moving it into long-term memory by simply repeating information over and over

Interference occurs when new information enters the short-term memory and pushes out information that is in our immediate awareness. To retain information in short-term memory, we often find ourselves using a process called **maintenance rehearsal** (see Chapter 9 for more on this). If you say something over and over (either aloud or in your head) that you want to keep in your immediate awareness, then you may also increase the chances of this information being moved into your long-term memory.

TABLE 1 Methods of maintenance rehearsal

Method	Example
Verbal (using words)	• Vocal – saying words out loud • Sub-vocal – thinking words silently to oneself
Non-verbal (using visual or spatial information)	• Visualising – keeping an image in one's mind • Muscular – imagining how it feels to perform an action

CHALLENGE 7.3B

Topic challenge!

In small groups, create a string of numbers 9 digits long. At the start of each lesson, say the numbers out loud in your group. Do you think you will be able to recall this sequence during Unit 4? Propose why you might or might not be able to recall this string of numbers.

CHECK YOUR LEARNING 7.3

Describe and explain

1 **Describe** short-term memory.
2 **Explain** the function of short-term memory.
3 From the options below, **select** the duration of short-term memory.
   A 30–60 seconds
   B 12–20 seconds
   C 18 seconds
   D 20–30 seconds
4 **Explain** the capacity of short-term memory. Use an example in your answer.

Apply, analyse and interpret

5 **Compare** sensory memory with short-term memory.
6 **Critique** the function of short-term memory in our ability to memorise information.
7 **Apply** your understanding of short-term memory to **critique** various methods that can be used to increase the efficiency of short-term memory.

Investigate, evaluate and communicate

8 **Discuss** the use of maintenance rehearsal to increase duration and capacity of short-term memory.

obook assess

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 7.3

» **Challenge**
Worksheet: 7.3A
Test your short-term memory

» **Challenge**
Worksheet: 7.3B
Topic challenge!

» **Weblink**
Duration and capacity of short-term memory

7.4 Long-term memory

KEY IDEAS

In this section, you will learn about:

- the function, duration and capacity of long-term memory
- different types of long-term memory including procedural, declarative, and implicit and explicit memory.

long-term memory
the information is encoded and stored, and as long as you know enough about the information, the information can be retrieved

We use **long-term memory** for conducting our everyday lives and without it we cannot function. It works very much like the hard drive on your computer – the information is encoded and stored and, as long as you know about it (like the name of a document or the folder it is in), you can retrieve it.

The way information is stored in long-term memory is different from sensory memory and short-term memory. In long-term memory, information is encoded by its meaning (that is, semantically) and stored in **semantic networks**.

semantic networks
the idea that items in long-term memory are stored in a hierarchical pattern of nodes with links between related nodes

Duration and capacity of long-term memory

It is hard to identify just how long the duration of long-term memory might be. Sometimes, previously stored memories are thought to be forgotten but, with the appropriate cues, they will suddenly come flooding back into conscious awareness. Long-term memories are maintained because of physiological changes to the neurons and their connections with other neurons.

Similarly, it is difficult to measure the capacity of long-term memory and there is probably no way of finding its limits. Different methods of retrieval produce different results. It is generally considered that 'forgetting' long-term memories is due to poor **retrieval cues** rather than capacity limitations.

retrieval cues
mental reminders or prompts that we create to assist our recollection later on

Different types of long-term memory

To understand the next part of this chapter – interactions between specific regions of the brain and the storage of long-term memories – you first need to be familiar with the different types of long-term memory. These are identified as **procedural memory** and **declarative memory**.

procedural memory
one aspect of implicit memory; memory for how to perform particular tasks, skills or actions

declarative memory
a long-term memory store of personal experiences (episodic) and facts (semantic)

Procedural memory

Procedural memory involves knowing how to do things – yet we might still find it hard to describe how to do them. The procedural memory system houses memory for actions, skills, operations and conditioned responses. It is very resistant to forgetting – people rarely forget how to ride a bicycle, for example.

FIGURE 1 Riding a bike is a type of procedural memory, hence the expression, 'It's just like riding a bike' for an activity that people are unlikely to forget how to do. Riding a bike can also be a declarative memory as you might remember your experience of learning to ride your bike with your parents.

implicit memory
memories of skills, emotions, preferences and dispositions; also called procedural or non-declarative memories; processed in the amygdala and possibly the cerebellum

Some theorists believe that there is a link between **implicit memory** and the procedural memory system (Squire, Knowlton & Musen, 1993) because memory for skills is largely unconscious. People use skills such as keyboard skills or cleaning their teeth with little conscious awareness of what they are doing. Furthermore, memory for these skills does not decline much over time. Sometimes people are surprised that they can still perform an activity such as skiing, playing an instrument or driving a car, even after many years of not doing it. This is because procedural memory is a store of routines that can be accessed and retrieved.

Declarative memory

Declarative memory involves memory for facts, events and general knowledge. It generally refers to information associated with learning for school, reading, mathematics and higher order thinking, which is associated with intelligence. It includes semantic and episodic memory. **Semantic memory** concerns memory for facts, worldly knowledge or general knowledge. **Episodic memory** refers to memories of particular events and is often autobiographical, such as birthdays, your first day of school or your first romantic kiss.

semantic memory
memory for facts or general knowledge

episodic memory
long-term memories of episodes or experiences in your life

A distinction can be made between two types of episodic memory:

- retrospective memory – remembering past events
- prospective memory – remembering things to do in the future.

FIGURE 2 You might think that you have forgotten all about your fifth birthday party, until you hear a song that was played, or pick up a toy that you received as a gift, or until your next birthday.

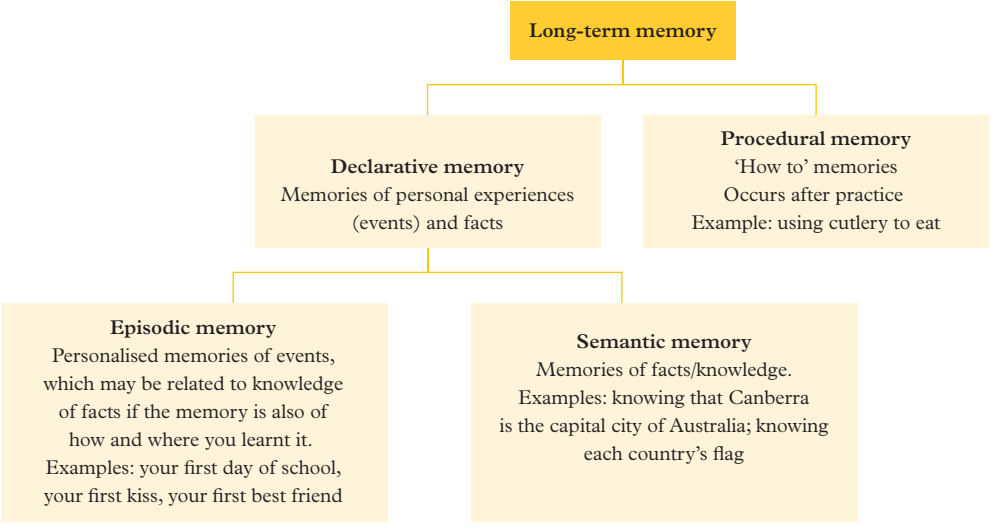


FIGURE 3 Organisation of long-term memory

Implicit and explicit memory

Information from the long-term memory can be retrieved and expressed either implicitly or explicitly. Implicit memory is unconscious; that is, it does not require intentional, deliberate recall. **Explicit memory** is the conscious retrieval of memory. This includes recall and recognition.

explicit memory memories of facts, names, images and events; also called declarative memories

Implicit memory and explicit memory are not memory systems. They are observable behaviours that appear to be handled, respectively, by the procedural and declarative long-term memory systems. The demonstration of the differences between implicit and explicit memory suggests that people may have several separate memory systems.

Implicit memory includes procedural memory, motor learning and classical conditioning. Recent research has shown that the amygdala is the key brain structure involved in implicit memory. The emotional aspects of memory are also the role of the amygdala, together with the hippocampus.

Explicit memory includes declarative memory and is shown to be the responsibility of the hippocampus.

FIGURE 4 When learning a new task, such as swimming, a conscious and deliberate effort is often required. However, after practice, the retrieval of this knowledge becomes implicit.

CHALLENGE 7.4A

Photographic memory

Photographic memory is the ability to form, and later recall, sharp, detailed visual images of a picture or notes from a page after examining them for only a short period of time. There are very few reports of people who truly have this type of memory. Sometimes people with exceptional memories are described as having photographic (sometimes called eidetic) memories. Assess the advantages and disadvantages of having a photographic memory.

CHALLENGE 7.4B

What memory are you using?

With a partner, follow the instructions below.

1 Remember these numbers in order 0963157208.

2 Sit on your hands while you answer the following questions:

- **a** Do you turn your front-door key clockwise or anticlockwise when entering your house?
- **b** Do you rotate a tap clockwise or anticlockwise to turn it off?
- **c** How do you use a knife and fork?
- **d** How do you use chopsticks?

3 What does the image on the right in Figure 5 mean?

4 What was the name of your Grade 1 school teacher?

5 Describe the front cover of this book without looking at it.

FIGURE 5 What does this sign mean?

6 Recite the national anthem out loud without singing the melody.

7 Name the highest mountain in Australia.

8 Cover Question 1 above and write the numbers in the exact order as presented.

What does this tell you about your memory? **Compare** your short- and long-term memory use for the above questions.

Study tip

Try to associate each type of memory with a skill or event that you recall For example, you might remember every capital city in the USA and recall that this is semantic memory.

CHECK YOUR LEARNING 7.4

Describe and explain

1 **Describe** long-term memory.

2 **Explain** the capacity and duration of long-term memory.

3 **Define** semantic networks.

4 **Explain** how memories are stored in long-term memory.

5 **Construct** a diagram to display our long-term memory stores (procedural, declarative, explicit and implicit).

Apply, analyse and interpret

6 **Compare** the duration and capacity of long-term memory with short-term memory.

7 **Differentiate** between procedural memory and declarative memory.

8 **Contrast** implicit memory and explicit memory.

Investigate, evaluate and communicate

9 **Evaluate** this claim: The strongest type of memory is procedural memory.

obook assess

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 7.4
- **» Challenge**
  Worksheet: 7.4A Photographic memory
- **» Challenge**
  Worksheet: 7.4B What memory are you using?
- **» Increase your knowledge**
  Semantic networks

7.5 The working model of memory

KEY IDEAS

In this section, you will learn about:

- Baddeley and Hitch's model of working memory
- the central executive, phonological loop, visuospatial sketchpad and episodic buffer.

For many years, the idea was that short-term memory was a location for storage of material as it was processed into long-term memory (LTM). More recently, however, this memory register has been seen as a system for working with the information we are aware of at any given time. Since we are consciously working on this information, psychologists now refer to this component as **working memory** (Baddeley *et al.*, 2009).

working memory the mental work that is occurring at any given time, including retrieving information, problem-solving, and comprehending sounds and visions; draws on information from sensory and long-term memories

CHALLENGE 7.5

Waltzing Matilda

Do you know the words to the chorus of 'Waltzing Matilda'?

Waltzing Matilda, Waltzing Matilda,
Who'll come a-Waltzing Matilda with me?
And he sang as he watched and he waited 'til his billy boiled,
Who'll come a-Waltzing Matilda with me?

Now try this. Time yourself as you say the chorus aloud as fast as possible. Time yourself as you say the chorus silently as fast as possible. Time yourself as you say the first word aloud and the second silently and so on as fast as possible. What were your results?

Investigate why you achieved these results.

Working memory

Baddeley and Hitch's model shows that there are four separate but interdependent aspects of working memory.

Phonological loop

The **phonological loop** is auditory working memory. This is the storage of what we hear; it is also called the articulatory rehearsal loop. This is the store that helps us to understand a sentence of more than a few words. It retains the words from the beginning of the sentence until we have heard the words at the end.

phonological loop a storage system for auditory information in working memory

visuospatial sketchpad the storage system for visual information in working memory

central executive the functional component of working memory that is responsible for switching attention from task to task, deciding what material is to be retrieved from or committed to long-term memory and for performing calculations and making linkages

Visuospatial sketchpad

The **visuospatial sketchpad** is visual short-term memory, the storage of what we see. This is the store we use to help picture, for example, what a room would look like if we shifted the furniture around.

The central executive

The **central executive** puts together the sounds and vision of working memory and controls our attention, which enables us to perform mental manipulation of data.

episodic buffer a theoretical component of working memory that acts as both a bridge and a filter (for auditory and visual information) between long-term memory and the central executive and storage components in working memory

The three main functions of the central executive have been identified as:

- **inhibition**: an aspect of attention; screening out irrelevant material
- **switching**: changing attention from one item to another
- **updating**: modifying items brought in from LTM before re-committing them to memory through the episodic buffer; creating a process of accommodation of the semantic network.

Episodic buffer

The **episodic buffer** helps retrieve information from LTM to associate with information that is in working memory, and to select and encode information into LTM.

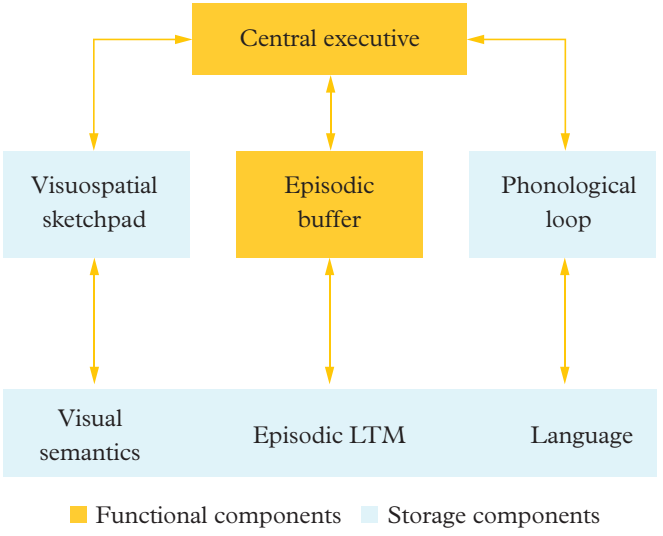


FIGURE 1 Baddeley and Hitch's (2000) model of working memory

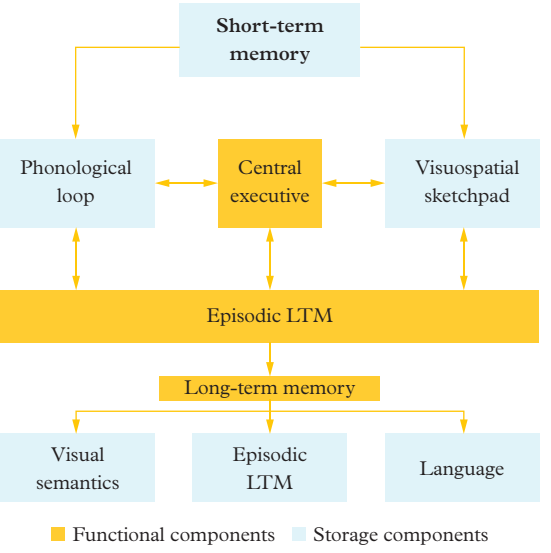


FIGURE 2 Working memory

Investigating working memory

Researchers have tried various ways of investigating the control of attention, which is a major function of the central executive.

Working memory and multi-tasking

Early research showed that the different stores in working memory are reasonably independent (Logie, Zucco & Baddeley, 1990). This means that we can fairly easily do two or more things at once, provided the tasks are using different 'stores' in working memory. For example, we can *drive* a car at the same time as *recalling* information relevant to a *conversation* we are having with a passenger. In contrast, if two tasks use the same store, it is harder to do them simultaneously. Think about how frustrating it is when you are talking on the phone to someone and a friend next to you is trying to tell you something at the same time.

Working memory and intelligence

People who perform well on working memory tasks also tend to show high levels of ability in such tasks as reading comprehension and even intelligence tests (Engle *et al.*, 1999). They are also likely to be better able to understand other people's points of view (Barrett *et al.*, 2004, as cited in Kalat, 2009).

Working memory in everyday life

The following explains how you use working memory in everyday life. Imagine that you want to send a text message to a friend to arrange to meet:

1 Your central executive gets the episodic buffer to access language from LTM.
2 Your central executive forms the message you want to send.
e.g., *Coffee at Charlie's café at 12. OK?*
3 Your central executive obtains the visual images of your phone's keypad from your visuospatial sketchpad and coordinates the keystrokes that write the message.
4 Your central executive encodes the memory of sending the message through the episodic buffer into LTM.

As you can see, the central executive is the controller, manager and decision-maker in working memory.

Imagine that you are going to perform the multiplication problem 7 x 43 = ____?

1 The visuospatial sketchpad enables you to picture the problem.
2 The phonological loop enables you to sound the problem in your mind.
3 The central executive enables you to realise that you are going to need to retrieve your 7 times table from LTM.
4 The episodic buffer retrieves the 7 times table from LTM.
5 The central executive works out that 7 x 3 = 21 and 7 x 40 = 280.
6 The phonological loop holds the sounds of 21 and 280.
7 The central executive adds these together to calculate the answer 280 + 21 = 301.
8 The phonological loop holds the sounds of 301 and enables you to announce the answer.
9 The central executive decides if this figure is to be committed to LTM.
10 The episodic buffer encodes the information into LTM.

CHECK YOUR LEARNING 7.5

Describe and explain

1 **Describe** working memory.
2 **Explain** what the phonological loop, central executive, visuospatial sketchpad and episodic buffer are.
3 **Construct** a diagram to explain working memory.

Apply, analyse and interpret

4 **Compare** the roles of the phonological loop and visuospatial sketchpad.
5 **Differentiate** between the central executive and episodic buffer.

Investigate, evaluate and communicate

6 **Evaluate** the working model of memory.
7 **Design** a methodology to test the role of the phonological loop in working memory.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 7.5

» **Challenge**
Worksheet: 7.5
Waltzing Matilda

» **Weblink**
Working memory

7.6 The levels of processing (LOP) model of memory

KEY IDEA

In this section, you will learn about:

+ Craik and Lockhart's levels of processing model of memory.

levels of processing model of memory a model of memory that suggests that memory comprises a continuous dimension in which memory is encoded related to the ease with which it can be retrieved: the deeper the processing of information, the greater the chance of it being retrieved

The **levels of processing model of memory** suggests that memory does not comprise any specific number of separate memory stores but instead is a continuous dimension in which memories are encoded related to the ease with which they can be retrieved: the deeper the processing of information, the greater the chance of it being retrieved. Levels of processing refers to the number and types of associations made between new knowledge and previous knowledge. Research by Craik and Lockhart (1972) suggested that there are three levels at which we encode material, and the deeper the processing, the better the chance of retrieval from memory at a later time. This model has practical applications. For example, when you are studying, the deeper and more elaborately you encode information, the more likely it is that you will understand it and remember it later on. Actually thinking about and using the information to be remembered is much more productive for encoding than just looking at or repeating the information.

Research

Craik and Lockhart suggested that it is the level of processing that influences how well material is encoded, but other research has shown that it is not as simple as that. Craik and Tulving (1975) found that the more complex the processing, the stronger the memory, even within the same level.

Rogers and his colleagues (1977) found that personal relevance or salience has a major effect on recall, so using questions such as 'Does this describe you?' produces better recall than 'What does this mean?'. Later, it was found that memory for participants who related each word to their mothers was just as strong as for those who related the words to themselves (Symons & Johnson, 1997). The conclusion is simple: memory grows stronger the more it is elaborated and linked to things we know well and care about. Tyler and his colleagues (1979) found that the more effort we have to put into remembering something, the stronger our recall will be once we have encoded it. They gave participants easy anagrams and complex anagrams of words to be remembered and found that the harder the participants had to work to solve the anagrams, the better they remembered the word!

hungry tired study good careful happy

FIGURE 1 Memory grows stronger when linked to things we know and care about.

SUGGESTED PRACTICAL

7.6 Depth of processing and the retention of words in episodic memory
Go to your obook assess »

TABLE 1 Types of encoding and processing

Type of encoding	Type of processing	Example		Recall
Structural Words are learnt by remembering their physical features, such as whether they were in upper or lower case, started with a vowel or consonant, or were long or short.	Shallow	pOTato brick BOOK Apple	Participants were asked to remember whether the word contained upper-case letters.	Only about 20% of words were recalled after structural encoding.
Phonemic Words are learnt by their sounds.	Moderate	bull style amazing radio	Participants were asked to think of a rhyme (bull/full; style/smile) for the word, or perhaps rhyme and rhythm (What a song/I love the phrasing/and the tune/is just amazing!).	Approximately 50% of words were recalled after phonemic encoding.
Semantic Words are encoded by their meaning, which allows them to be placed directly in our semantic networks.	Deep	gate yacht truck apple	Participants were asked to put the words into a sentence where the meaning of the word would be important to the meaning of the sentence, such as 'She opened the gate and entered the garden'.	80% or more of words were retrieved after semantic encoding.

CHALLENGE 7.6

Levels of processing

Unscramble the three complex words and the three simple words in Table 2.

Try to recall these words tomorrow. Consider the words that you think you will recall best.

TABLE 2 Word scramble

Complex	Simple
OCRTDO	MORYME
OOMTTA	UTEMIN
RREEAS	MMERSU

CHECK YOUR LEARNING 7.6

Describe and explain

1 **Describe** the levels of processing model of memory.
2 **Identify** and **explain** the three different types of processing and encoding.

Apply, analyse and interpret

3 **Compare** the working model of memory and the levels of processing memory.

Investigate, evaluate and communicate

4 **Evaluate** the levels of processing model of memory.
5 **Discuss** the following statement: 'The working model of memory provides a better explanation than the levels of processing model of memory'.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 7.6

» **Suggested pra.ctical**
7.6 Depth of processing and the retention of words in episodic memory

» **Challenge**
Worksheet: 7.6 Levels of processing

» **Weblink**
The levels of processing model of memory

CHAPTER 7

Review

Summary

7.1
- Information in memory must be encoded and stored so that it may be retrieved for use at a later time. The way we use our memory is similar to the way we use a computer.
- The Atkinson and Shiffrin multi-store model of memory suggests that there are three separate stores of memory: sensory, short-term and long-term.

7.2
- Sensory memory has a brief duration and an unlimited capacity. It relates to the five senses, including iconic memory for sight and echoic memory for sound.

7.3
- Short-term memory has a limited capacity and duration.

7.4
- Long-term memory is thought to have unlimited capacity and unlimited duration.
- Long-term memory is further organised into procedural memory and declarative memory. Declarative memory has two subsystems: episodic memory and semantic memory.

7.5
- Baddeley and Hitch's model of working memory shows that there are four separate but interdependent aspects of working memory: the central executive, phonological loop, visuospatial sketchpad and episodic buffer.

7.6
- The levels of processing model of memory suggests that memory comprises a continuous dimension in which memory is encoded.
- The deeper and more elaborately the information is encoded in the memory, the more likely it is that it will be remembered later on.

Key terms

- central executive
- declarative memory
- echoic memory
- encoding
- episodic buffer
- episodic memory
- explicit memory
- iconic memory
- implicit memory
- levels of processing model of memory
- long-term memory
- maintenance
- multi-store model of memory
- phonological loop
- procedural memory
- rehearsal
- retrieval
- retrieval cues
- semantic memory
- semantic networks
- sensory memory
- short-term memory
- storage
- visuospatial sketchpad
- working memory

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: ★ = low, ★★ = medium, ★★★ = high.

Multiple choice

1 In the multi-store model of memory, what are the three divisions considered to be, in order of initial processing?

A sensory memory, short-term memory, working memory

B episodic memory, semantic memory, procedural memory

C short-term memory, declarative memory, procedural memory

D sensory memory, short-term memory, long-term memory

2 Transfer of material from short-term to long-term memory requires which of the following processes?

A encryption

B encoding

C transmission

D transduction

3 Iconic images are considered to be those that register in which type of memory?

A sensory memory

B short-term memory

C long-term memory

D implicit memory

4 What is the duration of short-term memory for the average adult considered to be?

A 7 + 2 seconds

B 30 minutes

C 12–30 seconds

D 5 minutes

5 Loss of information from short-term memory is considered to be due to which of the following processes?

A proactive or retroactive interference

B anterograde amnesia

C decay

D displacement

6 Tony is an elderly retired plumber. He can easily remember how to attach a new tap to a water pipe but he cannot recall the names of his new neighbours. Tony's _____ memory is better than his _____ memory.

A implicit; explicit

B explicit; implicit

C prospective; retrospective

D episodic; prospective

7 Which of the following statements is *true* of sensory memory?

A Sensory memory prevents long-term memory from being overloaded.

B Incoming information decays slowly.

C Sensory memory has implicit and explicit sensory registers.

D Information stored in sensory memory is outside awareness and not processed.

8 Which of the following statements is *not* true of episodic memory?

A Sensory memory consists of memories of events.

B Sensory memory has retrospective and prospective types of memories.

C Sensory memory forms part of long-term declarative memory.

D Sensory memory is memory for general knowledge or facts.

9 A skill that does not require conscious recollection by our memory is what kind of memory?

A implicit memory

B explicit memory

C episodic memory

D retrospective memory

10 What is the role of the episodic buffer in working memory?

A to integrate and filter visual and auditory information between long-term memory and other components of working memory

B to act as a permanent storage system for visual and auditory information

C to integrate and filter visual and auditory information to and from short-term memory

D to rehearse information until it is committed to long-term memory

11 What does 'levels of processing model of memory' refer to?

A memory for facts, images, thoughts, feelings, skills and experiences

B procedural, declarative, implicit and explicit memory

C retrieval of information, problem-solving and comprehending sensory information

D associations between new knowledge and previous knowledge

Short answer

Describe and explain

★ **12** **Define** what a semantic network is, and provide an example.

★ **13** **Use** an example to illustrate working memory

★ **14** **Describe** the difference in capacity of sensory memory, short-term memory and long-term memory.

★ **15** **Explain** what maintenance rehearsal is and provide an example of a situation where it might be used.

★ **16** **Describe** the type of memory involved when your mother remembers she has to take you to a doctor's appointment in the morning.

★★ **17** **Describe** Atkinson and Shiffrin's multi-store model of memory, using an example to illustrate your answer.

★★ **18** **Explain** the levels of processing model of memory, paying particular attention to how memory can be strengthened.

★★ **19** **Identify** and briefly **describe** the different storage components in the working memory model.

★★ **20** **Describe** the processes of encoding, storage and retrieval, and explain how they work in relation to short-term memory.

★★★ **21** **Explain** how Atkinson and Shiffrin's multi-store model of memory differs from Baddeley and Hitch's model of working memory.

Apply, analyse and interpret

★ **22** **Distinguish** between encoding, storage and retrieval.

★ **23** **Differentiate** between long and short term memory; and **differentiate** between sensory and short term memory.

★ **24** **Differentiate** between explicit and implicit memory.

★★ **25** **Critique** the multi-store model of memory. Acknowledge the role of sensory, short and long term memory stores.

★★ **26** Troy is a visual arts student and has been working on creating a flip book of images. A flip-book is a book that when flipped through really fast seems to be moving. Troy has been doing research into the type of memory that allows this to happen. **Identify** the type of memory, and **consider** why a moving flip-book is possible.

★★ **27** On the weekend, Siobhan broke her mobile. Because of this she has to borrow her friends' or her parents' phones when she needs to talk to anyone. Siobhan has been trying to memories her five best friends' phone numbers and her parents to that she doesn't have to worry about carrying a list with her. **Determine** the best method for Siobhan to use so that she can remember the phone numbers, and **explain** why this is the appropriate choice.

★★ **28** **Compare** the functions of semantic memory and episodic memory.

★★ **29** **Consider** Craik and Lockhart's (1972) research into the Levels of Processing model of memory. **Determine** what the independent variable was and the dependent variable.

Investigate, evaluate and communicate

★ **30** **Differentiate** between explicit and implicit memory.

★ **31** **Develop** a methodology to evaluate the duration of short-term memory.

★★ **32** The following statement has been made about memory: 'As you age, you will remember how to complete actions over memories of events'.

a **Evaluate** this claim and use a specific example.

b **Create** a research question that targets a specific audience and scenario.

★★ **33** **Compare** the functions of semantic memory and episodic memory.

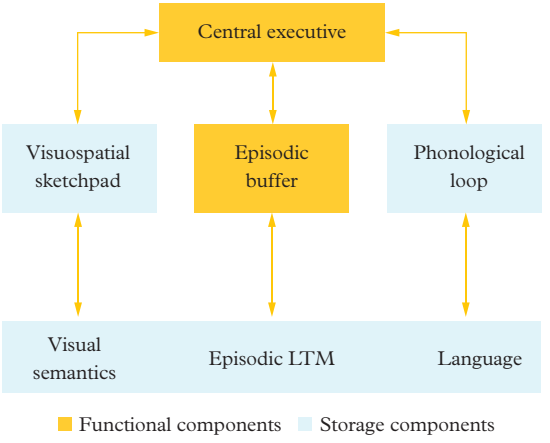


FIGURE 1 Baddeley and Hitch's (2000) model of working memory

★★★ **34** Working memory is a relatively new concept. It consists of the phonological loop, visuospatial sketchpad, the central executive and the episodic buffer. **Use** an example to **explore** the process of working memory and **decide** if it is a continuous cycle.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 7 Review
- **» Revision notes**
  Revision notes for Chapter 7
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 7

CHAPTER 8

Brain structures involved in memory

Our memories are a complex set of structures and neural pathways that help us navigate our everyday world, solve problems, recall information, control our movements and help us 'remember' emotions that relate to our experiences. As we have seen in previous chapters, our brains have a unique way of storing and retrieving various types of information. Different structures of the brain are responsible for encoding, recalling and consolidating sensory information, which enables us to make sense of our memories and experiences. It also helps us deal with the demands we encounter in our lives. For example, remembering how to hold a pen or ride a bike relates to our procedural memory – and our frontal lobes and cerebellum are responsible for such memories.

Imagine how difficult life would be if you were unable to think about anything but the last paragraph of a textbook you had just read. By 'pushing' this information from our immediate consciousness into a storage system, our minds are free to deal with the next 'input' of sensory information. Different structures and neural pathways enable us to recall this information at a later point in time and may even allow us to access the emotion we felt when the information was encoded (hopefully anticipation or excitement about what you were learning).

OBJECTIVES

→ Describe the role of the hippocampus in memory formation and storage.
→ Consider the role of the cerebellum in forming and storing implicit (procedural) memories.

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FIGURE 1 Memory involves connecting areas of the brain, such as the hippocampus and amygdala.

SUGGESTED RESEARCH

SUGGESTED RESEARCH	**8.2** The role of the hippocampus in memory (e.g. the result of damage to the hippocampus in Corkin, Amaral, Gonzalez, Johnson & Hyman 1997)

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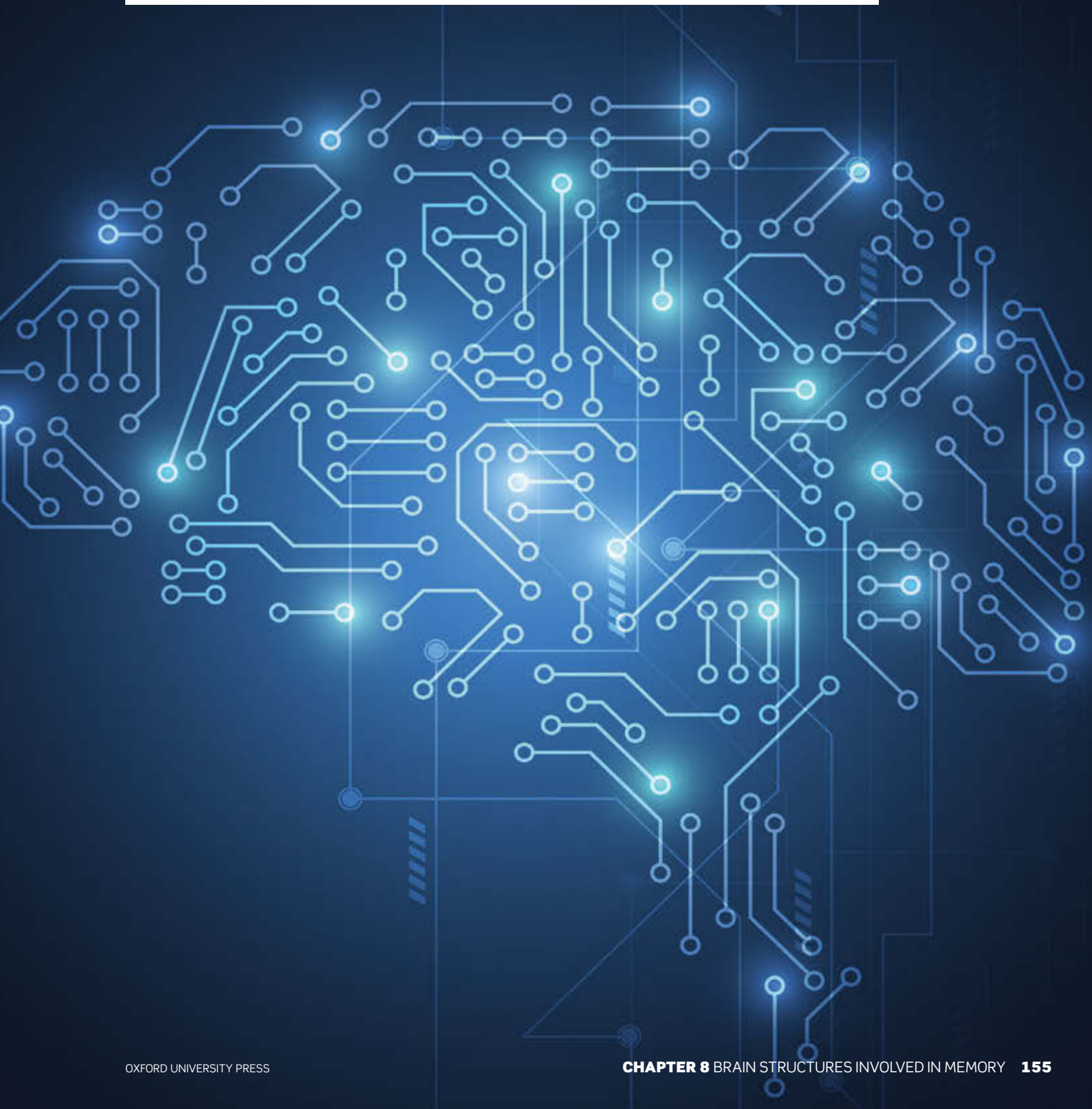

8.1 Brain structures and memory

KEY IDEAS

In this section, you will learn about:

- the location and function of key brain structures involved in memory
- the role of the cerebral cortex in memory.

Despite advances in the research and understanding of memory, the physiological make-up of memory is such that it is not possible to find the specific locations of specific memories, thoughts, ideas or events. However, it is clear that some structures play a pivotal role in the mechanism of memory formation.

Neuroscientists have located key brain structures involved in memory, such as the hippocampus for declarative memory; the cerebral cortex for short-term memory and aspects of declarative memory; the cerebellum for procedural or implicit memory; the amygdala for explicit memory; and the basal ganglia for procedural memory.

Table 1 provides an overview of what researchers believe to be the key brain structures that are involved in memory. Memories are located in different areas of the brain according to the type of memory and whether it is being encoded or stored. Figure 1 shows different parts of the brain where different forms of memories are processed and stored. For example, memories for pictures tend to be stored in the occipital lobe region and memories for sound in the left temporal lobe. The mechanism of memory is complex and involves several different regions of the brain at any given time. In very simple terms, the cerebral cortex stores short-term memories and declarative (long-term) memories, the hippocampus consolidates declarative long-term memories and transfers them to the relevant area of the cerebral cortex for storage, and the amygdala adds emotional content to memories. Figure 1 indicates the structures of the brain that have key roles in the mechanism of memory formation.

TABLE 1 Brain structures and memory

General location in the brain	Type of memory
Frontal lobes	• Storage, processing and encoding of procedural memories • Episodic memory (a form of declarative memory) • Memory for language and motor-skills tasks
Occipital lobes	• Memory for pictures
Parietal lobes	• Spatial memory (awareness of oneself in space)
Temporal lobes	• Memory for sound and the names of colours
Hippocampus	• Forming explicit memory • Consolidating and retrieving long-term declarative memories
Amygdala	• Forms of long-term implicit memory including emotional memories such as recognising emotions in faces • Procedural memories such as skill learning and classical conditioning
Basal ganglia	• Long-term procedural memory • Movement
Cerebellum	• Encoding, processing and storing of procedural memories • Classically conditioned responses (a form of implicit memory) • Memory for motor-skills tasks

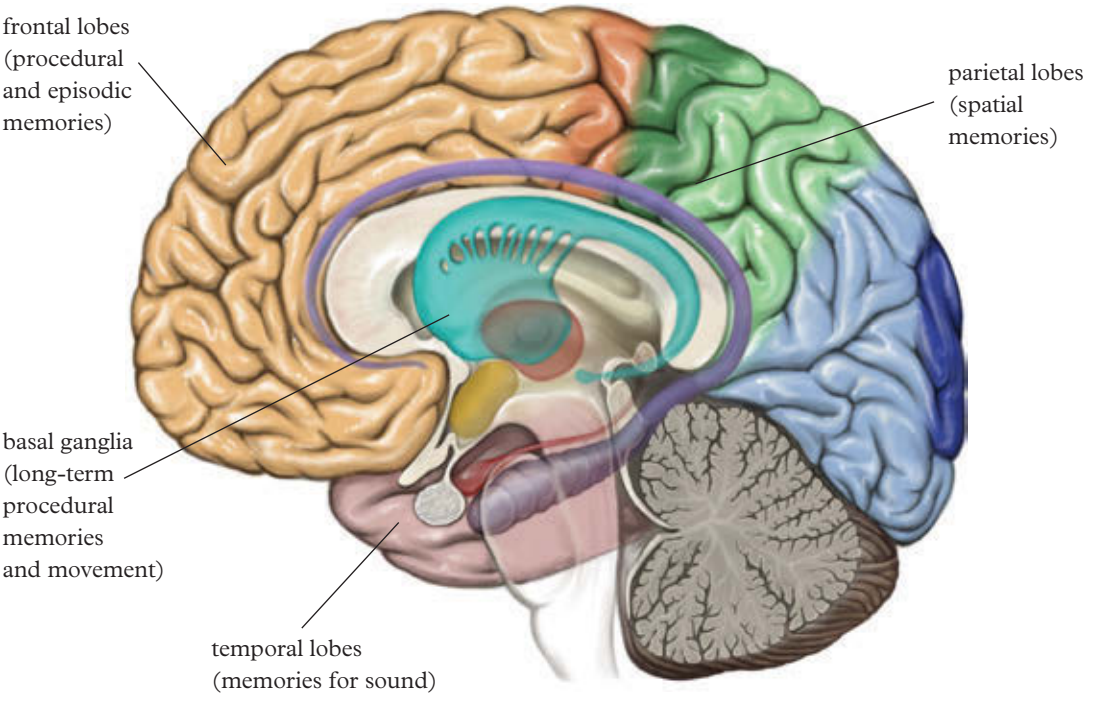

FIGURE 1 Cross-section indicating the location of key structures of the brain responsible for memory

The role of the cerebral cortex

Researchers have established that different long-term declarative memories are stored in the different cortical areas, generally according to where the type of information is processed, and that procedural memories are stored, processed and encoded in the frontal lobes of the cerebral cortex.

When we learn a new language it is stored in the Broca's area (Chapter 2) of the left frontal lobe, which is responsible for language. Memory for the names of colours is stored in the part of the temporal lobe that is close to the occipital lobe. Spatial memories (awareness of one's self in space) are stored in the parietal lobe. Memory for sounds is stored in the temporal lobes, and memory for pictures is stored in the occipital lobe.

CHECK YOUR LEARNING 8.1

Describe and explain

1 **Identify** the brain structures involved in memory.

2 **Describe** the type of memory linked to each of the four lobes of the cerebral cortex.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 8.1

» **Weblink**
Brain structures involved in memory

8.2 The role of the hippocampus in memory

KEY IDEAS

In this section, you will learn about:

- the location and structure of the hippocampus
- the roles of the hippocampus and the amygdala in memory formation
- factors that affect the functioning of the hippocampus.

The hippocampus is a finger-sized curved structure that lies in the interior of each of the temporal lobes and is located close to the amygdala. It is named so because its appearance is considered to be similar to a seahorse (in the genus Hippocampus). It is usually larger in women than in men. The hippocampus in each lobe is connected directly to the frontal lobe, thalamus and amygdala. Figure 1 shows the brain as a 3D illustration. The highlighted area shows the hippocampus, which is part of the brain's limbic system. The limbic system is a primitive part of the brain involved in emotions, learning and the formation of memories. The hippocampus is located inside the medial temporal lobe and plays an important role in long-term memory, and spatial memory and navigation.

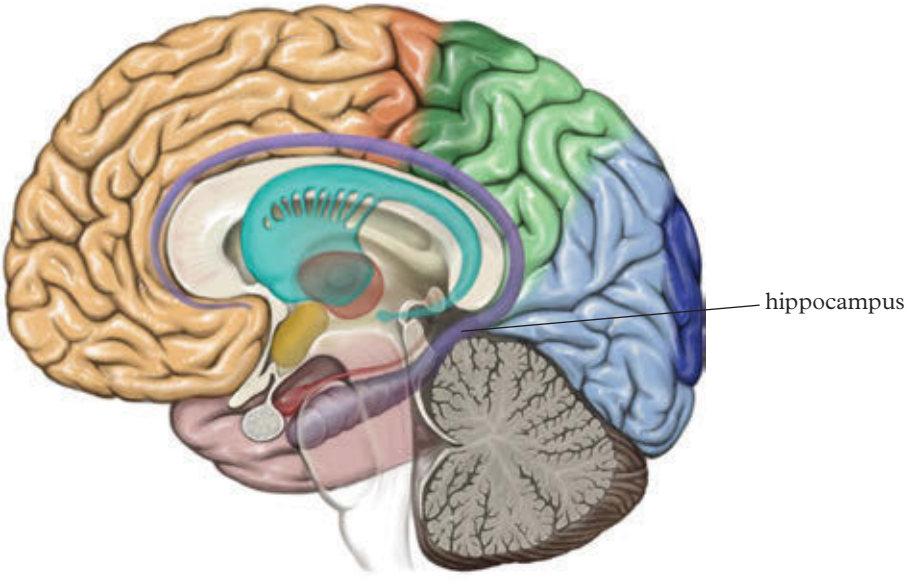

FIGURE 1 Location of the hippocampus in the brain

The hippocampus and memory

The hippocampus is involved in establishing the background or context for each new memory, such as the location, situation and memory of places. However, declarative memories are not permanently stored in the hippocampus. There is a point in the encoding and storage process of declarative memories that takes place in the hippocampus, before these memories are transferred for more permanent storage in relevant parts of the cerebral cortex (Garrett, 2009).

The hippocampus and formation of explicit memories

Unlike the cells in other structures of the brain, the cells of the hippocampus are able to reproduce and enable new memories to be formed. The hippocampus is important for forming explicit memory as well as the memory for complex tasks that require declarative memory – for example, a child learning to spell unfamiliar words (Reed & Squire, 1999). Another example is in the research of Maguire and colleagues (1997) who found the hippocampi of London taxi drivers to be larger than those in people who worked in other professions. This is explored in Case study 8.2A.

CASE STUDY 8.2A

The hippocampus and memory formation

Maguire et al. hypothesised that, just as with other animals, it might be possible to increase the size of human brain areas, such as the hippocampus where memories are formed. Their research found that this was the case for 16 London taxi drivers who were expected to memorise the streets of London before they could obtain a licence to drive a taxi (known in London as 'Doing the Knowledge'). The researchers found that the drivers had more activation in the hippocampus for a navigation memory task than for other types of memory tasks (Maguire, Frackowiak & Frith, 1997).

Further research using MRI scans of the drivers found that the posterior part of the hippocampus, an area of the brain involved in spatial navigation, was larger for the taxi drivers than in males of similar age who were not taxi drivers. It found that this area of the brain was largest in the most experienced of drivers. However, the overall size of the hippocampus was not different from non-taxi-driving males (Maguire, Mummery & Beuchel, 2000).

This research was helpful in understanding the role of the hippocampus in memory but it is important to remember that it is *correlational* – it is impossible to know if the taxi drivers' hippocampal changes were caused by memorising the maps or by some other variable such as walking the streets of London frequently.

FIGURE 2 London taxi drivers are expected to memorise the streets of London before they can obtain a licence.

The hippocampus and consolidating memories

consolidation process in which the brain forms a permanent representation of memory

The process of **consolidation** (the permanent storage of a memory) of declarative memory takes place in the hippocampus. Neuroscanning techniques have enabled researchers to observe the hippocampus during the process of consolidation. For example, in one study, participants were shown words to learn. How well the words were remembered later on could be predicted from how much activation occurred in the hippocampus during the presentation (Alkire *et al.*, 1998; Brewer *et al.*, 1998).

CASE STUDY 8.2B

The water maze

A study using rats indicated that the hippocampus has a vital role in the consolidation process. The rats were trained in a water maze, which is a tank of muddy water from which they could escape once they had quickly learnt the location of a hidden, submerged platform on which they could stand.

Immediately after they had learnt to swim to the platform, the rats were given a drug that temporarily disabled their hippocampus and prevented consolidation. When they were re-tested in the maze 16 days later, these rats performed poorly. This indicated that the hippocampus has a role in consolidation.

In a different trial, rats were *not* given the drug at the time they were in the maze: consolidation of learning the water maze was allowed to take place. However, these rats were given the drug 16 days later when they were re-tested. It was found that these rats also performed poorly because they were unable to *retrieve* the information about the platform that they had learnt. This demonstrated that the hippocampus also has a role in retrieval of declarative memory (Riede *et al.*, 1999).

FIGURE 3 The rat learns to escape the water by standing on the submerged platform.

The hippocampus and transferring new memory for storage

The hippocampus transfers declarative information to other relevant parts of the brain, such as the lobes of the cerebral cortex, for permanent storage as long-term memory. A study found that, in mice, the neural activity in the hippocampus gradually diminished 25 days after the initial memory was formed; however, neural activity for the memory increased in areas in the cerebral cortices of the mice (Bontempi *et al.*, 1999).

In another study, researchers lesioned (damaged) the pathway between the hippocampus and cortex in the brains of rats. For the first 24 hours, this did not affect the rats' ability to learn the location of the platform in the water maze. However, after four weeks, the rats had lost their memory of its location. The results of this study suggest that short-term memory formation requires both the hippocampus and cerebral cortex over time. To explore this further, the researchers lesioned another group of rats 24 hours after learning the water maze. They found that the rats' performance on the maze was poor four weeks later, whereas another group that was lesioned three weeks after training performed just as well as a control group of rats with intact brains (Remondes & Schuman, 2004).

Research suggests that the transfer of declarative memory from the hippocampus to other relevant parts of the brain occurs at times when it is less busy, such as during sleep (Lisman & Morris, 2001). The hippocampus is active during slow-wave sleep, when memories are being processed. Researchers have found that human performance on a visual discrimination task continued to improve two to four days after the initial training, even with no additional practice, but only if the participants had slept within the first 30 hours after training (Stickgold, James & Hobson, 2000).

Linking emotion to memory

Through its close relationship with the amygdala, the hippocampus plays an important role in the relationship between emotion and memory, including both the emotions that are generated by particular memories and memories that are triggered by emotions.

The amygdala is essential for the formation of implicit memories including those formed during classical conditioning and emotional memory. The amygdala also has a special role in the memory for emotions shown on faces (Markoswitsch *et al.*, 1994). In activating the hippocampus, the amygdala also plays a part in the consolidation of declarative memory with emotional content, such as winning an important sports competition (Garrett, 2009).

Factors affecting the functioning of the hippocampus

The functioning of the hippocampus can be disrupted by psychological factors such as stress, anxiety, depression and post-traumatic stress disorder (PTSD). It can also be damaged through brain trauma such as head injury. Health-related conditions such as Alzheimer's disease, viruses such as herpes, encephalitis and various other conditions can also cause dementia. Prolonged stress may cause the hippocampus to shrink and thereby disrupt its role in memory formation.

The hippocampus and the amygdala

Patients with damage to their hippocampus have enabled researchers to realise that there are two types of long-term memory: explicit memory and implicit memory. Researchers studied PET scans of participants while they undertook activities that required the use of explicit and implicit memory. They found that the hippocampus was active for explicit memory tasks, but other parts of the brain were active for procedural memory tasks. For example, the cerebellum was, in part, responsible for remembering motor-skills tasks (Sanes, Dimitrov & Hallett, 1990; Schachter *et al.*, 1996).

People with hippocampal damage are still able to learn and remember procedural information, such as motor skills or habits (bike riding, playing table tennis). If asked, however, these people cannot remember actually performing the skill because their memory of it is declarative (Zola & Squire, 2000).

Bechara and colleagues (1995) demonstrated the important role of the amygdala in emotional memory. This research included one participant with damage to the amygdala on both sides of the brain and another participant whose hippocampus was damaged on both sides of the brain.

The researchers tried to link responses in the participants by making a loud, unpleasant noise when a blue slide was shown to them, but no noise when a slide of a different colour was shown.

The participant with the damaged amygdala reacted emotionally to the loud noise and was able to tell the researchers which slide was followed by the noise. However, when the same blue slide was presented without the loud noise, he did not react emotionally. He had no emotional memory (reflex response) associated with the blue slide and so did not react to it when it was not accompanied by the noise.

In contrast, the participant with the damaged hippocampus showed an emotional response to the noise and also to the blue slide, but, when asked later, could not remember which colour slide was associated with the loud noise. His brain had not consolidated declarative memory for the colour that was associated with the noise (Bechara *et al.*, 1995).

This study found that people with a damaged amygdala are incapable of fear conditioning, indicating that this part of the brain is important for the formation of this type of memory.

CHECK YOUR LEARNING 8.2

Describe and explain

1 **Describe** how the hippocampus is involved in the formation of explicit memories.
2 **Explain** the role of the hippocampus in consolidation.
3 **Summarise** the role the hippocampus has in the transfer of new memories for storage.

Apply, analyse and interpret

4 **Compare** the roles of the hippocampus in memory and in emotion.

Investigate, evaluate and communicate

5 **Evaluate** the following statement: 'Without the hippocampus, people would not be able to transfer memories to long-term storage'.
6 Read Case study 8.2b.
   a **Consider** the ethics involved in using rats in the experiment.
   b Suggest how you could **modify** the experiment.
   c **Predict** what your experiment modification may result in.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 8.2

» **Suggested research**
8.2 The role of the hippocampus in memory

» **Weblink**
The hippocampus and memory

8.3 The role of the cerebellum in memory

KEY IDEAS

In this section, you will learn about:

- the role of the cerebellum in forming and storing implicit memories
- the impact of damage to the cerebellum.

The cerebellum has a role in the memory of how to perform a motor skill; it works with the motor cortex of the frontal lobes. Procedural memories are encoded, processed and stored by the cerebellum – as well as by the putamen, the caudate nucleus and the motor cortex in the frontal lobes of the cerebrum. A procedural memory is a type of implicit (unconscious) and long-term memory that helps you perform a particular task without conscious awareness of previous experiences. For example, procedural memories are automatically retrieved and used in executing integrated procedures involved in cognitive and motor skills, whether that be tying shoelaces, driving a car or reading a book. The cerebellum activates the relevant neural systems to retrieve a procedural memory, thereby enabling you to automatically perform a task or motor skill without consciously thinking about it.

FIGURE 1 When you access the skill of roller skating (motor skill), your cerebellum assists in relaying this procedural memory so that you are able to roller skate again.

Patients with anterograde amnesia have provided evidence for a difference between short- and long-term memory. This type of amnesia results from brain damage where there is injury to the hippocampus. Often these patients can only remember information up to the time of the head injury; although, they can still carry out many procedures learnt prior to the brain damage, such as using cutlery. They can also form new procedural memories that then enable them to learn a simple skill in a ball game. In contrast, these patients are unable to form new declarative memories (Baddeley & Warrington, 1970). This makes sense when we consider that the cerebellum plays a key role in the timing and execution of learnt, fine motor skills. The cerebellum also has a role in classical conditioning. A classically conditioned response is another form of implicit memory. A study found that rabbits with damaged cerebella were not able to be classically conditioned to the blink response when given a puff of air to the face (Green & Woodruff-Pak, 2000).

CHECK YOUR LEARNING 8.3

Describe and explain

1 **Describe** the role of the cerebellum in memory.
2 **Explain** what is meant by implicit memory.

Apply, analyse and interpret

3 **Compare** the roles of the cerebellum and hippocampus in forming and storing memories.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 8.3
- **» Weblink**
  Implicit and explicit memory storage
- **» Weblink**
  Test your memory

CHAPTER 8

Review

Summary

8.1
- Different parts of the brain are responsible for different types of memory, though collectively the brain forms all memories.
- Each of the four lobes of the cerebral cortex is responsible for a different type of memory.

8.2
- The hippocampus is found in the temporal lobes, close to the amygdala. It is involved in establishing background or context for each memory, such as the location, situation and memory for places.
- The hippocampus is particularly involved in forming explicit memories and memory for complex tasks that require declarative memory.
- The process of consolidation for declarative memories happens in the hippocampus. It then transfers declarative information to other parts of the brain for permanent storage in long-term memory.
- Because of the hippocampus's close proximity to the amygdala, it is also implicated in the relationship between emotion and memory.
- The hippocampus is responsible for explicit memory tasks.

8.3
- The cerebellum is implicated in how motor tasks are performed and works with the motor cortex of the frontal lobes.

Key term

- consolidation

Revision questions

The relative difficulty of the short answer questions is indicated by the number of stars beside each question number: ★ = easy, ★★ = medium, ★★★ = hard.

Multiple choice

1 How can the roles of the hippocampus and amygdala in memory formation be summarised best?

A hippocampus: implicit, declarative memories; amygdala: explicit, declarative memories

B hippocampus: implicit, procedural memories; amygdala: explicit, declarative memories

C hippocampus: explicit, procedural memories; amygdala: implicit, declarative memories

D hippocampus: explicit, declarative memories; amygdala: implicit, procedural memories

2 Where would you expect to find the greatest amount of brain activity for a person learning French verbs for the first time?

A cerebellum

B hypothalamus

C right frontal lobe

D hippocampus

3 The hippocampus is particularly active during _____. This is also a time when _____ is likely taking place.

A concentration; attention

B sleep; consolidation

C concentration; consolidation

D sleep; ageing

4 The cerebellum has a key role in the processing, encoding and storage of what kind of memories?
   A short-term memories
   B explicit memories
   C procedural memories
   D declarative memories

5 What does the cerebral cortex do?
   A It consolidates declarative long-term memories.
   B It stores short-term and declarative memories.
   C It adds emotional content to memories.
   D It processes and encodes explicit memories.

6 What did studies of patients with damage to their hippocampus help researchers discover?
   A two types of long-term memory: explicit memory and implicit memory
   B how classical conditioning may work
   C how declarative memories are stored
   D two types of long-term memory: procedural and declarative memory

7 Which of the following is the cerebellum *not* responsible for?
   A explicit memories
   B implicit memories
   C procedural memories
   D memory for motor-skills tasks

8 Which part of the brain would you expect to see damage to if a person could not remember what movie they saw last night?
   A amygdala
   B cerebellum
   C occipital lobe
   D hippocampus

Short answer

Describe and explain

★ **9** The hippocampus functions as a part of the brain that _____ (temporarily/permanently) stores new memory. However, memories are transferred to other parts of the brain for _____ (temporary/permanent) storage in _____ (long-term/short-term) memory.

★ **10** **Explain** how the hippocampus and cerebral cortex may both be involved in learning.

★★ **11** **Describe** the role and function of the amygdala in regard to emotion and memory, providing an example of what can happen when the amygdala is damaged.

★★ **12** Briefly **explain** what consolidation refers to, naming the structures in the brain responsible.

★★ **13** **Identify** and **describe** two structures of the brain that are involved in memory.

Apply, analyse and interpret

★ **14** **Compare** the roles of the hippocampus and cerebellum in forming and storing memories.

★★ **15** Based on your understanding of brain structures, **consider** why a person may remember how to ride a bike, but not remember details of the bike ride she took with a friend the previous day.

Investigate, evaluate and communicate

★★ **16** **Propose** why London taxi drivers may have larger hippocampi than people with other occupations.

★★ **17** **Construct** an argument for the role of the amygdala in memory storage.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 8 Review
- **» Revision notes**
  Revision notes for Chapter 8
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 8

CHAPTER 9

How we remember & forget

We all forget – sometimes for an instant, sometimes forever! Trying to remember someone's name, needing to recall a formula during a maths test, or reminiscing about what a great holiday all involve different methods of retrieval.

This ability to retrieve information from the memory can be affected by many things. While research has found that there are ways we can improve our memory, it can also be damaged in ways that are beyond our control.

In this chapter, we will distinguish between the different methods for retrieving memories. We will also examine how information is lost from memory and discuss strategies to improve memory.

OBJECTIVES

→ Distinguish between recall, recognition and relearning.
→ Describe how information is lost from memory through encoding failure, retrieval failure and interference effects.
→ Discuss strategies to improve memory, including chunking, rehearsal (maintenance and elaborative) and mnemonics (e.g. the method of loci and SQ4R method – survey, question, read, recite, relate and review).

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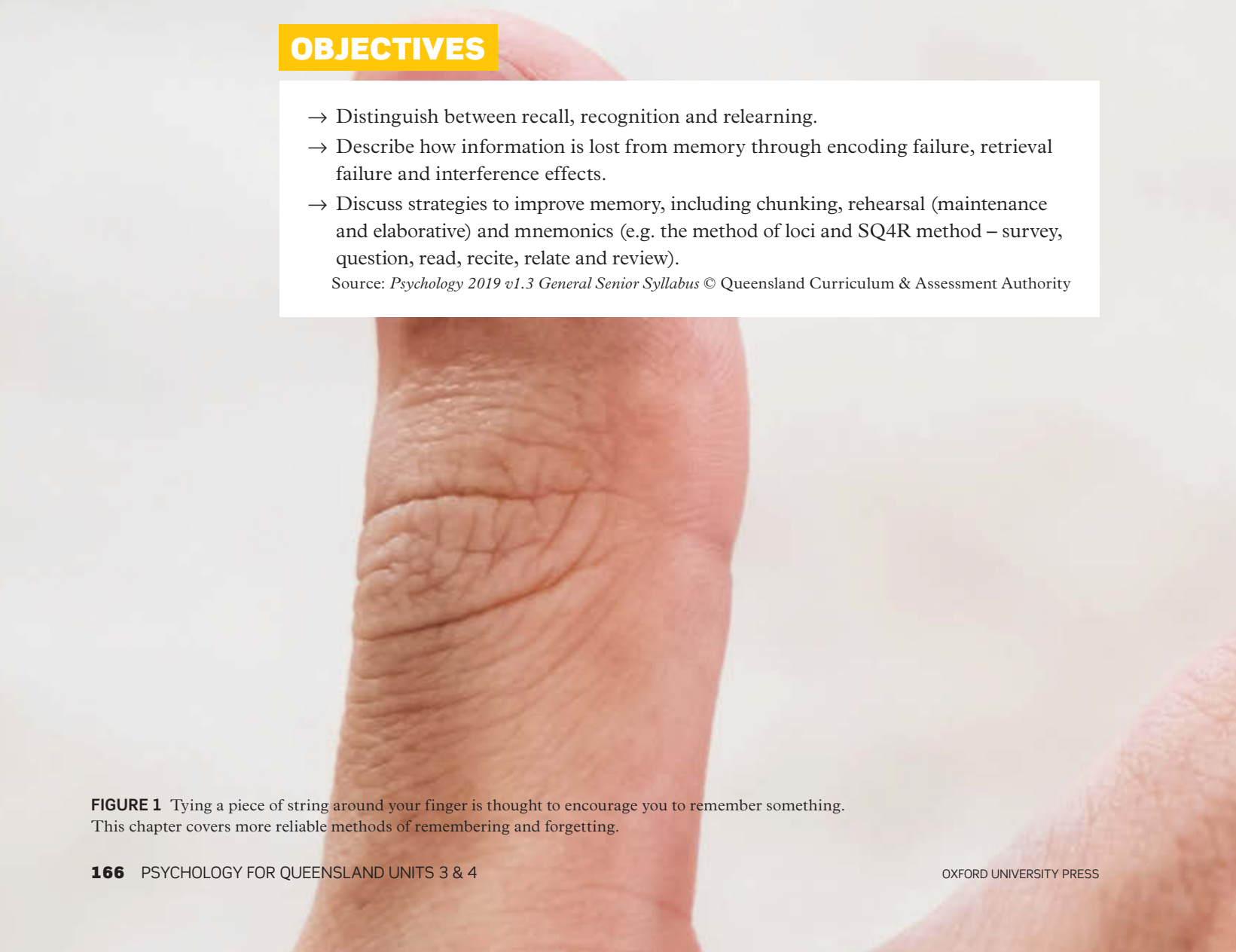


FIGURE 1 Tying a piece of string around your finger is thought to encourage you to remember something. This chapter covers more reliable methods of remembering and forgetting.

MANDATORY PRACTICAL

MANDATORY PRACTICAL

9.1 The effect of learning environment on memory

9.1 Recall, recognition and relearning

KEY IDEAS

In this section, you will learn about:

+ the differences between recall, recognition and relearning.

Memory research acknowledges the following four methods of memory retrieval:

- recall
- recognition
- relearning
- reconstruction.

We will focus on the first three.

Recall

recall
retrieval of stored information using minimal cues

free recall
recalling as much information as possible in any order, without cues

serial recall
recalling information in the order in which it was presented

cued recall
recalling assisted by cues, not involving the original items to be retrieved; e.g. being given an individual's initials to assist recall of their name

Recall requires a person to retrieve stored information using minimal cues. There are three main types of recall:

- **Free recall** is involved in a task in which the participants are required to retrieve as much information as they can in any order (e.g., a list of items to purchase from the supermarket).
- **Serial recall** involves recalling information in the order in which it was presented (e.g., the names of cities visited on an overseas journey).
- **Cued recall** uses various prompts (cues) to assist the retrieval process (e.g., 'The surname is short and begins with a D').

FIGURE 1 Cued recall: a photo makes it easier to recall the names of all the people in your class, especially if it is a class from a long time ago.

Recognition

Recognition refers to identifying the correct information among a list of incorrect pieces of information; for example, being able to select the correct answer to a multiple-choice question from a list of four alternatives.

recognition a process of retrieval that requires identification of a correct response from a set of alternatives

Recognition is generally more accurate than recall because it provides more cues to assist retrieval. For example, if you were asked to name the students in your English class in Year 7, what percentage of the class do you think you could recall? If, on the other hand, you were given a list of 50 names and asked to identify (recognise) those who were in your English class in Year 7, the number of names that you remember would almost certainly be higher.

Recognition and cued recall are sometimes confused and it is important to distinguish between them. Think of the example of remembering the names of students in your Year 7 English class. Recognition would involve you being given a list of names that included those who were in the class with many other names. Cued recall would involve you being given cues to the information, such as a class photograph or the initials of the class members, but not the evidence of the items to be remembered (the actual names).

Relearning

Relearning, which refers to learning again something that has previously been committed to memory, is easier than learning something for the first time. This is the case with all aspects of memory but is especially true of procedural memory. Have you ever returned to a previously learnt skill, like a sport or playing a musical instrument, after a period of time and picked it up really quickly? This is the savings effect of relearning. Many people find the same with speaking a foreign language.

relearning learning again something that has already been committed to memory; the most sensitive measure of retention

If the time taken to learn the material originally can be measured and compared with the time taken to relearn the same material, then a savings score can be calculated:

$$\text{Savings score} = \frac{(\text{Time for original learning}) - (\text{Time for relearning})}{(\text{Time for original learning})} \times 100\%$$

As an alternative, 'Trials' can be substituted for 'Time':

$$\text{Savings score} = \frac{(\text{Trials needed for original learning}) - (\text{Trials needed for relearning})}{(\text{Trials for original learning})} \times 100\%$$

It is worth noting that relearning is the most sensitive measure of retrieval, while recall is the least sensitive measure of retrieval. This means that if a very small amount of the memory remains, relearning will identify that it is there – even if recognition and recall cannot.

A *more* sensitive measure will register that a memory is present even if only a small amount of the memory remains. A *less* sensitive measure will only register that a memory is present when a large proportion of it remains.

FIGURE 2 More sensitive tasks may require relearning; less sensitive tasks can be remembered with free recall.

CASE STUDY 9.1

Ebbinghaus and the forgetting curve

Hermann Ebbinghaus was the first person to perform systematic research into remembering (or forgetting), publishing his findings in 1885.

Ebbinghaus experimented using only one participant – himself. He did not want previous knowledge to interfere with his results, so he learnt lists of pronounceable, nonsense syllables – three-letter combinations such as *bup*, *tov*, *ruj* and *lev*. Having tested himself until he had perfect scores for remembering the 'words' on each list, he waited for various periods of time – ranging from 20 minutes to 31 days – and then tested himself again to see what percentage of the learnt material he had retained. His results (see Figure 3) show that forgetting occurred most rapidly in the first 20 minutes, at a moderate rate until one hour had passed, and then very gradually for the next 31 days.

Since the publication of Ebbinghaus's forgetting curve, the same features have been shown in other research, no matter what form of memory was tested.

Most forgetting occurs immediately after the information has been learnt, so the beginning of a forgetting curve has the steepest slope.

More than 50 per cent of the material is forgotten within the first hour.

If the material was originally overlearnt (that is, learnt over and over even when already well known), then it is likely to be retained for longer and with greater accuracy.

Factors such as the complexity of the material learnt and even the intelligence of the learner do not seem to affect the rate of forgetting.

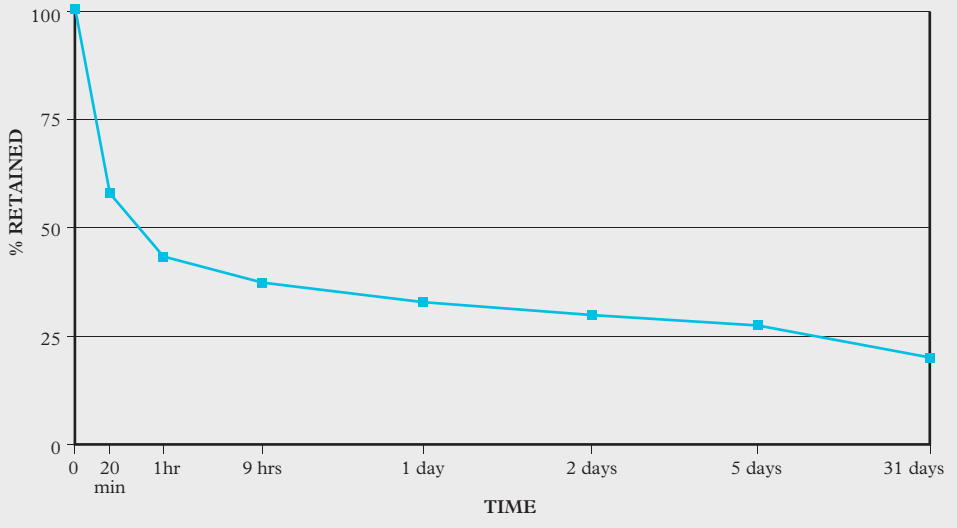


FIGURE 3 Ebbinghaus's results

CHALLENGE 9.1

Shared memories

With a classmate, choose a memory that you share. It might be something that has happened in class, on school camp or outside of school. Then answer the following questions separately:

1 When did the event happen?
2 Why did the event happen?
3 Who was there? What were they wearing?
4 What was the weather like?
5 What was said at the time of the event?
6 How did everyone feel about the event?

Now compare your answers and see if they are similar or different. Discuss why you think your recollection of this event is either similar or different.

CHECK YOUR LEARNING 9.1

Describe and explain

1 **Describe** recall, recognition and relearning.
2 **Calculate** Roger's saving score if it took him eight hours to learn a list of Australian native plant names at the beginning of term, and then only four hours to relearn the same Australian native plants for his exam.
3 **Explain** what is meant by free recall, serial recall and cued recall.

Apply, analyse and interpret

4 Charlie learnt to play the piano as a child. Originally, it took Charlie a year to learn to read music. Charlie has recently moved house and now has a piano again. He started to play the piano a week ago and can already read the sheet music well. **Determine** the savings score for Charlie's reading of sheet music.
5 **Compare** free recall and cued recall.
6 **Differentiate** between recall and recognition.
7 Sabrina has a savings score of 40 per cent for relearning how to speak French after she lived in Paris for a cooking course when she was 15. **Consider** how recall and recognition may have assisted in her low savings score.
8 Vicki was anxious about her Psychology exam. However, she felt better when she noticed that a large proportion of the exam was multiple choice. **Determine** why this made Vicki feel better.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 9.1
- **Mandatory practical**
  9.1 The effect of learning environment on memory
- **Challenge**
  Worksheet: 9.1 Shared memories
- **Weblink**
  Recall, recognition or relearning

9.2 Encoding failure

KEY IDEA

In this section, you will learn about:

+ the encoding specificity principle.

encoding specificity principle the associations formed at the time of encoding new memories will be the most effective retrieval cues

The **encoding specificity principle** (Tulving & Thomson, 1973) states that the associations formed at the time of encoding new memories will be the most effective retrieval cues.

This means that items are stored in memory according to their meaning at the time of encoding. For example, consider the following list of words: spectacles, monocle, glasses, vision, eyes, contact lenses. In this case, we are likely to associate the word 'glasses' with eyewear. Now consider this list: mugs, goblets, glasses, beakers, tumblers. This time we would probably associate the word 'glasses' with drinking vessels.

Another aspect of the encoding specificity principle is that if we are trying to retrieve information under conditions that are similar to those under which it was learnt, we will retrieve it more easily than under different conditions.

context-dependent cues cues to assist retrieval from long-term memory, due to the external environment in which learning took place

state-dependent cues cues to assist retrieval from long-term memory, due to the internal environment (mood-state or physical condition) in which learning took place

The two main conditions that assist retrieval are the learner's external environment (the context) and the internal environment (the internal state). Consequently, we refer to these conditions as **context-dependent cues** and **state-dependent cues**.

TABLE 1 Example of context-dependent and state-dependent cues

Context-dependent cues (external environment)	State-dependent cues (internal environment)
Brightness of light	Mood
Smells	Level of anxiety
Noises	State of tiredness

Context-dependent cues

Context-dependent cues refer to the learner's external environment (the context) in which the memory was formed. Environmental cues include sounds, smells, temperature and other environmental stimuli that were linked to the material being learnt at the time. At a later time, context cues can stimulate memories – these are often especially vivid if a smell is the stimulus.

FIGURE 1 Smell is a strong context-dependent cue. The scent of different flowers can remind people of previous memories.

People can also appear to have forgotten details of an event, but upon returning to the place where the original memory was formed they are flooded with detailed memories. This will often happen if you return to a street where you lived as a child, or if you are taken to the scene where you witnessed a crime.

We are likely to use context-dependent cues in everyday life. Imagine that you can't recall where you put your keys: you set about retracing your steps and, suddenly, you remember that you were wearing your blazer when you were at your locker. Sure enough, your keys are in your blazer pocket!

In the investigation of the murder of Peter Falconio in the Northern Territory on 14 July 2001, the sole eyewitness was his girlfriend Joanne Lees.

As part of the investigation, the police took her back to the scene of the crime so that the context might assist her to retrieve important details to assist in the hunt for the murderer.

State-dependent cues

State-dependent cues refer to the 'internal environment', which are factors within the person – the physiological and/or psychological state that they were in at the time of learning, such as their mood, level of anxiety and whether they were intoxicated, medicated or sober. For example, it has been found that when we are happy we are more likely to remember happy events, but if we are sad we tend to have unhappy memories.

State-dependent learning and retrieval cues might help explain why some people have difficulty recalling information when they are in examinations. In the exam they might be highly aroused, whereas when the learning of the material took place they were in a more relaxed emotional state.

FIGURE 2 If you experienced something for the first time near the Brisbane River at sunrise, the river or the sunrise could act as a future context-dependent cue.

Ineffective encoding

Ineffective encoding can help explain occasions where we think we have forgotten information but in reality the information was never encoded properly at the time of learning. Two examples of ineffective encoding include *pseudo-forgetting* and disruption to the consolidation process.

Pseudo-forgetting is where memory is thought to be forgotten but it was never encoded and stored in the first place. It is often caused by lack of attention. The research on levels of processing suggests that the most effective form of encoding is semantic encoding, where information is learnt at a deeper level, then phonemic encoding, where information is learnt at a shallow or superficial level and is less likely to be associated with other existing information that is stored in the long-term memory.

Another reason for ineffective encoding is when the consolidation process has been disrupted or prevented.

CHECK YOUR LEARNING 9.2

Describe and explain

1 **Describe** what happens during ineffective coding.
2 **Explain** what a state-dependent cue is.

Apply, analyse and interpret

3 **Compare** context-dependent cues with state-dependent cues.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 9.2

» **Increase your knowledge**
What do you remember?

» **Weblink**
Encoding memories

9.3 Retrieval failure theory

KEY IDEAS

In this section, you will learn about:

- why cues are important in retrieving information from memory
- the retrieval failure theory
- types of retrieval cues
- tip-of-the-tongue phenomena.

retrieval failure theory inability to retrieve material due to an absence of the right cues or a failure to use them

The retrieval failure theory of forgetting suggests that the correct cues to retrieve information are not used or are not available. It is also known as 'cue-dependent forgetting' and explains forgetting as an inability to retrieve material due to an absence of the right cues or a failure to use them. This theory was proposed by Endel Tulving (Tulving & Thomson, 1973). It suggests that the amount of information we are able to retrieve from long-term memory depends on the type of cue or prompt we use. If the memory cue or prompt we use is not the right one, then we are likely to experience forgetting. In other words, the memory is available but it is not accessible without the relevant cue or prompt to assist in retrieving it from long-term memory.

This theory tries to explain why we are sometimes unable to remember material that we are certain is in our memory, such as when you cannot remember what you intended to pack in your school bag for the day. If you walk into the kitchen and laundry, you might suddenly remember you need a snack for afternoon tea or sports clothes. The kitchen and the laundry provide retrieval cues. Similarly, the smell of freshly cut grass might trigger memories you thought you had forgotten, or the options in a multiple-choice test might provide cues that assist you in remembering the correct information to answer the relevant question.

retrieval cues mental reminders or prompts that we create to assist our recollection later on

Retrieval cues are mental reminders or prompts that we create to assist our recollection later on. We may create these cues deliberately, implicitly or both. Retrieval cues can come in a range of formats, including the context-dependent cues or environment in which the memory was encoded, as well as the emotional state-dependent cues that we were in or the smell, taste and sounds associated with the memory. Retrieval cues can also include physical objects, suggestions and verbal stimuli. The usefulness of retrieval cues also depends on the encoding specificity, which refers to the principle that how we encode information will determine our ability to retrieve that information later on.

FIGURE 1 If you are trying to remember information about lions, being presented with a kitten may help your brain trigger further information about cats.

According to Tulving, a good retrieval cue is similar to the original encoding of the information. For example, if the sound of the word was emphasised during encoding, then the retrieval cue should be to do with the sound of the word (phonemic cue). Alternatively, if the meaning of a word was emphasised during encoding, then the retrieval cue should be concerned with meaning (semantic cue; Tulving & Thomson, 1973).

To be sure that we will remember new information, we need to make a conscious and deliberate effort to create effective retrieval cues. This can be done in many ways – some methods include creating bizarre images in our mind or making associations between information already in our memory and the new information. One particular demonstration of retrieval failure is the tip-of-the-tongue phenomenon.

Tip-of-the-tongue phenomenon

tip-of-the-tongue phenomenon (TOT)
the feeling that something we know is just not available to be recalled from memory; an indication that some forgetting is due to retrieval failure

The **tip-of-the-tongue phenomenon (TOT)** involves knowing that your memory is ultimately aware of the name, item or material you are trying to remember but cannot retrieve it at that moment. Often, the memory is retrieved a few minutes later. For example, you might be trying to remember the name of an acquaintance. 'What is his name? I can see his face, the colour of his hair, his eyes – and his name starts with R. Ron? Rob? Rod? Roger? … Now I remember; it's Ryan.'

Even though we may not be able to recall the exact name of a person, we will often be able to recall certain features of the name, such as whether it was a long or short name, and the letter it started with. Usually these features will be recalled accurately. This is interesting because it shows that memories are stored in a complex fashion, at a variety of locations in the brain. TOT is an example of how we intentionally search for cues that will prompt the retrieval of a specific memory. TOT occurs in all languages, at least once a week for people on average, but this rate of occurrence increases as we get older. It typically involves proper nouns and knowing the first letter of the name, and is usually remembered about 50 per cent of the time when a person experiences it.

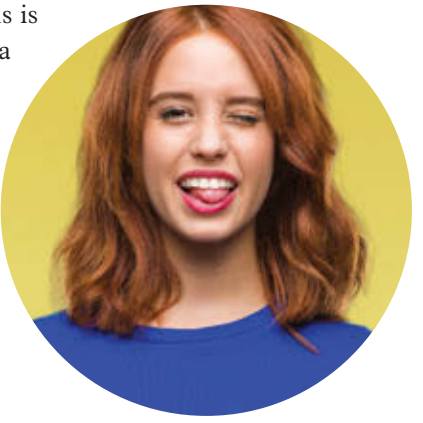


FIGURE 2 It's on the tip of my tongue, I just can't retrieve it right now.

Two different explanations for TOT:

- **Retrieval failure theory**: The information was available but not accessible due to inadequate retrieval cues.
- **Interference theory**: The information is available but is blocked by interference from similar sounding material.

CHECK YOUR LEARNING 9.3

Describe and explain

1 **Explain** retrieval failure theory.
2 **Identify** different types of retrieval cues.

Apply, analyse and interpret

3 **Consider** the role of retrieval cues in the tip-of-the-tongue phenomenon.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 9.3

» **Increase your knowledge**
Retrieval failure

» **Weblink**
On the tip of your tongue

9.4 Interference effects

KEY IDEAS

In this section, you will learn about:

- how interference affects remembering and forgetting
- proactive and retroactive interference and effect of similarity on remembering
- how interference affects remembering and forgetting.

Have you ever found yourself becoming confused or forgetting information when you sit several examinations on the same day? It might be that you have not forgotten the information but that interference is making the information in your memory inaccessible. This happens when we learn two telephone numbers or personal identification numbers (PINs) for bank accounts. You might also have experienced this if it took you a long time to learn your times tables (Burton *et al.*, 2019).

Interference theory refers to difficulties in retrieving information from memory, caused by other material learnt either previously (**proactive interference**) or subsequently (**retroactive interference**). This theory proposes that one set of information in the memory competes with another set of information.

proactive interference when previously learnt material inhibits our ability to encode and store new material

retroactive interference when newly acquired material inhibits our ability to retrieve previously learnt material

Proactive interference

Proactive interference is when previously learnt material inhibits our ability to retrieve new material. The prefix 'pro' means 'forward', so proactive interference is where older information moves forward to interfere with our retrieval of more recently learnt similar information. For example, you might have studied Italian in Year 7 and then learnt Spanish in Year 8. In a Spanish verbs test, your older knowledge of Italian verbs might interfere with your ability to retrieve the correct Spanish verbs. It is likely that proactive interference actually makes it more difficult for us to encode and store new information.

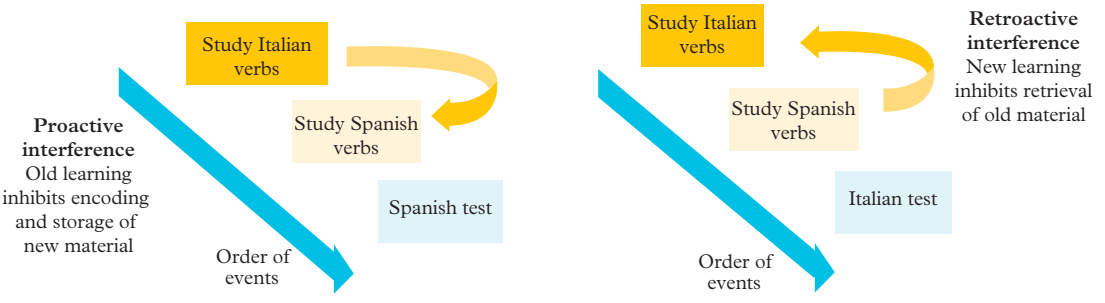


FIGURE 1 Proactive interference occurs when previously learnt Italian verbs interfere with the encoding of recently learnt Spanish verbs. Retroactive interference occurs when learning new Spanish verbs interferes with the retrieval of previously learnt Italian verbs.

Retroactive interference

Retroactive interference is when newly learnt material inhibits our ability to retrieve previously learnt material. 'Retro' means 'backwards', so retroactive interference is where new information interferes with the retrieval of older information stored in the memory. For example, in an Italian verbs test your more recent knowledge of Spanish verbs might interfere with your ability to retrieve the correct Italian verbs for the test.

Effect of similarity on retrieval

Interference is likely to be most pronounced when the two sets of material are very similar. This was shown in a study by McGeoch and McDonald and many studies since then.

In this well-known study, the researchers had participants memorise a list of two-syllable adjectives, and then after a set time interval, memorise another list of information. After another time interval, participants were tested on how many of the words they could remember from the original list. The researchers varied the level of similarity between the two lists of information. It was found that the amount of information that was forgotten from the original list increased as the level of similarity between the two sets of information increased (McGeoch & McDonald, 1931).

FIGURE 2 If you open a new bank account, remembering your new PIN may interfere with your ability to recall other/older PINs.

Strengths and limitations of interference theory

Although this theory seems plausible, has been readily replicated in laboratory settings and has face validity in terms of our own personal experiences, it is not without its critics. While researchers agree that interference does occur, they also point out that the laboratory experiments have tended to use tests of recall, which are particularly prone to interference – for example, recall of word lists and nonsense syllables. They also point out that in real life, interference might not occur so readily. For example, reading and remembering passages of meaningful information uses semantic memory, which is less prone to interference (Carlson *et al.*, 2007).

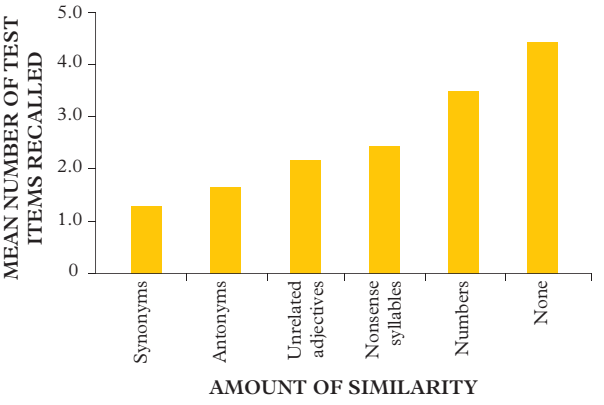


FIGURE 3 McGeoch and McDonald (1931) found that the amount of interference is greatest when the material is similar.

CHECK YOUR LEARNING 9.4

Describe and explain

1 **Explain** interference.
2 **Describe** retroactive interference.

Apply, analyse and interpret

3 **Compare** retroactive interference and proactive interference.
4 **Consider** why interference effects are more likely if the material is similar.

Investigate, evaluate and communicate

5 **Discuss** the benefits of differentiating between proactive and retroactive interference. Then **design** a methodology to test for different types of interference.
6 **Evaluate** the following hypothesis: Students studying for their QCE exams will remember more if they let information override past learning.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 9.4

» **Weblink**
Interfering memories

9.5 Improving memory

KEY IDEAS

In this section, you will learn about:

- techniques to improve encoding and recall of information from memory
- chunking, rehearsal and mnemonic strategies for improving memory.

We rely on our memory in many and varied ways in our everyday life. Students' ability to recall the information learnt during class and from textbooks is vital for academic success. How we encode information as it enters our memory systems affects our ability to recall this information later. There are many strategies and techniques that we can use to improve our memory – both at the encoding and the recall phase – which we will review.

Chunking

chunking the process of grouping items together to improve memory capacity – especially short-term memory – as a means of committing to long-term memory

Chunking is the grouping together of items that can be remembered. An item can be something simple, such as a digit, or more complex, such as a word. A chunk is a group of familiar stimuli stored as a single unit.

What this means is that instead of each item occupying a number of locations available in short-term memory, each chunk occupies only one location and therefore frees up the other locations for more information to be stored.

When remembering a string of numbers, it is often easiest to chunk in twos, threes or fours. Consider when we try to remember mobile phone numbers. With mobile numbers of 10 digits, we need to solve the problem of limited capacity of short-term memory (STM). To do this, we chunk some of the digits in the mobile number together. We do this automatically as we remember the numbers in the pattern 1234 123 123.

Chunking is even more effective when the chunks themselves have their own meaning in long-term memory (LTM; e.g., '365' for days in a year, or '2018' for the Commonwealth Games at the Gold Coast).

Chunking is a powerful means of assisting our memory. It greatly increases the amount of information that we can hold in STM.

FIGURE 1 Chunking greatly increases the amount of information that we can hold in short-term memory. This is useful when we are trying to recall a phone number.

Rehearsal

Maintenance rehearsal

The duration of STM is limited compared to that of sensory memory and LTM. It lasts for approximately 12–30 seconds provided there is no interference. Interference occurs when new information enters STM and pushes out information that is already there. To retain information in our STM, we need to solve the problem of its limited duration. To do this we use **maintenance rehearsal**. If you rehearse the information in STM, you increase the chances of retaining the information.

maintenance rehearsal a strategy for keeping information in short-term memory or for moving it into long-term memory by simply repeating information over and over

Maintenance rehearsal enables us to keep information in STM for a longer period of time. It simply means repeating the information over and over again. As long as we are not interrupted, we can keep information in STM almost indefinitely by this method; however, we can't spend our lives thinking about the same five to nine pieces of information, so new information fills the spaces and displaces the old items.

Maintenance rehearsal does not add meaning to the information or link it to other material already in LTM. It just holds it is STM for a longer time and, when maintenance rehearsal stops, the information will be lost 12–30 seconds later.

However, if we repeat something often enough – maybe tens or hundreds of times – transfer to LTM can occur. Case study 9.5A demonstrates the role of auditory processing on encoding. Case study 9.5B discusses the duration of short-term memory and how this can be aided by repetition.

CASE STUDY 9.5A

Conrad 1964

Conrad (1964) demonstrated in an empirical study that short-term memory appears to encode items mostly in an acoustic (sound) code. His experiments suggested that, regardless of whether we see or hear information, we usually repeat the information verbally rather than visually when we want to retain it in our short-term memory.

Conrad showed that when the presented letters rhymed, they were significantly harder to recall than non-rhyming letters because there was acoustic confusion.

TABLE 1 Methods of maintenance rehearsal

Method	Example
Verbal (using words)	• vocal – saying words out loud • sub-vocal – thinking words silently to oneself
Non-verbal (using visual or spatial information)	• visualising – keeping a pictorial image in one's mind • muscular – imagining how it feels to perform an action

Rhyming letters	Non-rhyming letters
B,T,C,P,D,E	Z,R,N,W,Q,A

Conrad also found that when letters were presented visually to participants, errors still tended to be based on acoustic confusability. He concluded that even when information enters the short-term memory in visual format, it is still encoded acoustically.

CASE STUDY 9.5B

Peterson and Peterson 1959

Peterson and Peterson (1959) demonstrated in an experiment that STM has a duration of approximately 12–30 seconds unless the information is rehearsed.

They asked participants to remember a single nonsense trigram of three consonants, such as 'dkt'. Participants' recall of the trigram was recorded after delays of 3, 6, 9, 12, 15 or 18 seconds. It was found that recall was very good (80 per cent) after 3 seconds but was only 10 per cent after 18 seconds. This study demonstrated the duration of STM and also the role of maintenance rehearsal in STM. Figure 2 indicates the duration of the nonsense trigrams in STM for different periods of time.

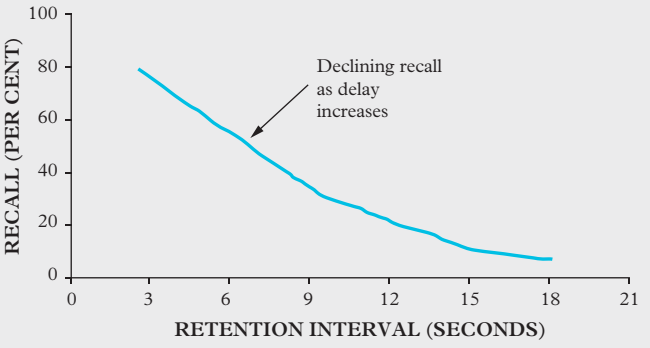


FIGURE 2 Results for Peterson and Peterson's study for the percentage of trigrams recalled after a delay.

In the second experiment, participants were given a task to prevent them from rehearsing the trigram. They were asked to count backwards by threes from the time each trigram was presented to the time a light signalled them to recall it. This is called a 'filled delay'. Results showed that recall after a filled delay was poor, even after 15 seconds. This study demonstrated the role of displacement in STM. Figure 3 illustrates the experiment..

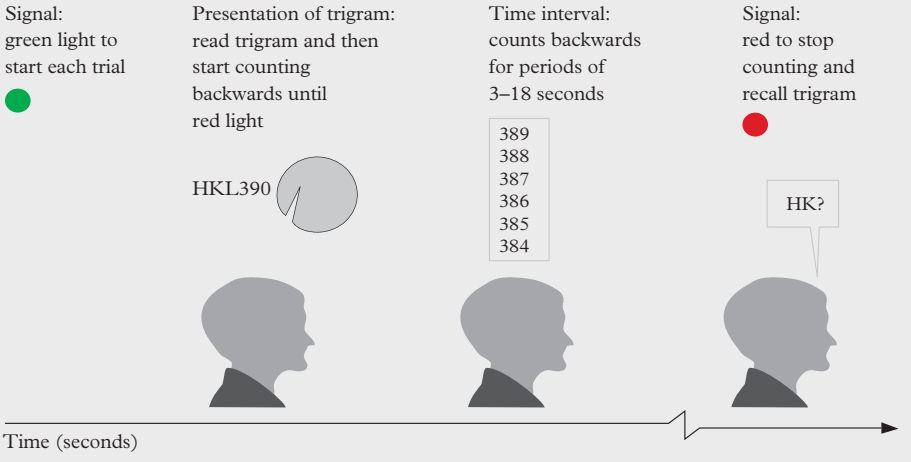


FIGURE 3 Peterson and Peterson's experiments on duration of STM

Elaborative rehearsal

For information to be encoded into LTM, it would ideally be transferred in STM in a meaningful form – that is, semantically encoded. However, we can also hold visual, acoustic and procedural information in LTM.

To have the best chance of encoding information into LTM it is best to use a form of **elaborative rehearsal**. Elaborative rehearsal is a process by which we give meaning to information and link it to other information already in the memory. By thinking of examples of concepts as we are learning them, we tend to process the information at a deeper level. Salience, or personal relevance, is another way we can improve encoding of information. This requires mentally involving ourselves in an example connected with the material being learnt.

elaborative rehearsal
a process by which we give meaning to information and link it to other information in our memories

The advantage of elaboration is that it provides extra links to other material in LTM. To use an analogy, it is like putting a brick in a wall that's being built – if it is attached to six other bricks it will be secure!

In other words, elaborative rehearsal involves using effort to make meaningful associations between new information to be remembered and old or familiar information that is already in LTM. Association involves making new information meaningful by relating it to information that is already in memory. By making associations between new and old information, we create cues to help us locate and retrieve this information from LTM at a later time.

CHALLENGE 9.5

Mobile phone number

Ask a classmate to give you a mobile phone number to remember. You could use maintenance rehearsal or chunking to try to remember it, but you will probably find that you have forgotten it later. However, you might be able to link the numbers with the birthdays or ages of family and friends – or you might convert the numbers into a song with a familiar tune. Test your memory for the number at the end of the lesson to measure the effectiveness of your method of elaborative rehearsal. Summarise your experience in a brief paragraph.

Mnemonics

Unusual events or events that are particularly significant to us are normally lodged in memory as an indelible record, but much of the information we learn at school is more difficult to retain. We have to make a very conscious effort to put it into long-term memory. **Mnemonics** are strategies to help improve our ability both to encode material into memory and to retrieve it when needed. There are many forms of mnemonics, including visualisation, verbalisation, rhythm and rhyme; the syllabus focuses on the method of loci and the SQ4R method.

mnemonics
a strategy or method that can be used to improve or strengthen memory

The method of loci

The **method of loci** is a mnemonic that utilises spatial memory to aid in quickly recalling information. It is a popular choice by memory contest champions to help them recall faces, digits and lists of words. It is sometimes referred to as the 'memory palace'. *Loci* is Latin for places.

method of loci
a mnemonic that focuses on visualisations to strengthen memory

To use the method of loci, you must visualise a series of locations that you know well, such as the house you live in. You probably have a mental map of your house, and in your mind right now could walk through it seeing all the rooms and the objects in them. People are inherently good at remembering spaces and visual stimuli, and we can use this to help us remember items and lists.

To understand how the method of loci works, consider the following:

Visualise your house make sure you are picturing a series of locations in a logical order. For example, enter through the front door, down the hallway, into the living room, past the couch, through to the dining room, around the kitchen, past the laundry, upstairs to the bathroom and finally into your bedroom.

Imagine that you need to remember the following:

- eggs
- toothbrush
- soup
- boots
- mushroom
- tennis racquet
- shark
- pineapple
- trumpet
- socks

Place each of these items that you want to remember at a different location in your visual house map. As you enter each location, continue to visually walk through the house in the same order, if you'd like you can also use furniture or objects within each room. Then, when you want to remember the items from the list, you can mentally walk through your house and see them. The more distinct you make each location, the easier it is to remember. For example, you may remember the items as:

- smashed eggs on the front door
- toothbrushes all over the hallway
- bowls of soup hovering on the living room door
- boots dancing on the couch
- mushrooms on the dining room floor
- a tennis match on the dining room table
- a shark swimming in the kitchen
- a pineapple floating in the kitchen sink
- a trumpet playing music from the clothes dryer
- socks scattered all the way up the stairs like footprints.

FIGURE 4 It might be easier to remember a pineapple when you picture it in the sink, a place where you typically don't place a pineapple.

These examples will be easier as you have made each item visually strong and unique.

SQ4R method

SQ4R method
a mnemonic that involves six steps: survey, question, read, recite, relate and review to help learning and retention

The **SQ4R method** – survey, question, and read, recite, relate and review – is a form of mnemonic and is used to remember the six general steps for reading well for study. It can be used for a whole text, a chapter or an assignment.

1 Survey

The first step of the method is survey, where you look for an overview of content. Survey involves scanning the text to get an idea of what is going to be addressed throughout the text and how the text is structured. People can focus on headings, subheadings and lists, as well as tables, pictures, charts and graphs, and read the captions.

2 Question

The next step in the method is question, where you ask 'What am I reading about?'. People are encouraged to write a question for each heading and subheading in the text. For example, for the heading 'SQ4R method' the question could be 'How does the SQ4R method work?' Asking questions of the headings encourages curiosity and motivation.

3 Read

The third step is read. In this stage, people read the text underneath the heading or subheading that they have posed a question for. For example, reading this text would be the read stage.

4 Recite

After a section has been read, people are encouraged to recite the text they have read, using their own words. People should also recite their answer to the question that they asked earlier.

Study tip

You can try using the SQ4R method in your senior study.

5 Relate

When people read, they usually try to relate new information back to things that they already know. It may take time to form the relationship between new information and information that already exists, but once the link is formed this will help with engagement and the ability to remember the concepts.

6 Review

The final stage is to review what was read. Look at the key terms, and anything that was highlighted, and review the original questions and the answers. During the final stage, people are refreshing their memory for things that have already been learnt or read about. People should review immediately after reading a chapter or text. If studying for exams, students should periodically review notes for each chapter throughout the semester or year.

CHECK YOUR LEARNING 9.5

Describe and explain

1 **Explain** chunking.
2 **Describe** rehearsal.
3 **Summarise** the two different types of mnemonics discussed in this text: the method of loci and SQ4R.
4 **Identify** the key components of the SQ4R method.

Apply, analyse and interpret

5 **Compare** maintenance rehearsal and elaborative rehearsal.
6 **Determine** if chunking would be beneficial for remembering this topic on memory in your external examination.

Investigate, evaluate and communicate

7 **Create** a methodology to test the effects of chunking.
8 **Assess** the benefits of rehearsal for short-term memory.
9 **Evaluate** the appropriateness of elaborative rehearsal for remembering a grocery list.
10 **Comment** on the following statement: 'Using the SQ4R method will help you remember your to - do list'.
11 **Create** a methodology to test the following: 'Mnemonics will be more successful than rehearsal for recalling a grocery list, and rehearsal will be beneficial for recalling phone numbers'.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 9.5
- **Challenge**
  Worksheet: 9.5 Mobile phone number
- **Weblink**
  Improving your memory

SCIENCE AS A HUMAN ENDEAVOUR

9.6 Does ageing decrease memory?

KEY IDEA

In this section, you will learn about:

+ how memory changes with age.

As humans age, they find it more difficult to recall names, dates or even where they put their mobile phone. This does not necessarily mean the onset of dementia – it's more likely that our ability to recall has slowed because our brain, much like the rest of our body, is no longer in the same shape that it was when we were younger.

In the absence of any causes for organic amnesia, such as disease or stroke, memory abilities vary across the lifespan. In the normal ageing brain there is usually some decline in learning and memory, but the loss of neurons and synapses is limited to a few areas only.

Brain functioning and age-related memory decline

As we age, the central nervous system begins to slow down and this may affect memory. Several neuroimaging studies have found that age-related deficits in working memory and episodic memory are related to changes in the functioning of the prefrontal cortex after the age of 60 (Rajah & D'Esposito, 2005). There is also a decline in the bundles of axons (white matter) that connect different regions of the brain. The decline disrupts communication between the regions of the brain (Andrews-Hann *et al.*, 2007).

Research on ageing animals also shows loss of synapses in the hippocampus (Gazzeley *et al.*, 1996). It is hypothesised that if this loss also occurs in humans, then long-term potentiation is diminished, resulting in a slower rate of learning and more rapid rate of forgetting in elderly people.

Not all forms of memory decline with age. There tends to be an age-related memory decline for episodic memory. Working memory also becomes less efficient with age. Studies have shown, however, that semantic memory, short-term memory and procedural memory perform at a relatively constant level across the adult lifespan, although some specific tasks used to assess short-term memory and procedural memory have revealed an age deficit (Nilsson, 2003).

Declarative memory

Semantic memory

Elderly people perform just as well as younger people on semantic memory tasks but may take more time to encode and retrieve information. It may take older people more time to learn new material but, if they are given adequate time to encode, they can learn as well as younger people (Perlmutter *et al.*, 1990). Knowledge that has become implicit memory (well-learnt semantic memory), such as reading and spelling familiar words, is readily retrieved and used.

Episodic memory

Older people tend to have episodic (autobiographical) memory decline. Longitudinal studies suggest that episodic memory is relatively stable up to middle age, then there is a sharp decline (Nilsson, 2003). This is possibly the reason that older people tend to talk more readily about their lives when they were younger, rather than about more recent personal events. Episodic memory is the only memory system showing gender differences in performance, with a significantly higher performance among women (Nilsson, 2003).

Procedural memory

Learning that has become an implicit memory or skill, such as riding a bike, opening a can or brushing teeth, does not disappear with age. For long-term memory, the difficulty older people tend to have is in retrieving explicit memories, rather than learning, using or demonstrating forms of implicit memory.

Short-term memory

For simple tasks, short-term memory generally does not deteriorate with age (Nilsson, 2003). Verbal recency memory (memory for recently learnt verbal information) is an aspect of memory that is most affected by ageing. Visual recency memory (recency memory for visual information) is, in contrast, less likely to be affected by age (Sekular *et al.*, 2006).

FIGURE 1 Older people may need greater assistance in remembering to take medication as their memory declines.

Working memory

Elderly people are more likely to perform poorly on complex working memory tasks. For example, elderly people find it difficult to perform complex tasks such as saying a string of digits backwards (Kirasic *et al.*, 1996) or doing several tasks at once (Einstein *et al.*, 1997; Van Gerven, Meijer & Jolles, 2007). Studies that used neuroimaging found that the prefrontal cortex – responsible for working memory – was less active and less efficient for people aged 60 and over (Reuter-Lorenz & Stanczak, 2000).

How memory decline is measured

Older people tend to experience more difficulty with retrieving new information than encoding it. Although the ability to recall information declines with age, the ability to recognise the same information does not. Therefore, the measure of retention that is used to assess the memory of older people is important. In a study testing people on their memory of school classmates, older people performed worse if asked to recall the names of classmates but we able to recognise the names and faces of their classmates just as well as younger adults (Bahrick, Bahrick & Wittlinger, 1975). In a study of declarative memory, elderly people performed much better on recognition tests than on recall tests. It is likely that, while the memories in storage in the brains of elderly people may not actually decline, the ability to retrieve them does (Searlemann & Herrmann, 1994).

CHECK YOUR LEARNING 9.6

Describe and explain

1 **Explain** the ways memory is affected by age.
2 **Describe** how long-term memory is affected by ageing.

Investigate, evaluate and communicate

3 **Assess** different types of memory (short- and long-term) and the various effects of ageing.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 9.6
- **Weblink**
  Memory decline with age
- **Weblink**
  Measuring memory decline

CHAPTER 9

Review

Summary

9.1
- Recall is the process of retrieving stored information using limited cues. Free recall is used when an individual needs to remember as much as they can, in any order. Serial recall is when information is recalled in the order it was presented. Cued recall is when an individual uses prompts to assist in retrieving a memory.
- Recognition is a type of retrieval that requires finding a correct response among alternatives.
- Relearning is where an individual has to obtain a skill that they have previously acquired.

9.2
- The encoding specificity principle is where associations formed at the time of encoding a new memory will be the most effective retrieval cues.
- Context-dependent cues are external (environmental) cues that help retrieve a memory.
- State-dependent cues are internal cues about a memory, such as emotions, that help with retrieval.

9.3
- Retrieval failure theory is the inability to retrieve material due to an absence of the right cues or a failure to use them.
- The tip-of-the-tongue phenomenon is the feeling that a memory exists, but cannot be accessed at that moment. It is an example of retrieval failure.

9.4
- Proactive interference is when prior information or memories prevent individuals from encoding and storing new material.
- Retroactive interference is when new information or memories prevent individuals from accessing or retrieving prior material.

9.5
- Chunking is when items are grouped together (such as a phone number) to make them easier to remember.
- Maintenance rehearsal – where information is retained in short-term memory or moved to long-term memory by repeating the information over and over.
- Elaborative rehearsal – where information is given meaning and is linked to other information in our memory.
- Mnemonics are methods of increasing or improving memory.
- The method of loci is a type of mnemonic that focuses on visualisations to strengthen memory.
- The SQ4R method is a mnemonic to strengthen the memorising and understanding of information. It has the following steps: survey, question, read, recite, relate and review.

Key terms

- chunking
- context-dependent cues
- cued recall
- elaborative rehearsal
- encoding specificity principle
- free recall
- maintenance rehearsal
- method of loci
- mnemonics
- proactive interference
- recall

- recognition
- relearning
- retrieval cues
- retrieval failure theory
- retroactive interference
- serial recall
- SQ4R method
- state-dependent cues
- tip-of-the-tongue phenomenon

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: ★ = low, ★★ = medium, ★★★ = high.

Multiple choice

1 Ebbinghaus's forgetting curve is basically the same shape as curves shown by later researchers, but he appears to have forgotten more material and at a faster rate than other research showed. What is a likely reason?

A Ebbinghaus tried to learn large numbers of lists of nonsense syllables at the same time, so there was much proactive interference.

B Ebbinghaus tried to learn large numbers of lists of nonsense syllables at the same time, so there was much retroactive interference.

C Nonsense syllables cannot be encoded according to their meaning, so only shallow processing was possible.

D Ebbinghaus was experimenting on himself and his involvement was unethical.

2 What does proactive interference refer to?

A difficulty learning material at a later stage due to earlier learnt material causing problems with the encoding process

B difficulty recalling material learnt at an earlier stage due to later learnt material causing problems with the retrieval process

C difficulty recalling memories from before a traumatic event

D difficulty forming new memories after a traumatic event

3 What does retrieval failure, where we know something perfectly well but just can't recall it at the moment, indicate?

A retrograde amnesia

B cue-dependent forgetting

C short-term forgetting

D anterograde amnesia

4 What does retroactive interference refer to?

A difficulty learning material at a later stage due to earlier learnt material causing problems with the encoding process

B difficulty recalling material learnt at an earlier stage due to later learnt material causing problems with the retrieval process

C difficulty recalling memories from before a traumatic event

D difficulty forming new memories after a traumatic event

5 Richard has just changed mobile phone providers and he has a new mobile number. When his friends ask him for his new number he keeps giving his old number by mistake and finds he has to write the new number on the back of his hand. What is the likely reason for his difficulty in learning the new mobile number?

A He experienced proactive interference from the old number he had learnt earlier.

B He experienced maintenance rehearsal from the old number he had learnt earlier.

C He experienced retroactive interference from the old number he had learnt earlier.

D He experienced mnemonics from the old number he had learnt earlier.

6 Xiau is preparing a study timetable for his examinations. He is studying Legal Studies and Economics, which he feels are similar to each other in processes and content. Which study program will be the most effective?

A He studies Economics before Legal Studies on odd dates and Legal Studies before Economics on even dates.

B He always studies these two subjects in the same order.

C He only studies one of these subjects on any one day.

D He makes sure that he studies a different subject such as Physics in between studying Economics and Legal Studies.

Questions 7–9 relate to this information:
Carla is trying to list all the people who attended her 11th birthday party 10 years ago so that she can invite them to her 21st birthday celebration. She knows they all went to her school.

7 Which of the following would be most useful in helping her remember who went to her party?

A a photograph of Carla's Year 6 class when she was 11

B a list of all the names of the students in Year 6 at Carla's school when she was 11

C a photograph of the parents of the children who attended Carla's 11th birthday party

D an invitation list for the 11th birthday party that only has the first names of the guests

8 With which of the following would Carla be able to use recognition?

A looking at a photograph of Carla's Year 6 class when she was 11

B reading a list of all the names of the students in Year 6 at Carla's school when she was 11

C looking at a photograph of the parents of the children who attended Carla's 11th birthday party

D reading an invitation list for the 11th birthday party that only has the first names of the guests

9 With which of the following would Carla be able to use cued recall?

A looking at a photograph of Carla's Year 6 class when she was 11

B reading a list of all the names of the students in Year 6 at Carla's school when she was 11

C looking at a photograph of the parents of the children who attended Carla's 11th birthday party

D reading an invitation list for the 11th birthday party that only has the first names of the guests

10 Relearning is calculated using a 'savings score', which is a measure of the improvement in learning speed (either by trials or by time) when relearning material that was learnt on a previous occasion. What is the formula for calculating the savings score, where T1 is the number of trials (or amount of time) taken to learn the material on the first occasion and T2 refers to the number of trials (or amount of time) taken to relearn the material on the second occasion?

A $\frac{T_1 - T_2}{T_1} \times 100\%$

B $\frac{T_2 - T_1}{T_1} \times 100\%$

C $\frac{T_1 - T_2}{T_2} \times 100\%$

D $\frac{T_2 - T_1}{T_2} \times 100\%$

11 Inspector Clouseau is trying to solve a murder. He takes witnesses to the scene of the crime and asks them to tell him everything they can remember. Soon, a witness provides accurate information that leads to an arrest. What was the strategy used by the inspector aiming to do?

A Stimulate the procedural memories of the witnesses.

B Stimulate the semantic memories of the witnesses.

C Stimulate context-dependent cues to assist memory.

D Stimulate state-dependent cues to assist memory.

12 When Jacqui studied for her Psychology exam at home, she used an oil-burner that filled the room with the scent of lavender. On the day of her exam, she tipped a few drops of lavender onto her handkerchief and found that sniffing this occasionally helped her to remember her material. What was Jacqui (mainly) using?

A state-dependent cues to assist memory

B cued recall to assist memory

C context-dependent cues to assist memory

D context-dependent and state-dependent cues to assist memory

13 Ineke studied hard for her boat-operator's licence and went to the traffic office to sit the test. While waiting for her appointment, she became increasingly anxious but did as her Psychology teacher had advised and imagined that she was sitting at her desk at home, relaxing and studying the regulations. When it was time for her to answer the questions, she passed the test. What strategy did Ineke use to enable her to remember the material?

A state-dependent cues to assist memory

B cued recall to assist memory

C context-dependent cues to assist memory

D context-dependent and state-dependent cues to assist memory

14 In researching the effectiveness of using mnemonics to maximise efficiency of learning, Maria used three Psychology classes of Year 11 and Year 12 students and each class used a different mnemonic device to assist with learning of a list of 40 words. Maria obtained permission from the parents of 22% of the students. Why did she do this?

A Only 22% of the students were aged 18 or more.

B Only 22% of the students were under the age of 18.

C Only 22% of the students lived at home.

D Only 22% of the students did not volunteer so she needed their parents to make them participate.

Short answer

Describe and explain

★ **15** **Describe** two major features of Ebbinghaus's forgetting curve.

★ **16** Eugene's new employee is Robert Moore, but Eugene keeps calling him Roger, mixing him up with the actor Roger Moore. **Describe** what this is an example of.

★★ **17** Use an example to **explain** how memory may be improved by using state-dependent cues.

Apply, analyse and interpret

★ **18** **Determine** why memories may not be accessible.

★ **19** **Consider** when retroactive and proactive interference would be detrimental.

★ **20** Max is unable to remember the key points of a chapter in his English text. He was daydreaming in class when these points were discussed. **Determine** what Max's forgetting is probably due to.

★★ **21** The three main measures of retention are recognition, recall and relearning. **Categorise** them from least sensitive (1) to most sensitive (3).

Investigate, evaluate and communicate

★ **22** Roberta is planning a Saturday study timetable for her QCE examinations. She is taking Specialist Maths, Psychology, English, Biology and Australian History. She feels that English and Australian History are similar to each other and Psychology and Biology are similar to each other, but Specialist Maths is different altogether. She needs to study every subject on Saturday. **Design** a study program for Roberta. Using your knowledge of interference theory, put subjects in appropriate time slots to make her study most effective.

Time	Subject
9.00–10.30	
10.45–12.15	
12.45–2.15	
2.30–4.00	
4.15–5.45	

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 9 Review
- **» Revision notes**
  Revision notes for Chapter 9
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 9

CHAPTER 10

Learning

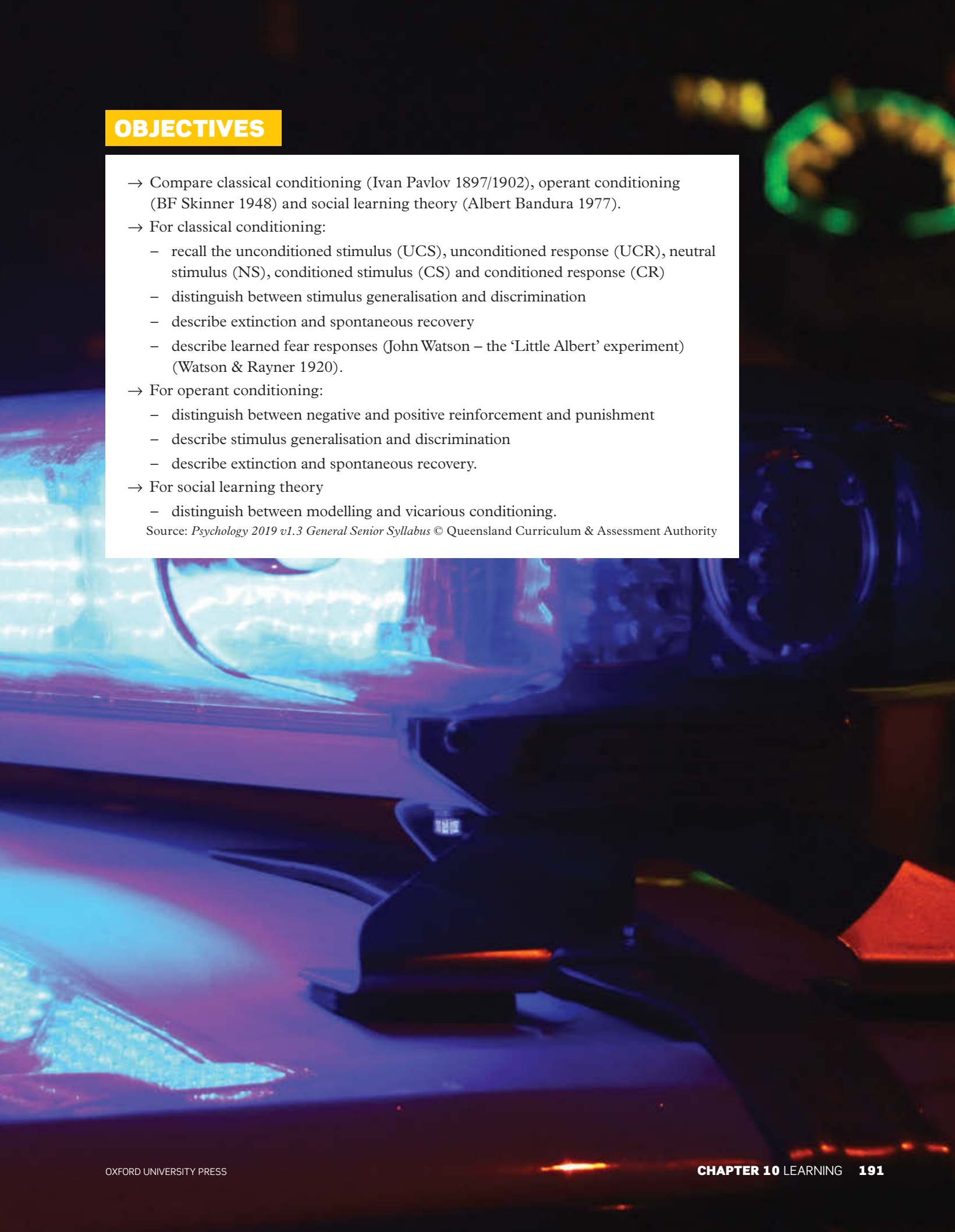
Stimulation of any of our senses can cause a reflexive response; this is the result of classical conditioning. For example, smelling freshly cut grass can remind you of spring. Any time a stimulus that was originally neutral (i.e. had no effect) now causes a behavioural or emotional reaction, classical conditioning has occurred. The conditioned responses may be physical (e.g., sneezing) or emotional (e.g., excitement).

We also learn to repeat the behaviours that bring the results we want and avoid the results we don't want. For example, we study to get good marks. We tell jokes to make our friends laugh. We eat so that we won't feel those nasty pangs of hunger. The list of these is almost endless – and it's not only us. Our pets, farm animals, wild animals and any organism capable of performing a voluntary behaviour has learnt, through operant conditioning, to repeat the actions that bring good results and to avoid performing those actions that bring unpleasant results. Operant conditioning is a form of learning in which behaviour becomes controlled by its consequences.

Is it possible to learn without direct participation in the process? Do classical and operant conditioning theories explain all forms of learning? How do people learn to use machinery or even simple items such as cutlery? Would it be wise for a learner driver to simply hop in a car and learn how to drive, or for a child to use power tools, such as electric drills or electric knives, by trial and error?

In this chapter, we will discuss how you learn by association in classical conditioning, and by reinforcement or punishment in operant conditioning. We will also discuss social learning theory and distinguish between modelling and vicarious conditioning.

FIGURE 1 Living in Australia, you will have learned that red and blue lights are used by emergency vehicles through a process called classical conditioning. This chapter will explore this, and other forms of learning.



OBJECTIVES

→ Compare classical conditioning (Ivan Pavlov 1897/1902), operant conditioning (BF Skinner 1948) and social learning theory (Albert Bandura 1977).

→ For classical conditioning:

- recall the unconditioned stimulus (UCS), unconditioned response (UCR), neutral stimulus (NS), conditioned stimulus (CS) and conditioned response (CR)
- distinguish between stimulus generalisation and discrimination
- describe extinction and spontaneous recovery
- describe learned fear responses (John Watson – the 'Little Albert' experiment) (Watson & Rayner 1920).

→ For operant conditioning:

- distinguish between negative and positive reinforcement and punishment
- describe stimulus generalisation and discrimination
- describe extinction and spontaneous recovery.

→ For social learning theory

- distinguish between modelling and vicarious conditioning.

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

10.1 Classical conditioning: a three-phase process

KEY IDEAS

In this section, you will learn about:

- the process of classical conditioning and Pavlov's research
- how classical conditioning occurs in everyday life
- learnt fear responses – the 'Little Albert' experiment.

classical conditioning whereby an animal or other organism can passively learn to show a naturally occurring reflex action, such as salivation, in response to any stimulus – learning through association; also known as Pavlovian conditioning

association a learnt connection between two (or more) objects or events – especially significant in classical conditioning

unconditioned stimulus (UCS) a stimulus that causes an unconditioned response (classical conditioning)

unconditioned response (UCR) a response that occurs naturally in response to the unconditioned stimulus (classical conditioning)

neutral stimulus (NS) something that causes no response (classical conditioning)

conditioned stimulus (CS) a previously neutral stimulus that is associated with the unconditioned stimulus and eventually causes a conditioned response (classical conditioning)

Consider the following reactions:

- You start to feel anxious when you walk through the entrance of a hospital, even though you are only going to visit an aunt who has a new baby.
- You are driving with your P-plates when you hear a siren and see flashing lights behind you. You get a sinking feeling in your stomach but then realise, with relief, that it's a fire engine and not the police, so you pull over to let them through.
- Your dog salivates when he hears the microwave 'ping'.

All of these behaviours have been learnt through a simple process known as **classical conditioning**.

Classical conditioning is a three-phase process that involves developing an **association** with a stimulus (or stimuli) that results in a learnt response. These three phases are outlined in Table 1.

TABLE 1 The three phases of classical conditioning

Phase	Description
First phase (before conditioning)	• Involves a response to a stimulus that has not yet been conditioned. It is natural or automatic.This is explained as an **unconditioned stimulus (UCS)** that results in an **unconditioned response (UCR)**. • During this phase there is also a **neutral stimulus (NS)** that causes no response.
Second phase (during conditioning)	• Involves the development of an association between the neutral stimulus (NS) and the unconditioned stimulus (UCS). • This causes the neutral stimulus (NS) to become a **conditioned stimulus (CS)**.
Third phase (after conditioning)	• Results in the now conditioned stimulus (CS) producing a **conditioned response (CR)** as a result of its association with the unconditioned stimulus (UCS).

CHALLENGE 10.1A

Dinnertime

Every night after school, your parents ask you to set the table at 5.45 pm. On the weekend, you've noticed you start to get hungry for dinner around 6 pm – despite not having dinner until later. Explain why this happens, and makes sure to refer to classical conditioning when justifying your response.

Pavlov's research

Classical conditioning was first described in the early twentieth century. Ivan Pavlov, who had won the Nobel Prize for physiology in 1904, was continuing his research on the digestive system of dogs when he noted that the dogs salivated before they received food.

Pavlov hypothesised that the dogs had come to associate the footsteps of the laboratory technician who fed the dogs with the presence of the food that was given to them, and that this sound had been conditioned to cause the reflex response of salivation.

Originally, the stimulus (food) produced the response (salivation). Eventually, the sight or sound of the laboratory technician became the stimulus, which produced salivation. The salivation response, which is biologically based in the nervous system and occurs involuntarily (that is, it is a reflex response), had now been conditioned to respond to a new stimulus (the sight or sound of the technician).

FIGURE 1 If you see flashing lights while driving, you might panic and thinking it's the police, until you realise it's a fire truck and calm down.

Pavlov began to experiment by associating various sounds (a bell, a tuning fork and a metronome) with the food and found that, after a few trials, the dogs could be conditioned to respond to these sounds by salivating.

As a result of Pavlov's work, clear evidence was provided for a very simple type of learning that was based on the repetitive association of different stimuli – classical conditioning.

Pavlov also discovered that **extinction** would occur if the bell was rung many times without ever again being paired with the food. The amount of saliva produced each time the bell was sounded would gradually reduce until ringing the bell did not cause salivation at all.

After a pause of some hours, during which the bell was never sounded, ringing the bell again caused a small amount of saliva to be produced and **spontaneous recovery** had occurred.

conditioned response (CR)
an automatic response developed by being trained to respond to a typically neutral stimulus (classical conditioning)

extinction
the response is extinguished after being shown several times without reinforcement

spontaneous recovery
the reappearance of an extinguished response after a rest period

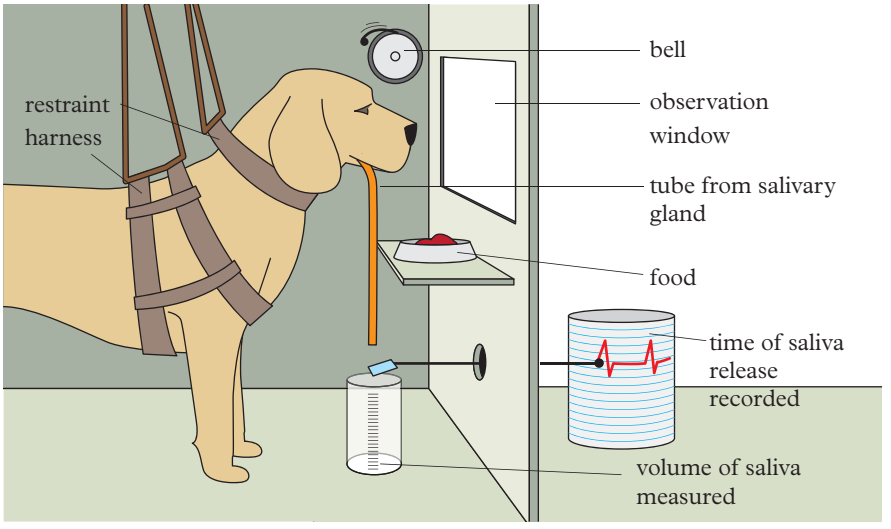


FIGURE 2 Pavlov's research with dogs provided evidence for a very simple type of learning that was based on the repetitive association of different stimuli.

Pavlov discovered that after a dog had been conditioned to salivate in response to the sound of a bell, it would also salivate when a buzzer was sounded, even though the buzzer had never been paired with the unconditioned stimulus of food.

stimulus generalisation in classical conditioning, when an organism responds to any stimulus that is similar to the conditioned stimulus

This was a demonstration of **stimulus generalisation**. If the buzzer was frequently sounded but never paired with the food, the dog would soon learn not to respond with salivation – extinction of that response would then occur. If the bell was still occasionally paired with the food, the dog would salivate to the sound of the bell but not the buzzer. **Stimulus discrimination** had now taken place.

stimulus discrimination in classical conditioning, when an organism responds to the conditioned stimulus but not to any stimulus that is similar to the conditioned stimulus

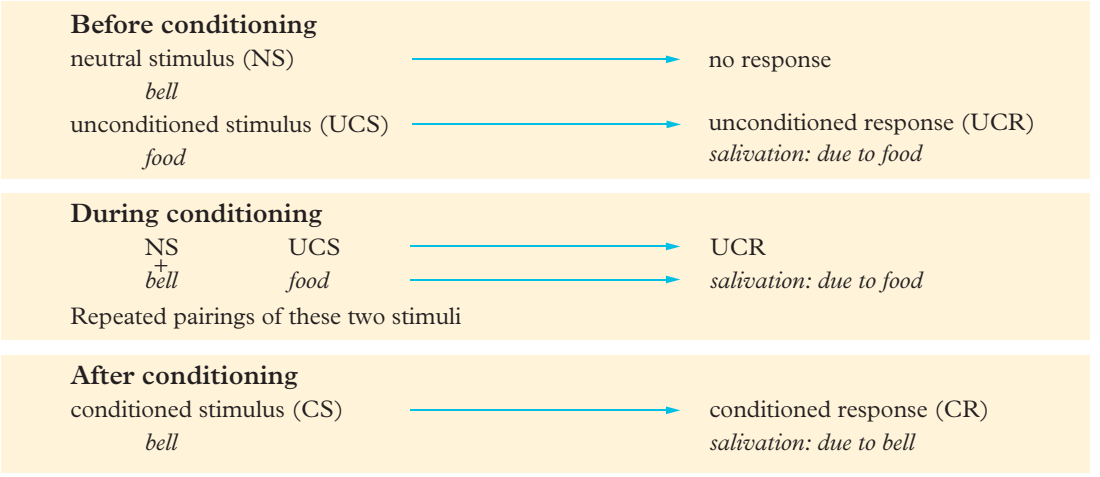


FIGURE 3 The three-phase process of classical conditioning in Pavlov's experiment

Classical conditioning in action

Classical conditioning is happening all around us – and to us – all the time. For example, if you start to feel happy because you are walking down the street where your boyfriend/girlfriend lives, that's because you've been classically conditioned! Read Case study 10.1 to see an example of classical conditioning in action.

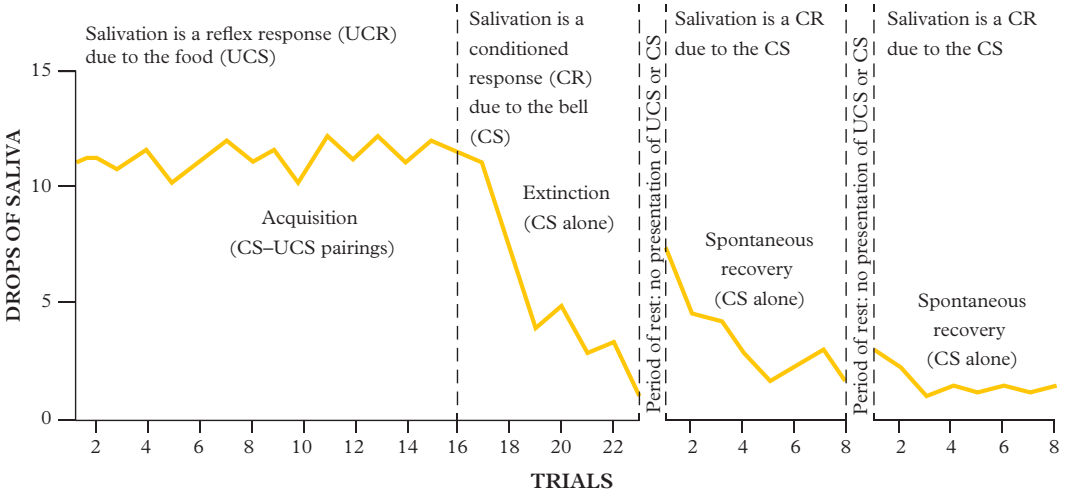


FIGURE 4 Learning (acquisition), extinction and spontaneous recovery in classical conditioning

CASE STUDY 10.1

Hugo's story

Hugo, a middle-aged man, was walking along the footpath, lost in thought, when a girl walked past him in the opposite direction. Hugo didn't even notice her but suddenly he caught her scent and experienced a feeling of pleasure. Realising that there was no obvious reason for this feeling he asked his friend, a psychologist, what had occurred.

'Did you recognise the scent?' asked the psychologist.

'Yes, it was the perfume my first girlfriend used to wear when I was 17!' Hugo laughed.

'That's it then,' replied the psychologist. 'You have been conditioned to experience feelings of pleasure in response to that particular scent!'

'What, after 30 years?'

'Oh yes, it has become a classically conditioned response. Unless it is extinguished, it will continue to happen – forever!'

Conditioned reflexes

Study tip

Try to identify things you have been classically conditioned to do. Think about sports you play and your classes at school by identifying the NS, UCS, CS and CR in these scenarios it will help you recognise them in possible examination questions.

The following are some common examples of the effects of classical conditioning:

- A mother who has breastfed her baby will tell you about this response: when it is approaching feeding time and she hears or sees her baby, her breast milk will suddenly start to flow from her.
- People who have been swooped by magpies will often develop feelings of anxiety when they see a magpie sitting in a tree and may even experience the anxiety when other birds are seen (stimulus generalisation). If this fear is reinforced by extreme swooping events, it may become strong enough to be a specific phobia.

Before conditioning

neutral stimulus (NS) *fingers to mouth* → no response

unconditioned stimulus (UCS) *bitter aloes* → unconditioned response (UCR) *gagging reflex: due to bitter aloes*

During conditioning

NS *fingers to mouth* + UCS *bitter aloes* → UCR *gagging reflex: due to bitter aloes*

Repeated pairings of these two stimuli

After conditioning

conditioned stimulus (CS) *fingers to mouth* → conditioned response (CR) *gagging reflex: due to fingers in mouth*

FIGURE 5 Classical conditioning can be used for aversion therapy, to stop individuals from reacting or behaving in a certain way, in this example, biting their nails.

Aversion therapy

aversion therapy a form of treatment using classical conditioning to cause an undesired behaviour to create an unwanted response, thereby reducing the incidence of the behaviour

Aversion therapy is an application of classical conditioning where a person with an unwanted behaviour learns to associate the unwanted behaviour with an unpleasant event. For example, in order to get a little boy to stop biting his fingernails, his parents may paint his fingernails with 'bitter aloes', a substance that tastes very bitter and causes a gag reflex, so that every time he bites his nails he almost vomits! This repeated association between fingernails in the mouth and gagging will soon cause the very act of bringing his hand to his mouth to stimulate gagging and the nail-biting behaviour will quickly stop.

The 'Little Albert' experiment: learnt fear

Study tip

Whenever you read about a psychology experiment consider the ethical implications. In the case of 'Little Albert', you may want to think about consent and harm.

In 1920, American psychologist John B. Watson carried out one of the most (in)famous pieces of research in the area of classical conditioning and behaviourism.

'Little Albert' (a pseudonym), who was nine months of age, was 'borrowed' from a childcare facility at the prestigious Johns Hopkins University. Little Albert, a placid child who was selected on the grounds that he had never been seen to cry, was placed on the floor in Watson's laboratory and allowed to play with a white rat. Little Albert showed no fear; nor did he respond negatively to other animals and objects such as a rabbit, a dog, a monkey, cotton wool and human masks. He did, however, show fear when a steel bar was struck with a hammer, making a loud noise just behind his back.

FIGURE 6 John B. Watson

Two months later, Watson paired the rat with a loud noise by striking a steel bar with a hammer just behind Albert's head when he touched the rat. At first, although this caused Albert to jump in fear, he did not cry. After seven pairings of the rat and the noise (over two sessions, one week apart), Albert did cry. Soon afterwards, when the rat was presented but no noise sounded, Albert cried and tried to crawl away from it.

Little Albert also showed fear when presented with a dog, a rabbit, a fur coat and a Santa Claus mask, though it is interesting to note that the fear response was much reduced when he was in a different and much larger laboratory.

FIGURE 7 Little Albert was conditioned to respond with fear to a white rat. This fear then applied to many other objects that could be related to the rat, including dogs, rabbits and Santa Claus's beard.

Ethical implications

The research conducted by Watson in his 'Little Albert' experiment would certainly contravene many ethical principles that are in place today, as discussed in Chapter 1.

By today's standards, it is extremely unlikely that a human ethics committee would approve an experiment such as Watson's. One of the most important ethical considerations in research, that no physical or psychological harm must come

to participants, was undoubtedly ignored. Little Albert came away from the study psychologically damaged, with a fear of rats among other furry creatures and objects.

In addition, Watson failed to obtain informed consent from its participant, since Albert was too young to understand the terms of the experiment. Nor was permission sought from Albert's parents on his behalf. Additionally, Watson also failed to properly debrief Little Albert, which in this case would involve extinguishing the conditioned response to fear white and fluffy objects.

CHALLENGE 10.1B

Childhood experiences

After reading about the experiment involving 'Little Albert' think about your own childhood. Are there things that you are afraid of or have a specific reaction to that may have been reinforced as a child by your parents? Select one example and identify the UCS, NS and CR, then determine if stimulus generalisation has occurred or if extinction has taken place.

CHECK YOUR LEARNING 10.1

Describe and explain

1 **Describe** classical conditioning.
2 **Define** the following:
   - **a** neutral stimulus
   - **b** conditioned stimulus
   - **c** unconditioned stimulus
   - **d** conditioned response
   - **e** unconditioned response
3 **Describe** stimulus generalisation.
4 **Explain** extinction and spontaneous recovery.
5 **Use** an example to **demonstrate** a learnt response.
6 **Describe** an example of how fear can be conditioned by classical conditioning.
7 **Recall** the aim and hypothesis of Watson's 'Little Albert' experiment.
8 **Identify** the UCS, CS, NS, CR, UCR in this scenario: When he was younger Jacob's parents thought he was eating too much pizza. Jacob had water sprayed in his face every time he ate pizza as a child. Jacob is now 17, and each time he eats pizza he flinches as though he will be sprayed with water again.

Apply, analyse and interpret

9 **Differentiate** between stimulus generalisation and stimulus discrimination.
10 **Compare** spontaneous recovery and extinction.
11 **Consider** the ethical implications of Watson's 'Little Albert' experiment.

Investigate, evaluate and communicate

12 **Appraise** Watson's 'Little Albert' experiment.
13 **Design** a methodology to reverse the effects of Pavlov's conditioning.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 10.1
- **» Challenge**
  Worksheet:
  10.1A Dinnertime
- **» Challenge**
  Worksheet:
  10.1B Childhood experiences
- **» Increase your knowledge**
  Conditioning and emotion

10.2 Operant conditioning

KEY IDEAS

In this section, you will learn about:

- the three-phase model of operant conditioning
- the elements of operant conditioning
- generalisation and discrimination.

B.F. Skinner began experimenting with rats and pigeons in the 1930s. He trained the animals to perform certain voluntary behaviours, such as turning in a circle when a light flashed or pressing a lever when a bell rang. He trained them by simply rewarding them with food if they performed the behaviour. After only a few training trials, the animals would perform the behaviour every time.

FIGURE 1 B.F. Skinner (Burrhus Frederic Skinner) was an American psychologist, behaviourist and author, responsible for researching operant conditioning.

This type of learning is called **operant conditioning** because animals and people learn to operate on their environment to produce desired consequences. An operant is a response that occurs without any stimulus – this is a **voluntary behaviour** that acts upon the environment in the same way each time.

operant conditioning a type of learning in which behaviour becomes controlled by its consequences

voluntary behaviour actions that are controlled by the person or animal performing them

The ABC of operant conditioning

One thing that Skinner noticed was that the conditions needed to be right before the behaviour occurred. This can be referred to as the **three-phase model (ABC of operant conditioning)**: the **A**ntecedent (the environment) that makes the conditions right for the **B**ehaviour to follow and be reinforced (or extinguished) by its **C**onsequences.

Skinner used the term **discriminative stimulus** to describe the antecedent (or the condition that influences behaviour by predicting the likely outcome of a behaviour). A good example of this is found when person Y wants to ask person Z out on a date. If Z has smiled at Y, laughed with Y and Z's body language generally has shown encouragement, Y will be more likely to show the behaviour (asking) that will lead to the consequence (accepting the invitation). The identification of the antecedent as a discriminative stimulus is important when we come to consider stimulus generalisation and stimulus discrimination in operant conditioning.

three-phase model (ABC of operant conditioning) the assumption that the antecedent makes the conditions right for the behaviour to follow and be encouraged or discouraged by its consequences

discriminative stimulus in operant conditioning, Skinner's term for the pre-condition that indicates that behaviour will be reinforced

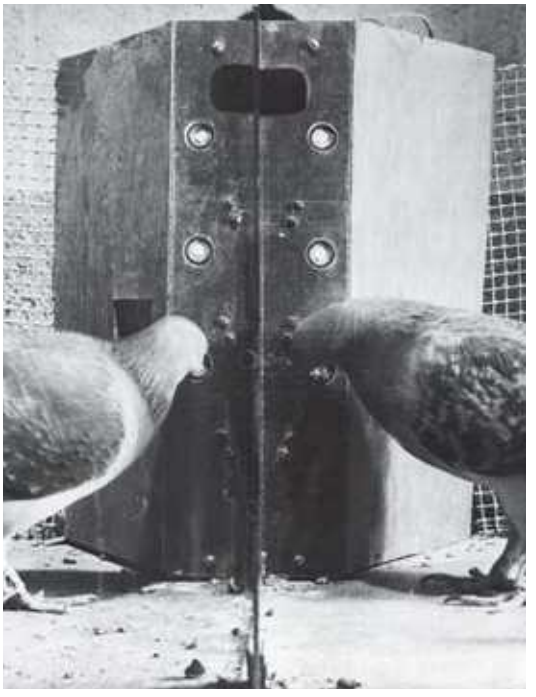


FIGURE 2 Skinner used pigeons in his experiments. The pigeons could be trained to press either a red or blue button to receive a food reward.

CHALLENGE 10.2A

Consequences

For each of the following scenarios, identify the behaviour and the consequences:

- **Scenario 1:** Your blind friend's guide dog stops at the edge of the pavement until there are no cars passing.
- **Scenario 2:** You bring your girlfriend/boyfriend a special card for your six-month anniversary and you get a huge, loving hug.
- **Scenario 3:** Your parents offer to give you $50 for every IA in which you get an A+; you work very hard!
- **Scenario 4:** You are training for more than four hours each day to get into the AIS swimming squad.
- **Scenario 5:** When you first got your P-plates, you were excited to drive to all your friends' houses. A few weeks later, you got a letter saying you had been 'pinged' by a speed camera for doing 65 kilometres per hour in a 60-kilometre zone. You were fined over $175 and you lost one demerit point. Since then, you have become a very careful and observant driver.

Elements of operant conditioning

Reinforcers and punishers

Reinforcers and punishers are key elements in operant conditioning. They may be either positive or negative.

A **reinforcer** is any stimulus (action or event) that strengthens or increases the likelihood of a response (behaviour):

- **Positive reinforcer**: a reward that strengthens a response by providing a pleasant or satisfying consequence. If you take a bite of a delicious piece of cake, you are very likely to have another bite.
- **Negative reinforcer**: the removal, reduction or prevention of an unpleasant stimulus. If you wake up with a headache the day after a rock concert and are able to fix it by taking a headache tablet, it makes it very likely that you will take a headache tablet any time you want to get rid of a headache.

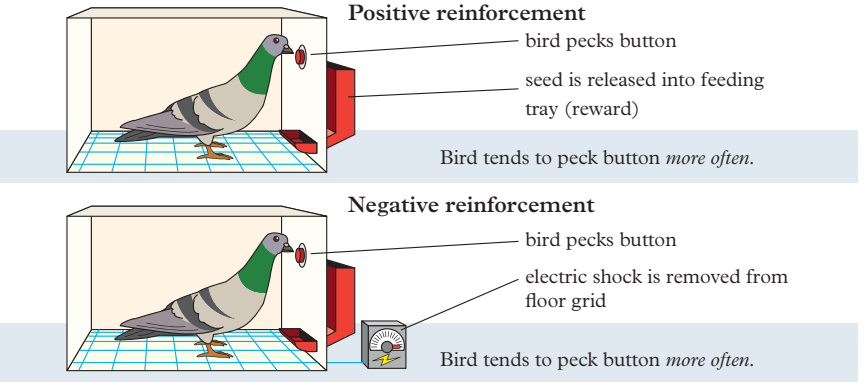


FIGURE 3 In B.F. Skinner's study, pigeons were positively reinforced when seed (food) was released after they pressed a button. The pigeons were negatively reinforced when the floor was set with electric shocks, and they pressed the button to remove the shocks.

reinforcer
a stimulus that encourages the likelihood of a response

positive reinforcer
a consequence that strengthens a response by providing a pleasant or satisfying outcome, increasing the likelihood that a behaviour will be repeated

negative reinforcer
the removal, reduction or prevention of an unpleasant stimulus in response to a behaviour, increasing the likelihood that a behaviour will be repeated

punisher/ punishment
any event that reduces the likelihood of a particular response occurring over time

A **punisher** is any stimulus (action or event) that weakens or decreases the likelihood of a response (behaviour). Punishers are any consequences that lead to a decrease in a given response. The consequence does not need to be intended as a punisher! For example, a quiet student who is 'fussed over' by the teacher every time she offers a response in class, may see such attention as threatening (punishing) rather than rewarding (reinforcing), as the teacher had probably intended.

- **Punishment** (sometimes called positive punishment): a behaviour followed by a negative experience. For example, if you stand up quickly in an aeroplane and bang your head on the overhead luggage-locker, you will probably stand up more slowly and carefully next time! Other examples include a parent yelling at a child who has drawn on his bedroom wall or a mother cat picking up a kitten that has run away and shaking it.

response cost
a form of punishment that occurs when something desirable is removed (e.g., removing a mobile phone if misused)

- **Response cost** (can be called negative punishment): a form of punishment that entails something desirable being removed, such as being grounded (losing freedom), having your mobile phone taken away or being fined for speeding on the roads (losing money).

Punishment or negative reinforcement

Punishment is distinct from negative reinforcement. Punishment decreases the probability of the response, while negative reinforcement (like positive reinforcement) increases the probability of a response.

Although both negative reinforcement and punishment involve an unpleasant stimulus (e.g., a reprimand or a fine), it is considered punishment when this unpleasant stimulus follows the response (such as an inappropriate behaviour). It is considered negative reinforcement when the response (the behaviour) stops an existing unpleasant stimulus.

Several side effects result from punishment. Frustration, aggression and feelings of helplessness may develop in a person who is punished frequently, with the punished person feeling aggrieved and aggressive towards the person administering the punishment. For example, judges are sometimes targeted as victims by criminals they have sentenced to prison. Children may resent teachers or parents who have punished them – even if the punishment was fair and appropriate – and the effects on their interpersonal relationships may be wide-ranging and long-lasting.

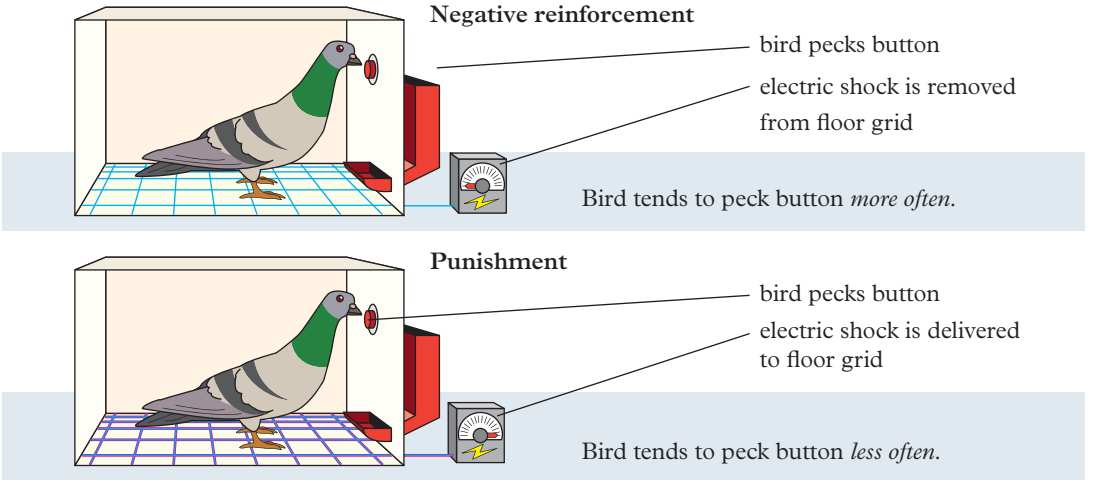


FIGURE 4 In B.F. Skinner's research the pigeons were negatively reinforced to peck the button more to stop the unpleasant shocks from the floor. In a different scenario, the pigeons were punished with an electric shock, so they wouldn't press the button as much.

Punishment can also have unintended outcomes. Administering the punishment may be an outlet for the frustrations of the punisher. Sometimes punishment is administered simply because it makes the punisher feel better, not because the person being punished deserves it.

Effective punishment needs to be brief, immediate and linked to the undesired behaviour in the mind of the person (or animal) being punished. It is only effective if a positive behaviour can be developed to replace the negative behaviour.

Shaping is another form of reinforcement. Shaping occurs when an individual receives reinforcement for each attempt, which eventually leads to the correct response. Shaping is a procedure in which a reinforcer is given for any response that gets closer and closer and eventually leads to the desired response or target behaviour. This is also known as the 'method of successive approximations'. Case study 10.2 explores some examples of shaping.

effective punishment
punishment administered in such a way as to reduce the likelihood of the behaviour recurring

shaping
a procedure in which a reinforcer is given for each response that is closer and closer and eventually leads to the desired response; also called the 'method of successive approximations'

CHALLENGE 10.2B

Can you learn multiple things at once?

For the most part, more than one complex behaviour cannot be taught at the same time. First, one simple behaviour is shaped, then another is added to it in a process referred to as 'chaining'.

Suppose that you want your dog to 'drop and roll over'. First, you train the dog to drop. The next step is to train him to roll over, and add it to the 'drop' behaviour he has already learnt.

Why do you think only one complex behaviour can be learnt at a time?

CASE STUDY 10.2

Shaping in everyday life

Shaping is a very common and successful way of teaching children. We use shaping ourselves, all the time, to help us learn new skills.

For example, consider this situation. You are learning to play piano and you have a new piece of music you want to play perfectly. You attempt the new piece and play until you make a mistake. Next, you try again, making it a little further through the piece before making a mistake and feel good about your progress. The next time, you get a little further and feel good again. This goes on until you play it perfectly. You have been using shaping.

In terms of operant conditioning, the antecedent is that the piano is available for you; the behaviour is attempting the piece to be learnt; and the consequence is feeling good (positive reinforcement).

Animal training

You might have seen movies and television shows in which animals perform complicated and apparently very intelligent actions. You might have seen guide dogs helping their vision-impaired owners to live active lives. Perhaps you have seen *Border Security* or *Dog Squad*, where working dogs perform amazingly skilful acts. All of these dogs have been trained using shaping procedures.

Dogs are not the only animals trained by this method – cats, horses, birds, reptiles and even fish have been trained to perform on command.

The procedure for shaping is as follows:

1 Identify the 'target' or desired behaviour.
2 Identify the steps that lead from the present behaviour to the target behaviour.
3 Reinforce the first step, then do not reinforce until the second step is performed, and so on.

For example, imagine you are trying to train your dog to 'drop' on command. You might use the following shaping procedure:

1 Say 'Drop' and give the dog a treat when he begins to put his haunches on the ground.
2 Say 'Drop' but don't reinforce until his chest touches the ground.
3 Say 'Drop' but don't reinforce until he stays down for two seconds.
4 Increase the time to 4, then 10, then 20 seconds before reinforcement.

FIGURE 5 Dogs are used in many safety and survival situations. This German Shephard has been trained to rescue people who may have been buried in an avalanche.

Generalisation and discrimination

stimulus generalisation in operant conditioning, when a behaviour is displayed because of a discriminative stimulus that is similar to the original

stimulus discrimination in operant conditioning, when a behaviour stops being applied to similar situations and only to the discriminative stimulus

In operant conditioning, the terms **stimulus generalisation** and **stimulus discrimination** refer to the antecedent (the discriminative stimulus).

Stimulus generalisation is where a behaviour is elicited as a result of a discriminative stimulus that is similar (but not identical) to the original. For example, your dog, who normally comes running when the electric can-opener is used, might come running at the sound of the blender. Soon, if there is no reinforcement when responding to this noise, the dog will no longer act in this way with the blender, only with the can-opener – the dog has learnt stimulus discrimination.

Extinction and spontaneous recovery

Extinction is when the conditioned response disappears over time after reinforcement has ceased. For example, a child might learn that their use of a bad word causes the adults around them to laugh. They continue this behaviour for weeks, until the child's mother tells the adults to stop laughing and ignore the bad behaviour.

After another few weeks, the child no longer says the bad word for attention. The child has learnt a behaviour, which has later become extinct because it is no longer receiving reinforcement.

Spontaneous recovery might occur if the child from the previous example starts to use that same bad word after a break, regardless of it not getting a reaction from adults.

Spontaneous recovery shows that extinction of a behaviour is not 'unlearning'. Even though a behaviour or response might not occur for a time, it does not mean that the response has been forgotten.

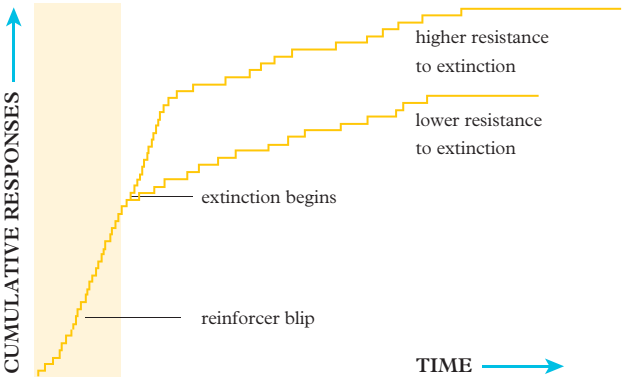


FIGURE 6 Extinction in operant conditioning

CHECK YOUR LEARNING 10.2

Describe and explain

1 **Describe** operant conditioning.
2 **Define** positive reinforcement, negative reinforcement and punishment.
3 **Explain** what is meant by extinction.
4 **Summarise** the process of spontaneous recovery.
5 **Identify** whether reinforcement or punishment was used in this scenario:
Ollie is a very obedient dog. When Ollie is told to sit, and successfully sits, Ollie is fed a treat. When Ollie does not sit, he is not fed the treat.
6 **Identify** the A, B and C in the following examples:
   a As I am driving to work, I see that the traffic light is red. I stop the car (and therefore avoid a traffic accident).
   b I am cold. I put on a jumper and feel warm.
   c Your mobile phone rings so you select 'answer' and talk to your friend.
7 **Identify** which elements of operant conditioning (positive or negative reinforcer, punishment and response cost) are present in the following scenarios:
   a You pat your dog on the head when he sits on command.
   b You receive a high score on your exam.
   c Your mobile phone is confiscated after it rings during class.

Apply, analyse and interpret

8 **Differentiate** between the potential positive and negative side effects of punishment.
9 **Consider** if the use of punishment or reinforcement would be more successful in getting a student to study hard for each Psychology test.

Investigate, evaluate and communicate

10 Using the internet, **investigate** strategies on how to discipline bad behaviour in children. You might find a blog, a newspaper article or an online forum to **modify** this strategy based on your understanding of operant conditioning.
11 **Predict** what would happen if you were to suddenly stop rewarding your dog Charlie, who is five years old, each time she sat.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 10.2
- **» Challenge**
  Worksheet: 10.2A Consequences
- **» Challenge**
  Worksheet: 10.2B Can you learn multiple things at once?
- **» Weblink**
  Operant conditioning

10.3 Social learning theory

KEY IDEAS

In this section, you will learn about:

- observational learning as a method of social learning
- the social learning theory and the 'Bobo doll' experiments
- the process of observational learning.

We can learn by observing others. Observational learning is a method of social learning, particularly in children, involving attention, retention, reproduction, motivation and reinforcement. Further explanation of observation learning as a form of social learning is provided next.

Observational learning as a form of social learning

observational learning
where a person learns by watching the behaviour demonstrated by another

Most people learn to use cutlery by observing other experienced people using it. Similarly, it is common for children to spend many years as a passenger in a motor vehicle observing their parents' driving. This tendency to observe and mimic others is known as **observational learning** and is highlighted by advertising campaigns aimed at reducing the likelihood of children growing up adopting, for example, the same unhealthy alcohol consumption habits as their parents.

Social learning theory and the 'Bobo doll' experiments

Bobo doll
a large inflatable plastic doll, approximately 1.5 metre tall, designed to spring back upright when knocked over, used by Albert Bandura in his research on social learning

In the 1960s, psychologist Albert Bandura and his colleagues conducted a series of experiments where they observed that children appeared to learn by watching the behaviour of others. Bandura's experiments have become classic studies and are known as the 'Bobo doll' experiments because they involved a large, inflatable plastic doll named Bobo that was about 1.5 metres high and designed to spring back upright when knocked over. In these experiments, the children were shown an adult (the model) behaving aggressively to a **Bobo doll** – hitting it, throwing it, sitting on it, etc. The children were then placed in a room alone with a Bobo doll and their behaviour was observed. There was evidence that learning had occurred when the children behaved aggressively to the Bobo dolls, just as they had observed the model doing.

The results of the 'Bobo doll' experiments led Bandura to develop social learning theory in which he acknowledged the importance of classical conditioning and operant conditioning in learning, but added that learning also occurred through direct observation or observational learning (Bandura, 1977).

FIGURE 1 The Bobo doll is an inflatable toy about 1.5 metres tall, designed to spring back upright when knocked over.

CASE STUDY 10.3

Social learning theory, aggression and the Bobo doll

Albert Bandura and his colleagues, Dorrie and Sheila Ross, extensively studied observational learning in their work with children (Bandura, 1977; Bandura, Ross & Ross, 1961, 1963a, 1963b).

They conducted a series of experiments at Stanford University that revolutionised the field of research in learning and aggression. They hypothesised that children learn from the behaviour of trusted adults. One of these experiments is outlined below.

This experiment involved a similar experimental design and procedure to the earlier Bobo doll studies. In this study, the conditions were that each group of children was shown one of three films. Each film showed an adult punching, kicking and verbally abusing the Bobo doll.

- **Group 1**: The aggressive model was rewarded with lollies, soft drink and praise from another adult.
- **Group 2**: The aggressive model was punished by spankings and verbal criticism from another adult.
- **Group 3**: The aggressive model received no consequences whatsoever.

After viewing their film, each child was placed alone in a room with a one-way mirror and observed by the researcher. Some children were offered rewards as incentive for imitating the aggressive behaviour while others were offered no reward or incentive.

The children who watched the aggressive model either being reinforced (Group 1) or experiencing no consequences (Group 3) imitated the model's aggressive behaviour more than the children who had watched the aggressive model being punished (Group 2). However, when a reward was offered to the children as incentive, even those who saw the model punished tended to imitate the model's behaviour.

Social learning theory is the process by which social influences alter people's thoughts, feelings and behaviour. Observational learning is defined as the means of acquiring this social learning. Children develop their attitudes by observing those expressed by other people who are important to them – such as parents and teachers – and by the consequences they observe for these people when they express these attitudes. When the observer demonstrates the learnt behaviour by imitating it, this is referred to as **modelling** (Bandura, 1967).

social learning theory
describes the way in which people acquire certain behaviours by watching and learning from role models; the initial focus of observational learning

modelling
when a person copies the behaviour or attitude demonstrated by another person

The four principles of observational learning are as follows:

1. Learning occurs by observing the behaviour of others and the consequences of those behaviours.
2. Learning can occur without there being an immediate change in behaviour – it can remain latent.
3. Cognition plays a role in observational learning because the learner has awareness and expectations of future reinforcements or punishments, and these can influence whether the learnt behaviour will be demonstrated.
4. Observational learning is a link between the behaviourist theories of learning (classical conditioning and operant conditioning) and cognitive learning theories.

CHALLENGE 10.3A

Monkey see, monkey do

This common saying can be applied to observational learning. Have you ever been told that you did something just like your mother, father, older sibling or best friend? Based on your understanding of observational learning, develop an explanation for this and create a research question to explore observational learning..

The process of observational learning

In observational learning, as in operant conditioning, the learner plays an active role in the learning. There are five key processes that are necessary for observational learning: attention, retention, reproduction, motivation and reinforcement (see Figure 3).

Attention

Attention must be paid to the model's behaviour and its consequences. This is a cognitive aspect of observational learning. For example, a child might concentrate on a parent (model) making pancakes for breakfast. Attention can be influenced by characteristics of the observer such as perceptual and cognitive capabilities, and arousal level. It is also important to consider characteristics of the model – if the learner likes the model and wishes to be like them, the learner is likely to pay careful attention. The observational learning process can also be influenced by characteristics of the event.

FIGURE 2 Children learn by imitation. This daughter is learning yoga by copying her mother.

Retention (in memory)

mental representation a cognitive process where information is stored in memory for later retrieval and use

The learnt behaviour must be stored in memory as a **mental representation** (understanding of what to do in the mind of the learner) so that the observed learning can be utilised at a later time. This is also a cognitive aspect of observational learning because the memory must be stored and later retrieved to reproduce the behaviour. For example, the child might remember the ingredients and procedure for making pancakes.

Reproduction (of the behaviour)

Note that the learner does not perform this behaviour at this time. Reproduction simply means that they have the physical and intellectual ability to convert these mental representations into actions. For example, the child must be old enough to be able to use the kitchen equipment for making pancakes.

Motivation

The learner must want to imitate the learnt behaviour. This will depend on whether the learner believes that there will be a desirable consequence (reinforcement) for reproducing it.

Reinforcement

When there is the prospect of a positive result for imitating the behaviour (that is, a reward for the learner), it is likely that the learner will do so. In contrast, if there is a prospect of punishment for reproducing the learnt behaviour, it is less likely that the behaviour will be imitated. For example, the child must perceive that praise will be given for making the pancakes or that there will be personal pleasure in eating the pancakes.

Reinforcement influences the likelihood that a learner will imitate an observed model's behaviour. The expectation of reinforcement or punishment influences the cognitive processes of the observer and this affects how well the learner pays attention to and retains the memory of the model's behaviour.

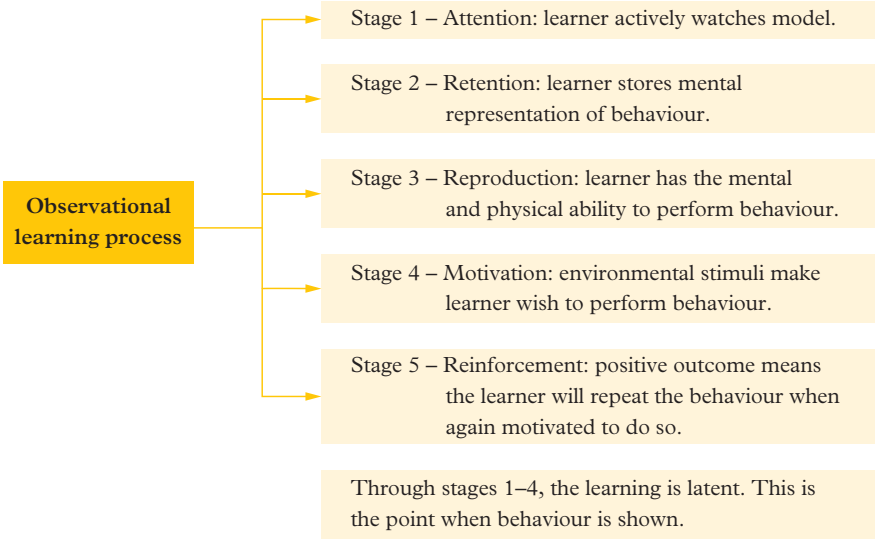


FIGURE 3 The key stages of observational learning

Reinforcement for imitating the model's behaviour can come from several sources:

- **the model** – A parent praises the child for imitating their behaviour.
- **a third person** – The observer might have imitated the behaviour of another person, such as a television personality or leader, but receives praise for the behaviour from a parent or teacher.
- **personal** – The observer receives satisfying consequences as a result of imitating the model's behaviour.
- **vicarious reinforcement** – Positive consequences received by the model increase the likelihood of the observer imitating the model's behaviour, whereas negative consequences for the model's behaviour decrease the likelihood of the observer imitating the model's behaviour.

vicarious reinforcement a theory that individuals are more likely to engage in a behaviour or activity if they witness another individual being rewarded for that activity or behaviour

Modelling

In observational learning, a model is someone who we respect or look up to; this can be a parent, teacher, friend or loved one. Modelling is the desire to imitate the behaviour and actions of this person, so that we can become more like them, or achieve the things they achieve.

Vicarious reinforcement

Vicarious reinforcement is the idea that we are more likely to engage in a behaviour or activity, if we see someone being rewarded for that behaviour. It also states, that we are less likely to engage in an activity or behaviour if we see someone being punished for that behaviour. There are two types of vicarious reinforcement: **positive vicarious reinforcement** and **negative vicarious reinforcement**.

positive vicarious reinforcement where an individual witnesses another being rewarded for a behaviour and decides to act in the same way

negative vicarious reinforcement where an individual witnesses another being punished for a behaviour so discontinues that behaviour themselves

For example, while you and your best friend are conducting an experiment, you start to be lazy and let your best friend do all the work. Your teacher notices this, and rather than telling you off for not doing the work, your teacher praises your friend for the great work they are doing. From watching this happen, you learn that participating in the experiment will make your teacher compliment you, so you start to participate in the activity. In this instance, you have experienced positive vicarious reinforcement.

Alternatively, you and your best friend might be sitting at the back of the class playing on your phones. Your teacher catches your best friend and tells them off. You see this happen, and before you can get caught too, you learn that this is not acceptable and so you put your phone away. In this scenario you have experienced negative vicarious reinforcement.

Vicarious reinforcement is successful because it allows us to have an expectation for the result of our behaviour before we engage in it. We are more likely to imitate someone who we respect and look up to, or someone who has a characteristic that we would like to have, such as having lots of friends, or doing really well on every test at school.

FIGURE 4 If you witness your friend getting told off for using their phone in class, you are likely to stop using yours in class too.

CHALLENGE 10.3B

Neurons and observational learning

Research has indicated that, for observational learners, some of the same neurons are active when observing the learning of others as when the observer is conducting the same behaviour themselves. When a model receives conditioned reinforcers for a behaviour, similar neurons in the observer's brain also strengthen (Carlson *et al.*, 2007). Explain the process of observational learning in learning to ride a bike.

Application of social learning

Observational learning means that role models (both fictional and real) are powerful sources of influence on the behaviour of others, especially impressionable people, including children. This helps to explain why physical punishment might lead to aggressive behaviour on the part of those who were punished – for example, parents who physically punish their children may unintentionally be modelling aggressive behaviour that their children will imitate. Examples where models can influence the positive behaviour of observers include parents reading to their children, demonstrations of problem-solving, moral thought and behaviour, and appropriate social behaviour.

CHECK YOUR LEARNING 10.3

Describe and explain

1 **Explain** social learning theory.
2 **Describe** observational learning.
3 **Identify** the key elements of observational learning.
4 **Define** modelling using an example.
5 **Identify** the aim of Bandura's experiment.

Apply, analyse and interpret

6 **Compare** modelling and vicarious reinforcement.
7 **Differentiate** between positive vicarious reinforcement and negative vicarious reinforcement.
8 **Contrast** observational learning with operant conditioning.

Investigate, evaluate and communicate

9 **Investigate** the 'Bobo doll' experiments. You may need to research online for this. In your own words, write out the steps of the methodology.
10 **Assess** the role of modelling in social learning theory.
11 **Comment** on the ethics of Bandura's 1965 experiment (Case study 10.3).

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 10.3
- **» Challenge**
  Worksheet: 10.3A
  Monkey see, monkey do
- **» Challenge**
  Worksheet: 10.3B
  Neurons and observational learning
- **» Weblink**
  Social learning theory

10.4 Comparing learning theories

KEY IDEAS

In this section, you will learn about:

+ the similarities and differences between classical and operant conditioning, and observational (social) learning theories.

As a child, learning is often considered in the context of learning new skills and gathering new information about our world. As we get older, learning is often considered as a purely academic pursuit. However, psychologists view learning as a lifelong process that reflects any change in our behaviour or response that is enduring in nature (see Burton, Westen & Kowalski, 2019). Learning on any level involves the processing of different kinds of information, whether it be in response to triggers in our environment, or as a consequence of our behaviour and experiences.

Our social environment and the context of the learning experience are also important to how we learn. As students, parents, teachers, coaches and even as consumers, it is important that we can differentiate between the different forms of learning and decide which form best suits the context of our learning. In this section we will compare and contrast the three forms of learning – classical conditioning, operant conditioning and observational (social) learning.

FIGURE 1 Learning is a lifelong process. The role of the learner, and the type of learning, changes with age.

Comparing the different theories

Although classical conditioning and operant conditioning share similarities (i.e. learning is based on associations between a behaviour and an event in the environment), the major difference is whether the response is involuntary (a reflex) or voluntary (the 'learner' has control over the response). The order of the stimulus and response, and whether the stimulus is pleasurable or not, are also important for the learning outcome (i.e. whether the behaviour is repeated or avoided). The role of the learner also varies between the different approaches to learning. The motivation of the learner and their previous social experiences can also influence observational learning. We explore the similarities and differences between the three learning approaches – classical conditioning, operant conditioning and observational learning – in Table 1.

TABLE 1 Classical conditioning compared with operant conditioning and observational learning

Type of conditioning	Classical conditioning	Operant conditioning	Observational learning
Acquisition	By pairing of a neutral stimulus (NS) with the unconditioned stimulus (UCS)	By reinforcing a behavioural response	By observation
Extinction	By conditioned presentation of the conditioned stimulus (CS) alone	Occurs when the behaviour occurs but reinforcement is never given	Occurs through modelling
Stimulus generalisation	Conditioned response (CR) occurs when a stimulus similar to the conditioned stimulus (CS) is presented.	Refers to discriminative stimulus (antecedent condition). When the behaviour occurs in an environment similar to that which led to reinforcement	By attention, retention and reproduction
Stimulus discrimination	After several trials when a stimulus similar to CS is presented but never associated with the UCS-CR only occurs with CS	When the behaviour is never reinforced in environments that are similar to the discriminative stimulus. Eventually, the behaviour occurs only when discriminative stimulus is present.	As with operant conditioning
Spontaneous recovery	When CR has been extinguished – after a time delay, CS is presented and again elicits CR	After the response has not been reinforced for several trials, the discriminative stimulus will not elicit the response. After a time delay, if discriminative stimulus occurs, behaviour will again be shown.	
Role of the learner	Passive – (reflexive) behaviour occurs without any deliberate action from the learner.	Active – the behaviour must be initiated by the learner.	As with operant conditioning
Timing of stimulus/response	Stimulus before response (reflexive behaviour) is in response to a stimulus.		With no reinforcement and no further modelling for several trials, the environment will not elicit (motivate) the response. After a time delay, the behaviour will again be shown in the right environment.
Nature of response	Reflexive – the learner has no control over the behaviour.	Discriminative stimulus is the environment that provokes the behaviour – it occurs before the behaviour (response).	Active – the behaviour must be initiated by the learner.

Differences between the theories

Direct versus indirect learning

While operant conditioning emphasises the importance of the organism's direct experience when learning, observational learning suggests that learning can occur indirectly through observation. For example, an employee who sees a colleague receive a promotion for hard work might also begin to work harder to receive a promotion.

Observable versus unobservable evidence of learning

Unlike operant conditioning, in observational learning there is a distinction between learning and performance. In observational learning, learning can occur but is not necessarily demonstrated or observed unless there is a motivation for the organism to demonstrate the learnt behaviour. There are many examples where people have learnt through observation but never actually perform the learnt behaviour. Therefore, a distinction is made between the acquisition and performance of a behaviour that has been learnt through observation.

The role of cognition in learning

Unlike operant conditioning, observational learning includes the role of cognition (thinking and memory) in the learning process. In observational learning, the learner must attend to a model's behaviour and its consequences and then store a mental representation of it.

Similarities between the theories

Active learning: the role of the learner

Observational learning is similar to operant conditioning in that the learner is active in both of these learning processes. For example, the employee who observes a colleague being rewarded with a promotion for hard work will deliberately work hard or change their working habits so that they might also be rewarded with a job promotion.

FIGURE 2 Operant versus classical conditioning

Reinforcement

As with operant conditioning, in observational learning it is reinforcement rather than the learning itself that influences the likelihood of the observed behaviour being imitated. If the learner observes a model receiving a favourable consequence for the behaviour, the learner will be more likely to imitate their behaviour. This is known as vicarious conditioning, where an observer learns the consequences of a behaviour by observing its consequences for another.

However, what is more important to the likelihood of the behaviour being imitated is the learner's perception that imitation will result in a positive reinforcer. The employee who observes a hard-working colleague receiving a promotion would be more likely to reproduce the same hard-working behaviour as the colleague if they thought there was a chance to also receive a promotion.

TABLE 2 Comparing observational learning and operant conditioning

	Observational learning	Operant conditioning
Direct versus indirect learning	Indirect	Direct
Observable versus unobservable evidence of learning	Not observable unless the organism is motivated by a stimulus to display the learning that has occurred via observation and retention	Observable
The role of cognition in learning	Cognition is necessary.	Cognition is not always necessary.
Active learning: the role of the learner	Active	Active
Reinforcement of the learner	Increases likelihood of the learner repeating the learnt behaviour to obtain a positive outcome	Increases likelihood of the learner repeating the learnt behaviour to obtain a positive outcome

CHALLENGE 10.4

What is the best type of learning?

Now that you have learnt about classical conditioning, observational learning and operant conditioning, consider whether one is the 'best' type of learning. You will need to consider if each learning style serves a different purpose or if they achieve the same goal. For example, you may want to think about how you learnt to open doors, sit down, use a pen, use cutlery and what not to do. Write a brief argument that determines if one type is better than the others or if they are all equally important.

CHECK YOUR LEARNING 10.4

Apply, analyse and interpret

1 **Compare** classical conditioning and operant conditioning.
2 **Contrast** classical conditioning with observational learning.
3 **Critique** Pavlov's study and Bandura's Bobo doll experiments.
4 **Discriminate** between operant conditioning and social learning theory.
5 **Differentiate** between the three theories discussed: classical conditioning, operant conditioning and social learning theory.

Investigate, evaluate and communicate

6 Select two types of learning discussed in this chapter. For the selected learning theories, complete the following tasks:
   a **Predict** which type of learning would best help someone learn to use cutlery, and which type of learning would best help children learn how to behave in a particular way.
   b Based on your answer from 6a, **hypothesise** your prediction.
   c **Design** a methodology to test the hypothesis from 6b.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 10.4

» **Challenge**
Worksheet: 10.4 What is the best type of learning?

» **Weblink**
Learning theories

SCIENCE AS A HUMAN ENDEAVOUR

10.5 Role models for teenagers

KEY IDEA

In this section, you will learn about:

+ how teenage behaviour is influenced by role models in our society.

Recall how the Bobo doll experiments showed the negative effects of modelling on children's behaviour, particularly aggressive behaviours. More recently, the same modelling principles have been applied to activities such as violent gaming and aggressive behaviour (see Burton, Westen & Kowalski, 2019). However, research is inconsistent and there is also evidence to support the positive outcomes for modelling on young people's behaviour and attitudes, particularly in teenagers.

Adolescence is a time when young people are searching for their identity. Teenagers typically search social media sites for people they admire and then imitate their behaviours. According to Robert Merton, a role model provides an example of how a behaviour associated with a certain 'role' is successfully performed (Morgenroth, Ryan & Peters, 2015). Research suggests that role models are people whom teenagers find worthy of imitating – teenagers actively look for someone with a positive identity or an image that appeals to them (Hurd, Zimmerman & Xu, 2009; Johnson *et al.*, 2016; Struchen & Porta, 1997).

Teenagers also select role models who have similar goals and aspirations, especially if the role model personifies behaviours that lead to success. However, role models don't always have to be perfect citizens. Nor do they need to have lived a charmed life. On the contrary, role models can teach younger people to never give up and to follow their dreams by simply sharing their personal story. They can describe how they worked through their mistakes and overcame adversity. In so doing, role models can have positive influences on teenagers – their aspirations, goals and their lifestyle choices.

Think of Queensland Paralympian snowboarder Simon Patmore, who won Australia's first Winter Paralympics gold medal in 16 years at the 2018 Winter Paralympics in Pyeongchang. Patmore is the first male Australian Paralympian to win a medal at both the Summer and Winter Paralympics. Another moving story of resilience is Aussie superstar surfer Sean Pollard, who lost his left arm and right hand, then four years later, went on to compete in the 2018 Winter Paralympics. Both stories can inspire positive change in others. Role models have been shown to empower disenfranchised young people and promote positive health behaviours (Johnson *et al.*, 2016; Morgenroth, Ryan & Peters, 2015).

Role models can also be much closer to home and come from a young person's social and family groups (e.g., their parents, siblings, teachers or coach). For example, Australian research has linked role modelling of older siblings with younger siblings' positive ideas about drinking and unsafe sexual practices (see Burton *et al.*, 2019). This learning process is a form of vicarious conditioning (social learning theory). We learn the consequences of our behaviours by observing the consequences of that behaviour for someone else.

Alternatively, role models can be public figures (e.g., sports people, political figures, actors or musicians). An Indigenous sporting group in the Goulburn Valley in Victoria has shown that young players consider their more senior players as role models. They identified their role models as being respectful, being employed, doing the right thing both on and off the field, having a responsible attitude to drugs and alcohol, and being able to move above family conflict (O'Brien *et al.*, 2009). Retired Queensland and NRL great Johnathan Thurston is a role model for all Indigenous youth, showing an ongoing strong commitment to closing the educational gap for young Aboriginal and Torres Strait Islander peoples. Thurston is an active supporter of Deadly Kindies, helping children have a great start to school and life. This Indigenous kindergarten program is focused on supporting and strengthening children's Aboriginal and Torres Strait Islander identity. Deadly Kindies ensures all children have health checks before they enrol and it encourages attendance by providing children with a safe and engaging play space.

FIGURE 1 Simon Patmore won gold at the 2018 Winter Paralympics.

CHECK YOUR LEARNING 10.5

Describe and explain

1 **Explain** how teenagers can learn positive behaviours by observing others.
2 **Identify** three positive role models for teenagers and explain how they can positively influence behaviour.
3 **Explain** why role models might have a negative influence on teenagers' behaviour. Give an example to illustrate.
4 **Define** modelling by using an example to illustrate the processes of the social learning theory.

Apply, analyse and interpret

5 **Compare** modelling and vicarious conditioning.

Investigate, evaluate and communicate

6 Teenagers are influenced by people they see in the media. **Identify** two positive influences and two negative influences. **Discuss** how these could affect teenagers in Australia.
7 **Assess** the benefits of teenagers being exposed to a variety of role models including parents, celebrities, teachers and their friends.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 10.5

» **Weblink**
Role models

» **Weblink**
Australian youth support

CHAPTER 10

Review

Summary

10.1

- Classical conditioning involves three phases: *before conditioning*, *during conditioning* and *after conditioning*.
- Pavlov experimented by associating various sounds with food and found that after a few trials dogs could be conditioned to salivate when they heard a sound.
- Extinction will occur if the conditioned stimulus occurs many times without ever again being paired with the unconditioned stimulus.
- Spontaneous recovery is said to have occurred if, after a pause of some time during which the conditioned stimulus is never presented, reintroduction of the conditioned stimulus will again cause a low level of the conditioned response.
- If the conditioned stimulus is still occasionally paired with the unconditioned stimulus, the conditioned response will occur only with the conditioned stimulus, not with a similar stimulus. This is stimulus discrimination.
- When Little Albert was allowed to play with a white rat, he showed no fear. He did show fear, however, when a steel bar was struck with a hammer, making a loud noise just behind his back. When Watson paired the rat with a loud noise, Albert cried and, soon afterwards, when the rat was presented but no noise sounded, he cried and showed fear. Albert also showed fear when presented with a dog, a rabbit, a fur coat and a Santa Claus mask, demonstrating stimulus generalisation. This experiment contravened many ethical principles that are in place today.

10.2

- Operant conditioning is a form of learning in which consequences determine behaviour.
- B.F. Skinner trained animals to perform voluntary behaviours by rewarding the response with food. After only a few training trials, the animals performed the behaviour every time.
- Skinner developed the system of teaching and learning referred to as operant conditioning. He referred to the three-phase model, known as the ABC of operant conditioning:
  - the antecedent condition (discriminative stimulus)
  - the behaviour
  - the consequence.
- A reinforcer is a stimulus that strengthens or increases the likelihood of a response (behaviour). There are two types of reinforcers:
  - positive reinforcers: rewards that strengthen a response by providing an agreeable consequence
  - negative reinforcers: outcomes that strengthen a response by removing a disagreeable consequence.
- A punisher is a stimulus that weakens or decreases the likelihood of a response (behaviour). There are two types of punishers:
  - punishment (sometimes called positive punishment): when a behaviour is weakened because it is followed by a negative experience
  - response cost: when a behaviour is weakened because something desirable is removed.

- Side effects of punishment include frustration, aggression, feelings of helplessness and displacement of anger onto the person doing the punishing.
- Effective punishment needs to be short in duration, immediate and connected to the undesirable behaviour in the mind of the person (or animal) being punished. It is only effective if a positive behaviour can be developed to replace the negative behaviour.
- Stimulus generalisation is where a behaviour occurs as a result of an antecedent that is similar (but not identical) to the original.
- Stimulus discrimination is where the organism learns to avoid responding to an antecedent that is similar (but not identical) to the original.
- When the conditioned response disappears over time, after reinforcement has ceased, extinction has occurred.
- When the extinguished response reappears after a rest period, spontaneous recovery has occurred.

10.3

- Social learning theory suggests that it is possible for people, especially children, to learn through observing the behaviour of others.
- Observational learning occurs when someone uses observation of another person's actions and the resulting consequences to guide their future actions.
- When the observer copies the observed behaviour, this is referred to as modelling.
- Observational learning is dependent on the processes of attention, retention, reproduction, motivation and reinforcement. Learners play an active role in the learning process.
- Reinforcement influences the learner's motivation to perform the learnt behaviour.
- Bandura's 'Bobo doll' experiments informed debate on the effect of both live and television role models on the learning of children.

Key terms

- association
- aversion therapy
- Bobo doll
- classical conditioning
- conditioned response (CR)
- conditioned stimulus (CS)
- discriminative stimulus
- effective punishment
- extinction
- mental representation
- modelling
- negative reinforcer
- negative vicarious reinforcement
- neutral stimulus (NS)
- observational learning
- operant conditioning
- positive reinforcer
- positive vicarious reinforcement
- punisher/ punishment
- reinforcer
- response cost
- shaping
- social learning theory
- spontaneous recovery
- stimulus discrimination
- stimulus generalisation
- three-phase model (ABC of operant conditioning)
- unconditioned response (UCR)
- unconditioned stimulus (UCS)
- vicarious reinforcement
- voluntary behaviour

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: * = low, ** = medium, *** = high.

Multiple choice

1 Who first described classical conditioning?
- **A** B.F. Skinner
- **B** Ivan Pavlov
- **C** Sigmund Freud
- **D** Carl Jung

2 'Before conditioning' involves a response to a stimulus that has not yet been conditioned. This can also be referred to as:
- **A** the unconditioned stimulus that results in the unconditioned response.
- **B** the unconditioned response that results in the unconditioned stimulus.
- **C** the unconditioned stimulus that results in the conditioned stimulus.
- **D** the neutral stimulus that results in the unconditioned response.

3 After classical conditioning, learning not to respond to a stimulus that is similar but not identical to the conditioned stimulus is called:
- **A** response generalisation.
- **B** stimulus generalisation.
- **C** response discrimination.
- **D** stimulus discrimination.

4 In the process of classical conditioning, what is an example of when the organism shows the response to a stimulus that is neither the original unconditioned stimulus nor the conditioned stimulus?
- **A** response generalisation
- **B** stimulus generalisation
- **C** response discrimination
- **D** stimulus discrimination

5 In the process of classical conditioning, which of the following is likely to occur when the conditioned stimulus and unconditioned stimulus are no longer paired?
- **A** The rate of responding will immediately decline.
- **B** The rate of responding will become erratic at first and then show steady decline.
- **C** The rate of responding will remain constant for a few trials and then decline.
- **D** The rate of responding will decline at first and then remain steady.

6 Aversion therapy could be used to:
- **A** help alcoholics to stop drinking alcohol.
- **B** help people to quit smoking.
- **C** stop children from biting their fingernails.
- **D** achieve all three answers above.

7 In operant conditioning, what must the learner do?
- **A** intend to learn
- **B** be active
- **C** know that learning is taking place
- **D** want to learn

Questions 8–11 refer to the following information:

Jimmy was two years old and when his mother took him to the supermarket one day he saw some chocolate frogs and started screaming, 'Want frog! Want frog!' After five minutes trying to ignore him, his mother went to the checkout and bought a chocolate frog, which she gave to Jimmy. Jimmy sat quietly in the trolley and ate the chocolate.

FIGURE 1 A chocolate Freddo frog

8 What is Jimmy receiving the chocolate frog likely to lead to?

A Jimmy screaming out the next time they go to a supermarket.

B Jimmy screaming out the next time he sees a chocolate frog.

C Jimmy's mother feeling stressed the next time she has to go shopping.

D Jimmy being better behaved on the next visit to a supermarket, hoping to be rewarded with a chocolate frog.

9 In terms of operant conditioning, what has Jimmy's mother experienced?

A punishment for the action of taking Jimmy to the supermarket

B positive reinforcement for the action of giving Jimmy the chocolate frog

C negative reinforcement for the action of giving Jimmy the chocolate frog

D reinforcement for the action of taking Jimmy to the supermarket

10 The next week, Jimmy and his mother went shopping at a hardware store. As soon as he was put in the child seat in the trolley, Jimmy started screaming, 'Want frog! Want frog!' In terms of operant conditioning, what was Jimmy exhibiting?

A response generalisation

B stimulus discrimination

C response discrimination

D stimulus generalisation

11 When Jimmy and his mother went shopping at the hardware store, the entrance to the shop and being put in a trolley acted as a(n):

A generalised response.

B antecedent.

C behavioural consequence.

D predictive stimulus.

12 A Grade 2 teacher has set up a star chart for her whole class. There is a long list of behaviours for which children can earn a star; and at the end of each day, they can exchange their stars for treats. This system is a form of _____ and the stars are _____.

A operant conditioning; negative reinforcers

B behaviour therapy; positive rewards

C operant conditioning; positive reinforcers

D behaviour management; negative rewards

13 Observational learning suggests that people imitate a model because of _____ and _____: those received by the model as well as by the imitators.

A reflexes; punishments

B aggression; rewards

C rewards; punishments

D reinforcers; aggression

14 Models are most effective when they are perceived as _____ or _____ by the observer.

A similar; successful

B similar; male

C male; consistent

D successful; flattering

15 Which is the correct sequence for observational learning?

A attention, retention, reproduction, motivation, reinforcement

B attention, retention, motivation, reproduction, reinforcement

C attention, retention, reinforcement, reproduction, motivation

D attention, retention, reproduction, reinforcement, motivation

16 Which of the following might be a definition of modelling?

A a form of learning in which the learner watches another person perform a task and then imitates their action when the occasion is right

B a form of learning in which the learner watches another person perform a task and forms a mental image of the action

C a form of learning in which the learner is a passive participant observing an action being performed

D a form of learning in which the learner watches another person perform a task and gets reinforced for it

Short answer

Describe and explain

★ **17** **Describe** the three-phase model of classical conditioning.

★ **18** **Explain** what is meant by extinction in operant conditioning. **Use** an example in your answer.

★ **19** **Describe** three characteristics of effective punishment.

★ **20** Briefly **summarise** the five key processes involved in observational learning.

★★ **21** Using the language of classical conditioning, **explain** exactly how Pavlov's dogs were conditioned to salivate at the sound of a bell.

★★ **22** Dorothy is teaching her dog, Toto, to sit. Every time Toto sits when he is told to do so, Dorothy gives him a treat.

a **Identify** the form of conditioning being used.

b **Identify** the form of reinforcement being used.

FIGURE 2 Dogs can be taught to sit through conditioning.

★★ **23** **a** **Use** an example to show stimulus generalisation in operant conditioning.

b **Use** an example to show stimulus discrimination in operant conditioning.

c **Use** an example to show spontaneous recovery in operant conditioning.

★★ **24** **Use** examples to **explain** the following processes involved in observational learning:

a retention

b reproduction.

★★ **25** In observational learning, there is a stage where learning has occurred but the behaviour has not yet been shown.

a **Identify** which processes involved in observational learning must occur immediately before the behaviour is shown.

b **Explain** which of the processes involved in observational learning must occur if the behaviour is to be shown more than once.

c **Explain** exactly what is meant by what is necessarily the first of the observational learning processes.

★★★ **26** Refer to the diagram below and **use** it to show how an advertising firm could use classical conditioning with the unconditioned stimulus of an attractive model to help sell a new sports car.

Before conditioning

NS _____

UCS _____ UCR _____

During conditioning

NS

+

UCS _____ UCR _____

After conditioning

CS _____ CR _____

Apply, analyse and interpret

★ **27** **Consider** how watching glorified violence on television may impact a child's behaviour.

★★ **28** Gustav sometimes experiences headaches for which he takes paracetamol tablets. These work well and the headaches become much less severe. One day, he takes tablets and his headache clears as usual, but he later finds that he took sugar pills rather than

paracetamol. Using the language of classical conditioning, **determine** why Gustav's headache may have been cleared by the familiar action of taking a tablet.

★★ **29** Mary wants to stop chewing her pencils. She wears a thick rubber band on her wrist and every time she feels that she is about to chew her pencil, she snaps the rubber band. This causes a sharp pain that makes her feel anxious. After a few weeks, she does not think about chewing her pencils as the thought is unpleasant for her. **Determine** how Mary has successfully used classical conditioning to help her stop chewing her pencils and provide the term for this type of therapy.

★★ **30** **Differentiate** between observational learning and operant conditioning.

★★ **31** **Compare** classical conditioning and observational learning.

★★★ **32** **Use** an example to **explain** the concept of response cost as a punishment. **Consider** how this could be confused with negative reinforcement.

Investigate, evaluate and communicate

★ **33** **Design** a method for training a dog to bark using the three-phase model of operant conditioning.

★ **34** **Evaluate** one key difference between operant conditioning and classical conditioning.

★★ **35** Negative reinforcement and punishment are often confused.

- **a** **Identify** two ways in which negative reinforcement and punishment are different.
- **b** **Demonstrate** these differences by giving an example of negative reinforcement and an example of punishment.
- **c** **Discuss** the effectiveness of each for learning a new task.

★★ **36** Nuria wants to use observational learning to teach her five-year-old daughter Luciana how to tie her shoelaces. **Identify** stages 2 and 4 of observational learning and, for each of these, **decide** how Nuria could teach the skill of tying shoelaces.

★★ **37** Malik wants to use observational learning to teach his four-year-old son Nasir how to make his bed in the morning. **Identify** stages 1 and 5 of observational learning and, for each of these, **decide** how Malik could teach the skill of bed-making.

★★★ **38** The 'Little Albert' experiment breached some significant ethical guidelines. **Identify** what guidelines need to be used today, and **propose** an alternative method of conducting this research that does not breach any of them.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 10 Review
- **» Revision notes**
  Revision notes for Chapter 10
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 10

UNIT 3

Practice exam questions

Multiple choice

1 Dr. Smith was interested in different types of conditioning. She proposed the following study: 20 primary school aged children. Of the 20, 10 were female, and 10 were male. Each child was paired with a child of the opposite gender of the same age. Dr. Smith aimed to use operant conditioning to increase each child's school results, but informed the children that they the test would measure their enjoyment of animals. Select the relevant ethics that apply to Dr. Smith's study.

A informed consent; debriefing

B informed consent; debriefing; deception

C informed consent; debriefing; deception; voluntary participation; right to withdraw; confidentiality

D no lasting harm

2 From the following, identify the correct components of the peripheral nervous system

A the spinal cord, the brain, the cerebellum

B somatic nervous system, autonomic nervous system, sympathetic nervous system, parasympathetic nervous system

C the spinal cord, somatic nervous system, sympathetic nervous system, the brain

D the spinal cord, motor neurons, interneurons, sensory neurons

3 Parkinson's disease is a progressive neurological condition. Common symptoms associated with this condition are best explained by all of the following except:

A reduced levels of dopamine in areas of the brain that control movement

B increased levels of dopamine in areas of the brain that control movement

C a balance of dopamine and acetylcholine is required for normal motor function

D a drop in dopamine influences the levels of acetylcholine, which is necessary for normal movement.

4 Visual perception involves six stages. The sequence from first to last is:

A reception, transmission, transduction, selection, organisation, interpretation

B reception, selection, transmission, transduction, organisation, interpretation

C reception, transduction, transmission, selection, organisation, interpretation

D reception, organisation, transduction, transmission, selection, interpretation.

5 Light is absorbed by photoreceptors in the retina, and converted into electrochemical impulses in a process known as:

A perception

B transmission

C electromagnetic energy

D transduction.

6 Soldiers wearing camouflage gear to avoid detection by the enemy are utilizing the fact that the visual perception principle _____ is no longer working.

A closure

B proximity

C size constancy

D figure-ground organisation

7 The phenomenon observed in these studies on the Muller-Lyer illusion suggests that perception is influenced by _____ factors

A biological

B cognitive

C sociocultural

D behavioural

8 The memory store that holds information for approximately 3 seconds is known as:

A sensory memory

B echoic memory

C short-term memory

D working memory.

9 Nana is teaching her granddaughter to knit. She finds it easier to show her how to knit instead of explaining what to do. She also recalls her own grandmother teaching her how to knit when she was young. What types of memory are involved in this scenario?

A eclarative, procedural

B episodic, declarative

C procedural, episodic

D short-term memory, long-term memory

10 Operant conditioning occurs when learning is acquired through:

A associating a NS with a UCS

B reinforcing behaviour through consequences

C modelling or observing behaviour

D rewarding desired behaviour.

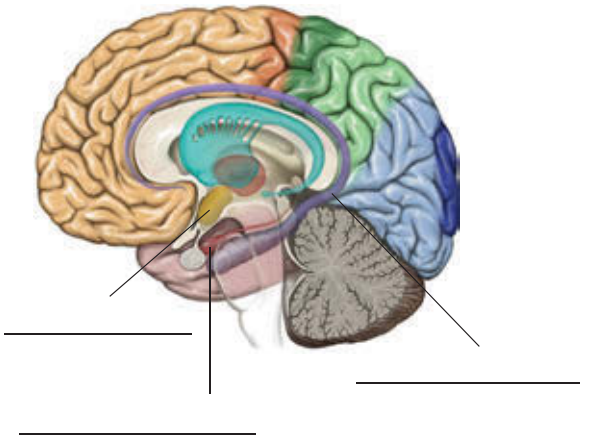
Short answer

11 a Define the monocular depth cues linear perspective and texture gradient.

b Compare how linear perspective and texture gradient allow people to perceive depth.

12 Using an example, compare procedural and declarative memory. Write a short paragraph to explain this.

13 Label the diagram correctly, and describe the responsibility of each area labelled.



14 In the famous 'rat-man' experiment by Bugelski and Alampay (1961), one group of participants (Group 1) were shown a series of faces followed by the rat-man stimulus. Another group of participants (Group 2) were shown a series of animals followed by the rat-man stimulus.

a Describe the responses given by a majority of participants in each group when asked to identify the ambiguous rat-man stimulus.

b Explain why the participants in each group tended to perceive the ambiguous stimulus in a different way. In your answer, show your understanding using key psychological terms.

15 The working model of memory suggests that there are three key areas: the visuospatial sketchpad, the central executive and the episodic buffer. Use an example to differentiate between these areas, and summarise the role of each.

16 Much to his parents' despair, Shin loves to empty the kitchen cupboards whenever he is left alone in the kitchen. Each time his mum returns to the kitchen to find the mess her young son has created, she places him on a mat in the corner for 5 minutes.

a Using operant conditioning, identify the three components in this scenario for Shin.

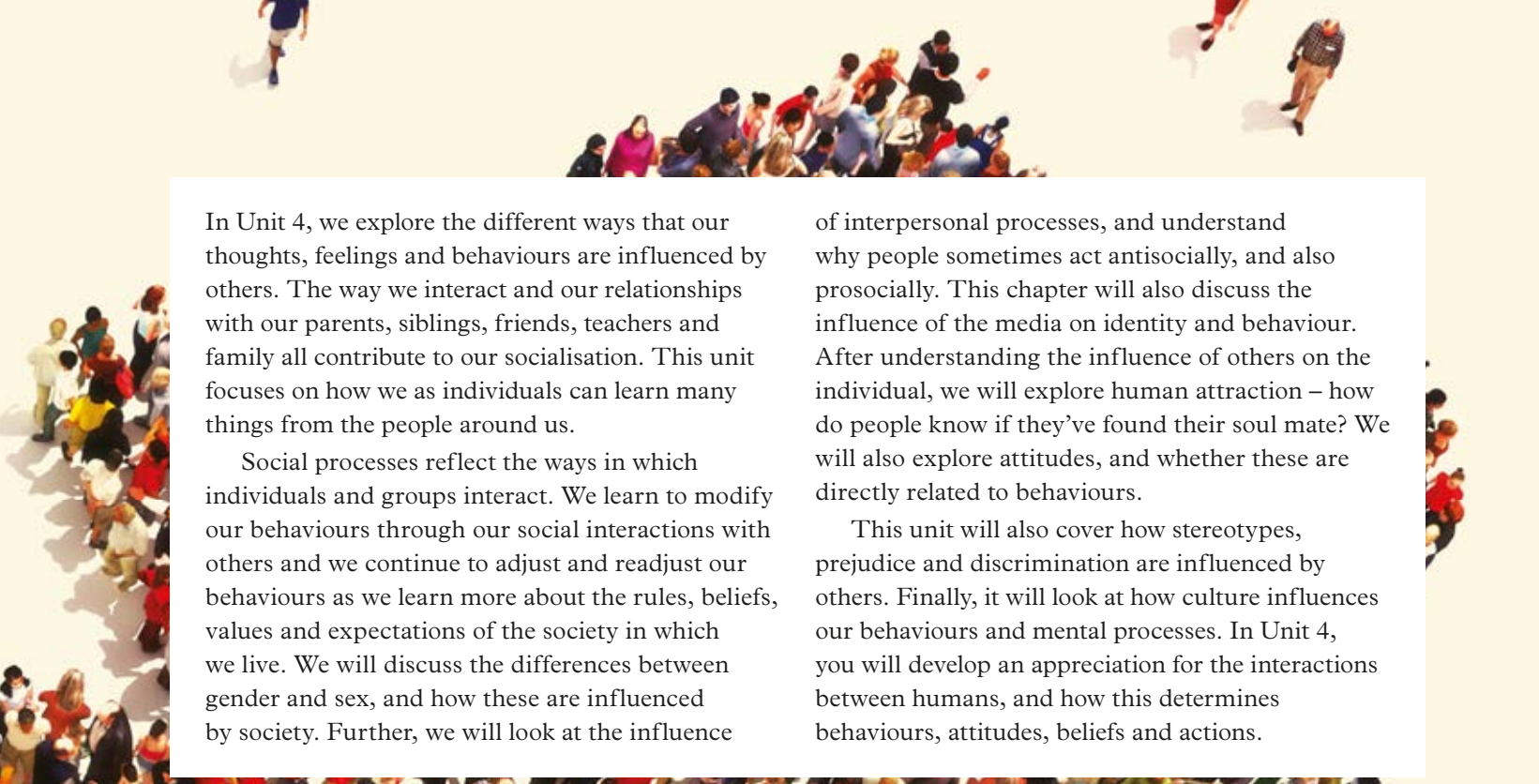
b In the above scenario, Shin's mum is hoping to change her son's behaviour through.

UNIT

4

THE INFLUENCE OF OTHERS

FIGURE 1 While people are individual, it is human nature to seek the comfort and guidance of groups to form our thoughts and behaviours.



In Unit 4, we explore the different ways that our thoughts, feelings and behaviours are influenced by others. The way we interact and our relationships with our parents, siblings, friends, teachers and family all contribute to our socialisation. This unit focuses on how we as individuals can learn many things from the people around us.

Social processes reflect the ways in which individuals and groups interact. We learn to modify our behaviours through our social interactions with others and we continue to adjust and readjust our behaviours as we learn more about the rules, beliefs, values and expectations of the society in which we live. We will discuss the differences between gender and sex, and how these are influenced by society. Further, we will look at the influence of interpersonal processes, and understand why people sometimes act antisocially, and also prosocially. This chapter will also discuss the influence of the media on identity and behaviour. After understanding the influence of others on the individual, we will explore human attraction – how do people know if they've found their soul mate? We will also explore attitudes, and whether these are directly related to behaviours.

This unit will also cover how stereotypes, prejudice and discrimination are influenced by others. Finally, it will look at how culture influences our behaviours and mental processes. In Unit 4, you will develop an appreciation for the interactions between humans, and how this determines behaviours, attitudes, beliefs and actions.

Unit 4 topics

Topic 1	Social psychology	Chapters 11–12
Topic 2	Interpersonal processes	Chapters 13–15
Topic 3	Attitudes	Chapters 16–17
Topic 4	Cross-cultural psychology	Chapters 18–19

Unit objectives

→ Describe and explain social psychology, interpersonal processes, attitudes and cross-cultural psychology.

→ Apply understanding of social psychology, interpersonal processes, attitudes and cross-cultural psychology.

→ Analyse evidence about social psychology, interpersonal processes, attitudes and cross-cultural psychology.

→ Interpret evidence about social psychology, interpersonal processes, attitudes and cross-cultural psychology.

→ Investigate phenomena associated with social psychology, interpersonal processes, attitudes and cross-cultural psychology.

→ Evaluate processes, claims and conclusions about social psychology, interpersonal processes, attitudes and cross-cultural psychology.

→ Communicate understandings, findings, arguments and conclusions about social psychology, interpersonal processes, attitudes and cross-cultural psychology.

Source: Psychology 2019 v1.3 General Senior Syllabus © Queensland Curriculum & Assessment Authority

CHAPTER 11

Social psychology

Social psychology is the scientific study of how our thoughts, feelings and behaviours are influenced by the presence of others (Allport, 1985). We are impacted by social influences that can be real, imagined or implied. For example, while we are watching television or shopping for the latest fashion trends, we are being socialised to conform to the norms of our society. This socialisation process is largely influenced by social media and other virtual networks and communities. For instance, we are also being socialised when we post a story on Instagram or when we share our thoughts and experiences in a blog.

In this chapter we will examine how socialisation occurs through primary (family) and secondary (e.g., schooling, media and peers) influences. We will discuss how biological, cognitive and social theories influence our perceptions, beliefs and attitudes towards gender. Finally, we will explore how the social groups and networks we are connected to can influence and change our attitudes, beliefs and behaviours.

OBJECTIVES

→ Explain the difference between primary (family) and secondary (media, schooling) socialisation.

→ Describe gender and compare social learning, cognitive developmental and biology-based theories of gender role formation.

→ Describe group social influence, with reference to compliance, identification and internalisation.

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

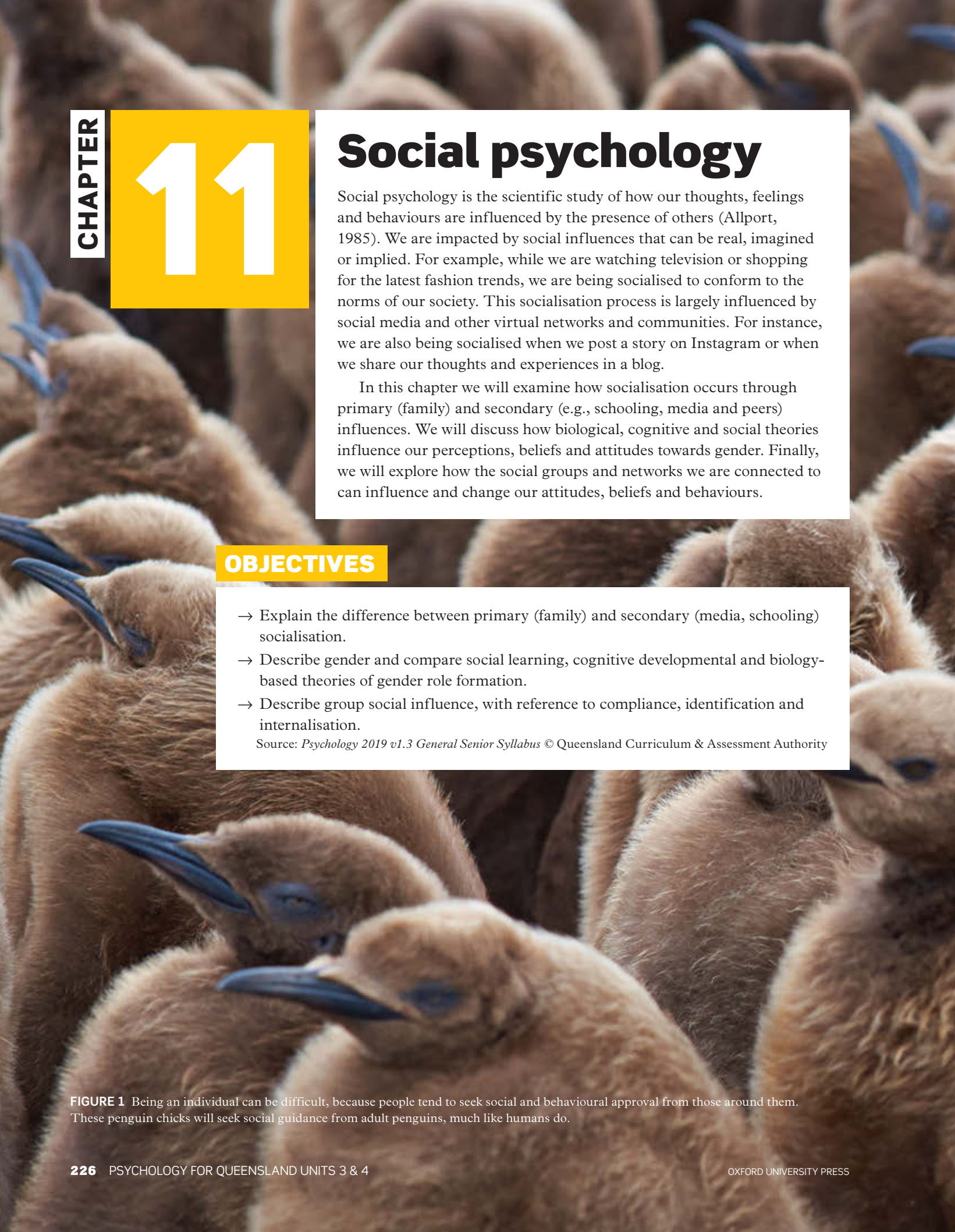


FIGURE 1 Being an individual can be difficult, because people tend to seek social and behavioural approval from those around them. These penguin chicks will seek social guidance from adult penguins, much like humans do.

SUGGESTED RESEARCH

SUGGESTED RESEARCH	**11.6** The influence of social media in adolescent–peer relationships (e.g. identity formation, behaviours and relationships in Wood, Bukowski & Lis 2016)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

11.1 Socialisation

KEY IDEAS

In this section, you will learn about:

- socialisation as a process
- primary socialisation from the family, and secondary socialisation from the media and via schooling.

socialisation
the process of how people learn the beliefs, customs and appropriate behaviours of a society or group

primary socialisation
the process of learning the beliefs, customs and appropriate behaviours of a group during the early stages of life, typically from parents and close family members

secondary socialisation
the process of learning the beliefs, customs, and appropriate behaviours of a group via teachers, extended family, friends and the media

agent
a person or group that facilitates the process of socialisation; could be parents, family, peers, school or the media

vicarious learning
witnessing a type of behaviour in another and establishing whether this is acceptable or not based on the observation

A person's personality and identity are not fixed at birth, rather they continue to develop consistently throughout the lifespan. **Socialisation** refers to the process by which an individual learns the norms, customs and beliefs of a group or society, which provides them with the necessary skills for participating in that group or society.

The process of socialisation begins at birth, and continues into adulthood. This section will focus on two key forms of socialisation; **primary socialisation** and **secondary socialisation**. Primary socialisation is the process of learning beliefs, customs and behaviours that are appropriate during the early stages of life. Typically people learn these from parents and close family members, such as grandparents or siblings. Secondary socialisation is the process of learning beliefs, customs and behaviours that are considered appropriate from extended social networks including teachers, extended family, friends and the media.

During socialisation it is also important to consider the role of the **agent**. Agents of socialisation are those who facilitate the learning of values and behaviours such as family, friends, school and the media.

Primary socialisation

Primary socialisation is the basis for all future socialisation. It occurs when a child begins to learn the attitudes and values of those who are closest to them, and learns to convey these attitudes and values through appropriate behaviour.

For children, particularly infants, socialisation occurs through parents and very close family members such as siblings, or perhaps grandparents. In Unit 3, theories of development were discussed, including social learning theory and modelling. Modelling is a form of **vicarious learning**, where a person learns to behave in a certain way based on the rewards or punishment that another person experiences. For children, their first 'role models' are typically their parents. Because of this children learn to model their behaviour on their parents. For example, if a child is exposed to racist or discriminatory language and thoughts from their parents, they may also begin to express these thoughts and feelings.

FIGURE 1 Children learn how to behave from what their parents show them.

Children also learn gender roles and stereotypes from their parents. For example, if a child sees their mother always doing the laundry or the cooking, they may assume that all women are responsible for cooking and laundry.

During primary socialisation, parents act as an agency for socialisation and children become self-aware.

CHALLENGE 11.1

How were you socialised?

Think about your own life and the people who have influenced you. Identify two primary and two secondary agents, and consider how these have affected your beliefs, behaviours and attitudes. Summarise these influences in a paragraph, and then propose how you could study this – you will need to consider study designs, methods of collecting data and the sample size, as well as any ethical implications.

Secondary socialisation

Secondary socialisation is the continuing process of socialisation into adulthood. It is the process of learning how an individual fits into larger society when they are free from the confines of their primary caregivers and agents (their parents).

Through secondary socialisation, individuals learn how they should behave and act when they are outside of the home. For example, if a child at home is exposed to discriminatory values, when they attend school they may learn that this is not acceptable.

Unlike primary socialisation, which requires direct interaction with the agent, secondary socialisation does not require direct interaction with an agent. This can be seen via the influence of mass media on children, adolescents and adults.

Secondary socialisation through media

Television can provide children and adolescents with the feeling that they are interacting, despite the fact that they are not. Several studies have demonstrated that television can influence children's behaviour and opinions: individuals can learn about the social and cultural expectations for their daily life. For example, by watching *The Good Doctor*, individuals may learn about the roles of a doctor, a surgeon and a nurse. While this may be a basis for understanding, if an individual limits their assumption about nurses and doctors to *The Good Doctor*, they may have misleading information. If they had watched *RPA*, which focuses on the daily running of the Royal Prince Alfred Hospital in Sydney, they may have better understanding, as *RPA* documents actual medical events at the major hospital. Through television, individuals are also exposed to societal stereotypes and bias (see Chapters 16 and 17).

Further, the media can influence our perception of an ideal image of self. When young women are exposed to images of toned, slender women in media, like Victoria's Secret models or the Kardashians, these images may influence young women to think that they should look the same. This can also be seen in the way young men are highly influenced by athletic, muscular men in media, such as Cooper Cronk and Chris Hemsworth. This influence can teach adolescents what they should look like and how they should behave, which is a process of secondary socialisation.

Study tip

To help you distinguish between primary and secondary socialisation, try to associate agents from your own life with each (e.g., primary = your parents; secondary = your friends).

FIGURE 2 The Kardashians have built a media empire that can influence young women who may aspire to be like them, whereas Valentine Holmes, a prominent rugby star, can influence young men who may aspire to be like him.

CHECK YOUR LEARNING 11.1

Describe and explain

1 In your own words, **explain** what is meant by:
   - **a** primary socialisation
   - **b** secondary socialisation.

2 **Identify** the agent in the following scenarios:
   - **a** Charlie's mother works as a lawyer and usually leaves the house in business clothes with heeled shoes on. Charlie's school teacher tends to wear more relaxed clothing. Charlie has started to walk around their home in heels.
   - **b** Yong watches movies that feature people who hate cheese. Yong's girlfriend loves cheese, and Yong's parents have always liked cheese. Recently, Yong has begun to express how he doesn't like cheese.

3 **Describe** the need for primary and secondary socialisation.

4 **Define** modelling.

5 **Use** socialisation to **summarise** the influence of media personalities on teenagers in Australia. In your response, you could think of the effects on self-esteem, body image, career goals and gender stereotypes.

Apply, analyse and interpret

6 **Compare** the roles of primary socialisation and secondary socialisation.

7 **Differentiate** between the socialisation from a parent and a celebrity.

Investigate, evaluate and communicate

8 **Propose** what could happen if someone only experiences primary socialisation.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 11.1
- **» Video**
  Socialisation
- **» Challenge**
  Worksheet: 11.1 How were you socialised?
- **» Weblink**
  The influence of parents on development

11.2 Sex and gender

KEY IDEA

In this section, you will learn about:

+ the difference between gender and sex.

There are obvious physical and biological differences between males and females. At birth, biological sex is one of the first things observed. As children grow and mature, they will learn to identify as male or female, as a boy or a girl (or a man and a woman), but this identification is not necessarily caused by their biological sex. Rather, it is determined by which gender they identify with. Despite the existence of predetermined biological differences between males and females, there are not necessarily psychological differences between men and women, or girls and boys, particularly before puberty.

sex
determined by the biological chromosome make-up expressed through an individual's reproductive organs, genitals and other physical characteristics

gender
a socially and culturally constructed idea of what male and female are; this can include, but is not limited to, personality traits, social behaviours and physical appearance

It is important to understand the difference between sex and gender. A person's **sex** is determined by the biology of their X and Y chromosomes, which is typically expressed with the individual's reproductive organs (see 11.3). A person's **gender** is the sociocultural differences between being male and being female. Typically, sex is set at birth, and without medical intervention this cannot be changed; the gender an individual identifies with is continuous and can change for various reasons.

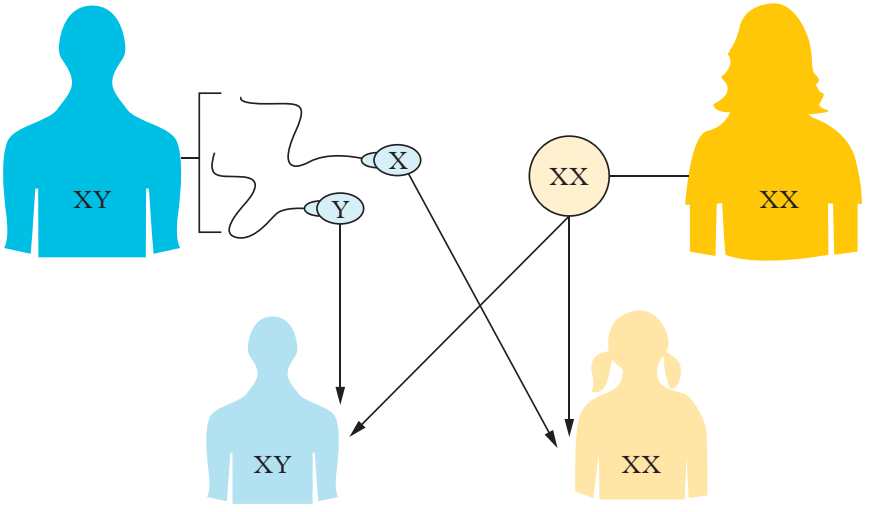


FIGURE 1 X and Y chromosomes determine sex: XX is female, XY is male.

Gender is not rudimentary. For instance, males can display feminine behaviour and still remain male, and females can display masculine behaviour and still remain female. Transgender people have a gender identity that differs from their assigned sex. They may choose to undergo sex reassignment surgery to transition from one sex to another. Currently in Queensland, only people who have undergone sex reassignment surgery can apply to have their birth certificates changed; however, transgender and intersex people are pushing for the right to have their gender recognised on their birth certificate without having to undergo surgery.

FIGURE 2 Depicts typical traditional socially constructed ideas of what men and women 'should' do.

CHALLENGE 11.2

Gender roles

Create a list of five gender stereotypes or societal norms. For each norm, suggest why this became a norm and then discuss how this norm has changed or is changing in current society.

Almost all cultures and societies expect differences in the behaviour of males and females, and this expectation typically begins at birth. For example, when a girl is born the parents are usually given pink clothing and dolls; a boy may receive blue clothing and toy trucks and cars. These are preconceived ideas about gender and sex.

Gender roles are expectations on how each gender 'should' behave. Gender roles can be based on stereotypes and bias. The next sections in this chapter will discuss different theories on how these roles are formed, including biological, cognitive and social theories.

CHECK YOUR LEARNING 11.2

Describe and explain

1 **Describe** sex.
2 **Explain** gender.
3 **Use** an example to **summarise** gender roles.

Apply, analyse and interpret

4 **Differentiate** between sex and gender.
5 **Consider** the interactions between socialisation and gender identity.

Investigate, evaluate and communicate

6 **Investigate** a stereotypical male gender role. **Discuss** the development of this stereotype, and how it may be reinforced on a daily basis. In your discussion, you might want to consider if this role is as prevalent in your generation as it has been in previous generations.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 11.2
- **Video**
  Gender and sex
- **Challenge**
  Worksheet: 11.2
  Gender roles
- **Weblink**
  Describing gender

11.3 Biological theories of gender role formation

KEY IDEAS

In this section, you will learn about:

- the biological approach to gender roles
- evolutionary psychology
- biological differences.

In the previous section, the differences between gender and biological sex were identified. Despite society beginning to recognise that gender and sex are different, psychologists are still seeking answers to the way that gender roles are developed. This section will review the **biological theories of gender role formation**.

biological theories of gender role formation overarching theory that an individual's gender is predetermined by their biological sex: their genitals and reproductive organs

The biological theories of gender role formation offer several explanations for how children develop their gender identity and gender role. Each approach is based on the assumption that biological sex will influence and determine the gender role that an individual acquires. The biological theories do not differentiate between sex and gender. According to the theories, if you are born with female chromosomes and reproductive organs, your gender will be female; likewise if you are born with male chromosomes and reproductive organs, your gender will be male. In biological theories, gender is always the same as biological sex, and any gendered behaviour will be a result of an individual's hormones and chromosomes.

Evolutionary psychology

Evolutionary psychology attempts to explain and justify human behaviour on the basis of natural selection and what gave humans an advantage as a species. In this sense, an evolutionary explanation for gender roles is that natural selection required males and females to possess different biological and psychological traits to increase human reproduction, and continue the survival of the human race.

According to evolutionary psychology, stereotypically male traits, such as aggression and competitiveness, evolved because this increased the likelihood of a male attracting a female partner and, as a result, the likelihood of being able to reproduce. Evolutionary psychology also theorises that women evolved to be more nurturing so that they were able to attract a partner who was able to protect the family by being aggressive and competitive, leaving women with time to raise children. When humans were living in hunter-gatherer societies, being able to protect and defend each other was of great importance.

FIGURE 1 Knowledge about human evolution is based on assumptions. This drawing could make people assume that men were hunters.

Theorising about human evolution requires assuming that people evolved to live a certain way because it provided survival advantages at the time. The evolutionary theory offers an explanation as to why people developed to have these traits, but it does not offer an explanation for why these gender roles are still formed and maintained. The theory has also been criticised because it does not state that these differences were genetically determined, rather that society has evolved this way as a result of the pressures each gender experiences.

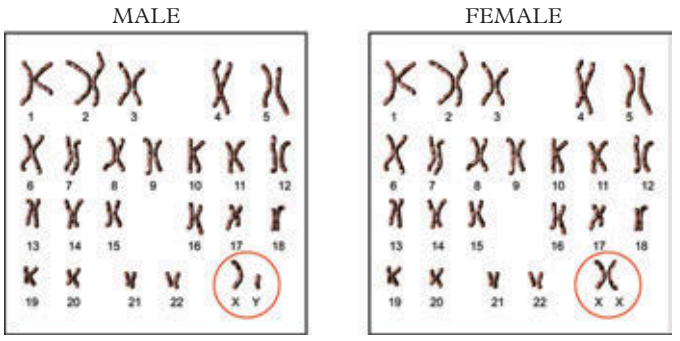


FIGURE 2 This is the female and male chomosome karyotype. Sex is determined as Male XY or Female XX.

Biological differences

Males and females have biological differences. For example, men typically possess greater physical strength than women. Sex is determined by biological make-up; males have the chromosomal structure XY and women XX. Intersex is when an individual is born with a different XY pattern, which may include XXY or differences on the X and Y chromosomes.

During foetal development, sex hormones are released, and it is the presence of androgens (male sex hormones) that will determine if an embryo will develop male or female genitalia and male or female reproductive organs.

Theories that are based on biological differences assume that if a child is born with male genitalia, he will take on masculine gender roles.

Theory of psychosexual differentiation

theory of psychosexual differentiation
a biological theory of gender role formation that focuses on the way testosterone affects the brain to determine masculinity

The **theory of psychosexual differentiation** is a biological theory of gender role formation. This theory states that testosterone affects the brain to develop masculinity. It also states that humans are born with an innate instinct to identify as male or female, and that this is determined by the presence of testosterone.

This suggests that prenatal hormones are the main influences for gender identity, and that socialisation is secondary to this.

Biosocial theory

biosocial theory
a biological theory that states that gender roles are developed as a result of interaction between biological sex and socialisation

intersex
an individual who is born with both male and female, or ambiguous, genitals and reproductive organs

In 1972, Money and Ehrhardt developed the **biosocial theory**, which was based on a study that suggested that the development of gender roles was the result of interaction between socialisation and biological factors. This theory states that when a child is born, they are gender neutral, and that their socialisation will be based around the genitalia they show.

This theory was developed after Money and Ehrhardt observed **intersex** people (those born with both or ambiguous genitalia). By observing intersex people, Money and Ehrhardt determined that children born intersex could have surgery to assign them a biological sex, and that they would then grow up to assume the sex they were biologically given through surgery.

When this theory was introduced it was very popular and drew great public interest. However, over time, concerns were raised and it was acknowledged that there was more to gender than the genitals and reproductive organs that people had. Case study 11.3A illustrates the potential issues.

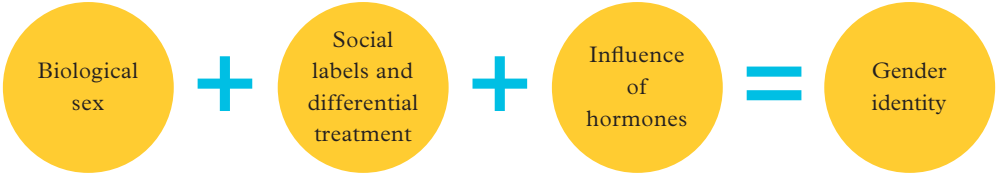


FIGURE 3 Interactions between biological sex and social labels are the basis of biosocial theory.

CASE STUDY 11.3A

Bruce, Brenda, David?

At the peak of Money and Ehrhardt's research and theory, a couple gave birth to twin boys: Brian and Bruce. The boys developed a urinary difficulty that was to be corrected with circumcision. During the circumcision, Bruce suffered irreversible damage to his penis. Based on Money and Ehrhardt's theory, his parents consented to gender reassignment surgery, and began to raise Bruce as Brenda.

Brenda never identified as a girl, and always felt strange wearing frilly dresses and playing with dolls. At the age of 14, Brenda's parents revealed that she was born male. After learning this, Brenda chose to assume the identity of a boy, David.

David underwent gender reassignment surgery (now sex reassignment surgery) again, and took hormone replacements. Despite marrying and becoming an adoptive father, and living a relatively normal life, David later died by suicide.

David's lived experience is highly relevant to the discussion about gender and sex, including children who are born intersex. Prior to David's death by suicide, he gave interviews about his life in the hope that no other child would have to go through what he went through. New research recommends enabling intersex children time to form a gender identity prior to any surgical or hormonal interventions.

Biological theories also suggest that males and females are born with innate psychological abilities. Prior to puberty, boys and girls typically have similar levels of the same hormones. At the onset of puberty, these levels change, with boys experiencing an increase in androgens, and girls experiencing an increase in oestrogens (female hormones). These physiological changes have been implicated in male and female cognition. For example, males typically possess increased visuospatial awareness, while women often display increased language ability.

A study by Shaywtiz and colleagues (1995) demonstrated that women tended to use both sides of their brains for language, whereas men tended to just use the left. However, more recent research by Sommer and colleagues (2004) suggests that there is no significant difference in brain usage between males and females.

Related research by Van Goozen and colleagues (1995) demonstrated that when transgender men (female at birth) undergo male hormone replacement therapy, they experience an increase in male mental abilities, including an increase in visuospatial awareness and an increase in aggression. More recent research examining the effects of exogenous testosterone on multiple mental health indicators in female-to-male (FTM) transgender people replicated this spatial intelligence finding: spatial performance substantially increased over time for the FTM transgender people compared to the controls (Colton Meier, 2012). Overall, Colton Meier showed that FTM transgender people were psychologically healthier after undergoing three months of exogenous testosterone treatment, with effects maintained one year later.

The biological approach offers an understanding of the traits that each gender possesses that can be attributed to hormonal and chromosomal influence on gender. As can be seen in each of the theories that this chapter discusses on gender role formation, the biological approach offers an explanation for why men and women display certain behaviours and differences, though it doesn't offer an explanation for the maintenance of these gender roles.

FIGURE 4 Studies have shown that an increase in male hormones, such as testosterone, can cause an increase in visuospatial awareness and aggression – typically masculine traits.

Study tip

As you think about gender role formation, remember that the ideas presented here are theories. You should be mindful of this as you continue your study of psychology.

CASE STUDY 11.3B

Competing in sports

Most sporting bodies have separate divisions for men and women on the basis of physiological differences, specifically because men typically possess increased physical strength compared with women.

Over the past century, there have been several instances where females who are intersex or have hyperandrogenism have been involved in sporting controversies.

Hannah Mouncey was born male, and played sports competitively including handball and AFL, before undergoing sex reassignment surgery. Hannah possesses higher levels of testosterone than other female AFL players, though this is still within the limits set by the AFLW (Australian Football League Women's). Despite this, Mouncey was deemed ineligible to play AFWL, but still permitted to play VWFL (Victorian Women's Football League). Mouncey is tall by any standards, and at 6 feet, 2 inches (1.88m); her body muscle mass is also high compared to many female players.

FIGURE 5 Hannah Mouncey has been restricted from playing in certain sports leagues due to their gender assignment.

Mouncey's experiences with the AFLW have echoed past experiences of athletes who are transgender, intersex, hyperandrogenous or in some other way possess increased male hormones. Women who possess increased levels of male hormones, such as testosterone, are not guaranteed to win against other women. However, there is much debate about whether these athletes possess superior strength, speed or endurance, and the impact of this advantage on competition.

CHECK YOUR LEARNING 11.3

Describe and explain

1 In your own words, **describe** the biological theories of gender role formation.

2 **Explain** the evolutionary approach to gender role formation.

Apply, analyse and interpret

3 **Compare** the biosocial approach with the theory of psychosexual differentiation.

4 **Consider** the role of hormones and chromosomes in gender role formation.

Investigate, evaluate and communicate

5 Consider Case study 11.3a. **Evaluate** the biological theory of gender role formation with reference to this study.

6 Read Case study 11.3b. Using evidence, **explore** the inclusion of intersex, transgender and hyperandrogenous women in women's sport.

obook assess

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 11.3
- **Increase your knowledge**
  Gender and sports
- **Weblink**
  Biological sex and gender role formation

11.4 Cognitive theories of gender role formation

KEY IDEAS

In this section, you will learn about:

- Kohlberg's cognitive theory of gender
- the gender schema theory.

Cognitive psychologists seek to understand the relationship between our thought processes and the behaviour that we present. Unit 1 Psychology covered some of the different theories of cognitive development. This section will consider Kohlberg's cognitive developmental theory and how this relates to gender role formation. Kohlberg's theory poses that children's gender understanding increases with age, and, as a result of this, so does their gender identity. We will also discuss gender schema theory.

Kohlberg's cognitive theory of gender

gender identity achieved around 2–3 years of age, where a child recognises and labels themselves as a boy or a girl

gender stability achieved around 3–4 years of age, where a child realises that their sex will not change over time

gender constancy achieved at the age of 5, where children realise that sex is a fixed state that will not change; they also realise that if someone's appearance or behaviour changes, this does not make them a member of the opposite sex

Kohlberg's theory states that children go through three stages: **gender identity**, **gender stability** and **gender constancy**.

Gender identity

According to Kohlberg's theory, children will begin to think about gender as soon as cognition begins. Around 2–3 years of age, children are typically able to understand if they are male or female and will actively try to guess the sex of other people. Despite understanding if they are male or female, children will not understand what makes them that sex, and instead they associate each gender/sex with certain behaviours or attributes. For example, children may associate being female with wearing dresses.

Further, children at this stage are also unable to understand that their sex will not change, and has not changed since birth. They are unlikely to realise that they were always this sex, and a boy may believe that he was once a girl and that he could be a girl again in the future. This should not be mistaken for confusion about gender identity; rather, it is the limits of a child's understanding at this age. Children at this stage will also not realise that their biological sex is determined by genitals. For this reason they may assume that if a man is wearing a dress he is a girl, despite having other clues that would suggest otherwise, such as name or having a beard.

FIGURE 1 Children in stage two of Kohlberg's theory would assume that this is a girl.

Gender stability

During this stage, children begin to understand that their sex will not change over time (generally between 3 and 4 years of age). While children may understand that their sex won't change over time, they are unable to apply this to others.

Much like gender identity, a child may assume that because their mother suddenly dresses like their father, their mother is now a man.

In this stage, children don't fully grasp the difference between sex and gender, and as a result are unable to maintain gender stability: the understanding that someone's sex is unlikely to change over time. During this stage children will realise that if all of their circumstances stay the same, their sex will too, but they will also believe that if their circumstances change, their sex could also change.

Gender constancy

Around the age of 5, children enter the final stage of Kohlberg's theory, gender constancy. Children will realise and understand that sex is constant over time for all people, not just themselves. They will identify as male or female by their genitals and they may even want to see others' genitals to confirm if that person is a girl or a boy.

At this stage, children also realise that just because someone changes their appearance to be more feminine or masculine, this doesn't mean that their sex will change. They are also able to acknowledge that just because a girl doesn't act like other girls, this doesn't make her a boy or not a girl.

FIGURE 2 A child in stage three of Kohlberg's theory would be able to recognise that this boy is still a boy, despite playing with a stereotypically female toy.

Gender schema theory

gender schema
a mental representation of what it is to be male or what it is to be female, typically based on stereotypes

gender schema theory
a theory of gender role formation that people build over time that provides information about how a male or female should behave

gender scripts
gender roles and behaviours that children come to consider as normal, based on their observations of everyday life

People use schemas to create mental representations of an idea or a belief; this can make life easier. A **gender schema** is a mental representation of each gender, often based on gender stereotypes or preconceived ideas about what each gender is responsible for within society.

Gender schema theory assumes that cognitive processes influence gender role formation. As soon as children reach Kohlberg's gender identity stage, between 2 and 3 years of age, gender schema theory states that children will start to seek gender information. Once a child realises that they fit into a group as a boy or a girl, they will want to know more about the group that they have identified with. A boy will seek out information about being a man, and a girl will seek out information about being a woman.

When a child finds information about their group, they will form a schema. The schema that a child forms is usually quite basic, but also becomes the foundation that they will continue to build on throughout life. For example, it may include ideas that girls should play with dolls and wear dresses, and that boys should play with cars and wear pants.

Children will also build **gender scripts** for each gender. These scripts will help children decide how they should behave and predict how someone else will behave. These scripts are usually based on things that children see in their daily lives. For example, if a child sees their mother going to work each day, they may assume that women go to work, and they will build their script around this; alternatively, if a child witnesses their mother cooking each day and looking after their home, the child may assume that women are supposed to take care of the home and will

build this into their script. In this sense, the stereotypes that children are exposed to will influence their gender scripts too.

Once a child has a script, they will focus on things that connect to their gender, and lose interest in things that, according to their script, do not fit their gender. As these scripts and schemas build they become less malleable; children will attend to and remember anything that matches their schema, and ignore anything that contradicts it.

Gender schema theory offers an explanation for why gender roles are stable within society and why they rarely change after middle childhood. Gender schema theory also recognises that children are not passive in their gender identity. It also has a large focus on the individual, and neglects to focus on the social and cultural factors that influence gender role formation.

FIGURE 3 Gender scripts like this can help children determine how they should behave. For example, when referring to this script, a young girl may believe that she should not play cricket, be interested in mathematics or play video games – these are not necessarily correct, but they help her form her identity.

CHALLENGE 11.4

Write a new gender script

As a child you are likely to have created a gender scripts to you help you decide how you were meant to interact with others and to help you predict the behaviour of others. As a young adult the gender script you created as a child will have changed. Write a brief gender script for males. Consider if this has changed since you were a child, and if you think it will change as you get older.

CHECK YOUR LEARNING 11.4

Describe and explain

1 **Summarise** gender schema theory.
2 **Use** an example to **explain** what a gender script is.
3 **Summarise** Kohlberg's cognitive development theory.
4 **Identify** and **describe** each of Kohlberg's stages.

Apply, analyse and interpret

5 **Consider** the role of stereotypes on gender scripts.
6 **Compare** Kohlberg's theory with gender schema theory.

Investigate, evaluate and communicate

7 Think about the beliefs that you hold about gender roles. **Evaluate** the role of gender schemas on your beliefs.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 11.4

» **Challenge**
Worksheet: 11.4
Write a new gender script

» **Weblink**
Kohlberg's cognitive theory of gender

» **Weblink**
Gender schema theory

11.5 Social learning theory of gender role formation

KEY IDEAS

In this section, you will learn about:

- the social learning theory of gender role formation
- vicarious reward and vicarious punishment for gendered behaviour.

Chapter 10 introduced the social learning theory proposed by Albert Bandura in the 1970s. Social learning theory suggests that people develop their identity and develop who they are by vicarious learning and modelling. When applied to gender role formation, social learning theory states that children learn how to behave by watching their parents and other people, and that they are affected by the differential treatment received by boys and girls.

In general, people are more likely to pay attention to people who are the same sex as them, attractive, successful or who have a similar or higher social status. Children are also influenced by these factors and will learn vicariously through people who meet these criteria. For this reason, girls are more likely to copy their mothers, and boys copy their fathers. As children grow and mature, they will be exposed to further role models such as teachers, friends and the media, which could include famous celebrities or sports stars. Children will continue to model their behaviour on these people, assuming gender roles and behaviour that is presented to them.

Social learning theory of gender role formation is based on the assumption that there are no innate psychological differences between the sexes, and that any gendered behaviour is learnt as a child through socialisation. This socialisation means that children will adopt the gendered behaviour that is appropriate to their gender based on what they witness in their culture or society.

FIGURE 1 Social learning theory suggests that a young boy may learn to love watching sports or cooking, depending on the behaviours and attitudes of key male role models such as his father. These behaviours are not influenced by sex or gender norms, but through looking up to someone an individual identifies with.

Social learning theory

vicarious reward when a child observes a behaviour being rewarded

Children may witness people of the same sex as them receiving a reward (**vicarious reward**) for behaving in a gender-appropriate manner. For example, a girl may witness her mother

being told how lovely she looks in a skirt; the same girl could witness her sister being told that she shouldn't want to play football, an example of **vicarious punishment**. Through vicarious learning, the girl could learn that women get rewarded for wearing skirts, and punished for wanting to participate in stereotypically male behaviour. Alternatively, a boy may see his friend crying and being told, 'boys don't cry', which could lead the boy to learn that society doesn't think he should cry.

vicarious punishment when a child observes a behaviour being punished

Cultural and societal stereotypes and expectations vary between countries, and also over time. Blue was once thought to be a feminine colour and pink masculine; today, this is not the case.

These beliefs about behaviour and stereotypes will lead to a child modelling what they think is appropriate for their gender, or sex. In a study by Fagot (1985), it was found that children were more critical of their peers when male children displayed female behaviours and when female children displayed male behaviours. The children could become 'gender police' for each other, and tell each other how they should behave (Fagot, 1985). The study also found that while girls could be influenced by teachers and other girls, boys were most likely to be influenced by other boys. A study by Eccles (1987) found that the praise that teachers would give students was largely influenced by the gender of the student. Girls were more likely to be praised for their obedience and being tidy, while boys were more likely to be praised for their academic achievements. This was thought to stem from society's belief that boys tend to be more mathematical (Eccles, 1987).

The benefits of looking at gender through social learning theory are that it acknowledges the influence of social and culture factors and how these can shape gender roles. However, despite this being positive, social learning theory does not offer any explanation for the variation in conformity to gender roles and gender stereotypes; women do not always adopt stereotypically female behaviours and men also do not always conform to what society expects as male behaviour. Social learning theory suggests that gender is passively acquired, which research has demonstrated is not the case. Research shows that children actively participate in their socialisation.

FIGURE 2 Today, people would automatically assume that the pink shoes belong to a girl, and the blue to a boy, but this was not always the case. Blue was once considered to be a feminine colour and pink once a masculine colour.

CHECK YOUR LEARNING 11.5

Describe and explain

1 **Describe** social learning theory with reference to gender.

2 **Explain** how children learn gender roles through vicarious learning and modelling.

Apply, analyse and interpret

3 **Discuss** the limitations of social learning theory and gender.

Investigate, evaluate and communicate

4 **Assess** how children are influenced by stereotypes in society.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 11.5
- **» Increase your knowledge**
  Vicarious learning
- **» Weblink**
  Social learning theory and gender

11.6 Group social influence

KEY IDEAS

In this section, you will learn about:

- Herbert Kelman's social influence theory
- compliance, identification and internalisation.

Section 11.1 of this chapter introduced the way that people are influenced by their social networks through primary and secondary socialisation. In this section, the concept of group social influence will be introduced, and Herbert Kelman's (1958) social influence theory will be summarised.

Have you ever said that you agreed with an attitude or an idea, even though you don't? Perhaps your best friend goes for the Broncos, and around them you say you do too, but when you're at home with your family you barrack for the Cowboys, because you've gone for them for as long as you can remember. Perhaps you've even started to barrack for the Broncos. But have you wondered why you are able to say one thing and believe another?

People have a need to be right and a need to be liked by society. If an individual is able to meet both these needs simultaneously, this will make the person feel better.

Social influence theory

social influence theory suggests people's are more likely to change their attitudes, beliefs or behaviours because of compliance, identification or internalisation

compliance a change in people's attitudes publicly, but not privately, so that they are more likeable in their group

identification a change in people's attitude and behaviour because they are influenced by someone and relate to the content of the attitude

internalisation a change in people's attitude and behaviour because they have taken on a new attitude and have taken this into their belief system

During the 1950s in the United States, racial segregation was a strong political and social concern. Because of the social pressures, many psychologists began to investigate how attitudes were formed and maintained and how they could be changed. Herbert Kelman was interested in the changing of attitudes on the basis of group influence. In 1958 he presented his social influence theory. **Social influence theory** poses that the attitudes and beliefs of someone, and the behaviours that express these attitudes, are influenced by the people who an individual associates with including family, friends, colleagues and their wider society. Social influence theory identifies three processes that an individual can go through to achieve attitude change: **compliance**, **identification** and **internalisation**.

Compliance

When people demonstrate compliance, they present themselves as agreeing with the attitudes or beliefs of others, and keep any contradictory attitudes or beliefs to themselves. People are likely to engage in compliant behaviour or attitudes because it is likely that their social networks will like them and they may gain social benefits.

Identification

When we identify with someone, we are likely to be influenced by them. Think about an advertisements you have seen on television. Often, they will feature someone famous endorsing a product. A classic Australian example is the Nutri-Grain Iron Man advertisements. These advertisements use Iron Man champions to encourage viewers that they too could be the same. These campaigns use the identification idea – that people will be influenced by someone who is liked and respected. This can be a friend, teacher or relative but can also be a famous celebrity or sports star.

People are likely to get satisfaction or reward from the act of conforming, rather than from the attitude that they are conforming to.

SUGGESTED RESEARCH

11.6 The influence of social media in adolescent-peer relationships
Go to your obook assess »

FIGURE 1 Nutri-Grain cereal has been heavily involved in Iron Man competitions. The Iron Man competitors are influential over young women and men.

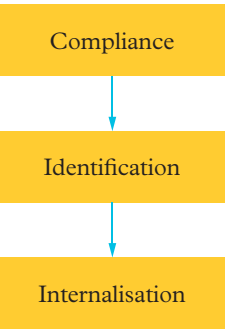


FIGURE 2 Social influence theory states that people must first comply with an attitude, then identify with the attitude, and finally they internalise the attitude.

Internalisation

When a belief or attitude is accepted by a person and their behaviour reflects this, an attitude is said to be internalised. When someone has internalised an attitude, they will experience this both privately and in public. Using the rugby example from earlier, when someone has actually changed their belief to think the Broncos are the best team, they will support them both around friends but also when they are alone and there is no one to impress.

When people internalise a belief or attitude, they are likely to be rewarded by the actual belief they have adopted. They are no longer being rewarded by social benefits.

CHALLENGE 11.6

Social influence theory

People are influenced by those around them. Consider social influence theory, and apply it to a belief or attitude you possess. Determine where this attitude or belief came from and how those around you encouraged or discouraged it.

CHECK YOUR LEARNING 11.6

Describe and explain

1 **Explain** what the following terms mean:
   - **a** compliance
   - **b** identification
   - **c** internalisation

2 **Summarise** Kelman's social influence theory.

Apply, analyse and interpret

3 **Compare** internalisation and compliance.

Investigate, evaluate and communicate

4 **Evaluate** social influence theory as a means for gender role formation.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 11.6
- **» Suggested research**
  11.6 The influence of social media
- **» Challenge**
  Worksheet: 11.6 Social influence theory

CHAPTER 11

Review

Summary

11.1
- Socialisation is the process by which people learn the beliefs, customs and appropriate ways of behaving within a particular group or society.
- Primary socialisation occurs during the early stages of life and is typically learnt from primary caregivers such as parents and close family members.
- Secondary socialisation occurs from early childhood into adulthood as children learn from teachers, extended family and friends, and from media sources.
- An agent refers to a person or group that facilitates socialisation, such as a family group, peers, school or the media.

11.2
- Gender is a socially constructed idea of what males and females are, whereas sex is biologically determined and expressed though genitals and reproductive organs.

11.3
- Evolutionary psychologists suggest that natural selection requires males and females to have different biological and psychological traits to ensure reproduction and survival.
- Biological difference theories suggest that male and female gender roles are taken on by males and females due to chromosomal and hormonal differences.
- Theory of psychosexual differentiation suggests that testosterone affects the brain to determine sexuality and hormones, rather than socialisation as the primary factor in gender identity development.
- Money and Ehrhardt's (1972) biosocial theory suggests that gender roles develop through the interaction of socialisation and biological factors and that people are born gender neutral.

11.4
- Kohlberg's cognitive theory of gender states that children pass through three stages of gender development: gender identity (2-to-3 years of age), gender stability (3-to-4 years of age) and gender constancy (5 years of age).
- Gender schema theory refers to how gender roles form over time and provides information on how males and females should behave.
- Gender scripts refer to the scripts children build about how males and females should act, based on their observations of how males and females act in their daily lives.

11.5
- Social learning theory suggests that people learn gender roles through the observation of the behaviour of others.
- Vicarious learning of gender roles occurs when children see a person of the same sex as them being rewarded for behaving in a specific way, and being punished for behaving in another.
- Vicarious reward occurs when children observe people of the same sex as them being rewarded for engaging in certain behaviours.
- Vicarious punishment occurs when children observe people of the same sex as them being punished for engaging in certain behaviours.

11.6
- Kelman's (1958) social influence theory suggests three conditions under which people are more likely to change attitudes, beliefs and behaviours: compliance, identification and internalisation.

Key terms

- agent
- biological theories of gender role information
- biosocial theory
- compliance
- gender
- gender constancy
- gender identity
- gender schema
- gender schema theory
- gender script
- gender stability
- identification
- internalisation
- intersex
- modelling
- primary socialisation
- secondary socialisation
- sex
- social influence theory
- socialisation
- theory of psychosexual differentiation
- vicarious learning
- vicarious punishment
- vicarious reward

Revision questions

The relative difficulty of the short answer questions is indicated by the number of stars beside each question number: ★ = low, ★★ = medium, ★★★ = high.

Multiple choice

1 What does vicarious learning relate to?

A biosocial learning theory – when children observe a behaviour of a person of the opposite sex being rewarded or punished

B Kohlberg's cognitive theory – when children learn appropriate ways to behave and look based on observing how members of the same sex behave and look

C social learning theory – when children observe a behaviour of a person of the opposite sex being rewarded or punished

D social influence theory – when children observe a behaviour of a person of the opposite sex being rewarded or punished

2 What does primary socialisation refer to?

A socialisation by family

B socialisation in primary school

C socialisation by teachers and peers

D socialisation by media and schooling agents

3 Which of the following statements best describes socialisation?

A It only occurs during direct contact with other people.

B It is the process of learning how to fit into society outside the immediate family circle.

C It is a continuing process of learning social beliefs, customs and behaviours, occurring within both primary and secondary social environments.

D It is the process by which children learn acceptable ways of behaving within certain groups and societies.

4 Gender is _____ determined, whereas sex is _____ determined:

A biologically; socially

B biosocially; biologically

C socially; biologically

D socially; culturally

5 What is one strength of biological approaches to gender?

A It offers an explanation of how gender roles are maintained.

B It offers an explanation of the influence of chromosomes and hormones on gender traits.

C It offers an explanation on how gender roles are formed and maintained.

D It offers an explanation of why gender roles are stable and rarely change in middle childhood.

6 A public change in attitudes and beliefs that does not hold in private is known as:

A identification.

B vicarious learning.

C compliance.

D internalisation.

7 Which of the following concepts is *not* a stage in Kohlberg's cognitive theory of gender?

A gender identity

B gender normality

C gender stability

D gender constancy

8 Julia sees her mother going to work every day and assumes that her friends' mothers also go to work every day. What is this an example of?

A gender scripting

B gender schematics

C gender theory

D gender roles

9 Psychosexual differentiation theory suggests:

A gender roles form through interaction between biological sex and psychology.

B gender roles form through interaction between biological sex and socialisation.

C gender roles form through the effects the male hormone has on the brain.

D gender roles form through the effects of psychological and genetic influences.

10 What are gender schemas?

A when a person identifies with someone and then is more likely to be influenced by them

B mental representations of each gender, based on stereotypes or preconceived ideas

C vicarious learning experiences, where a person learns to behave in a certain way based on the rewards or punishment that they see another person receive

D the process of learning the beliefs, customs and appropriate behaviours of a group

Short answer

Describe and explain

★ 11 **Define** gender and sex, clearly outlining the differences between them.

★ 12 **Explain** what is meant by the term gender schema.

★★ 13 **Explain** how the social and cultural expectations of children can be influenced by the media, including a definition of secondary socialisation.

★★ 14 **Explain** what vicarious reward refers to in social learning theory as related to gender, providing an example from a male and female perspective.

★★★ 15 **Describe** how primary and secondary socialisation contribute to the way people form ideas about gender. **Use** a particular theory of gender role formation to develop your argument.

Apply, analyse and interpret

★ 16 Leroy spent most of his childhood going hunting with his father and grandfather. Leroy has just turned 15 and has discovered that his friends at school do not approve of hunting. Leroy has decided that he will become a vegetarian and will no longer go on trips with his father.

a **Identify** the agents in Leroy's life.

b **Apply** your understanding of primary and secondary socialisation to Leroy's life. **Determine** what kind of socialisation has changed Leroy's attitude and why this has occurred.

★★ 17 **Compare** the strengths and limitations of social learning theories and biological theories of gender role formation.

★★ 18 Talia is 3 years old and she has a younger brother, Graham, who is 2. Talia never wanted

a brother, so she continually dresses Graham up in her princess costumes, and makes him play with her and her dolls. Talia is convinced that if she dresses Graham in girl's clothing Graham will not be a boy. **Determine** what stage of Kohlberg's theory Talia is in.

★★★ **19** **Consider** how the psychosexual differentiation theory might explain transgender or intersex individuals.

★★★ **20** **Summarise** the theoryof evolutionary psychology in relation to gender, and **differentiate** between it and biological differences theory.

Investigate, evaluate and communicate

★ **21** **Select** one of the three processes identified by Kelman that explains how people can achieve attitude change. **Evaluate** the process and explain how it can have a positive influence on changing a racist attitude.

★ **22** Write a brief essay to **appraise** the way you were socialised as a child by your parents and later as a teenager by your friends. In your response consider:

- the beliefs that you had as a child, versus the beliefs you have now
- the beliefs your parents have, and the beliefs that your friends have
- the school you go to, and if this has shaped your beliefs.

★★ **23** Brian enjoys going to the ballet. When his wife asks him to attend the latest production of *Swan Lake* when out to dinner with a group of friends, Brian laughs and says no – he'd prefer to go to the football game that's on the same night. **Propose** why Brian reacted this way, based on social influence theory.

★★ **24** **Use** the different theories of gender role formation to **evaluate** the following claim: 'Gender is determined through your biological sex'.

★★★ **25** **Investigate** the history of male and female gender stereotypes. Based on your understanding **discuss** how socialisation influences these, alongside the theories of gender role development.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 11 Review
- **» Revision notes**
  Revision notes for Chapter 11
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 11

CHAPTER 12

Status & power in groups

Humans are social creatures. We live in and belong to many groups: families, tribes, villages, sports teams and peer groups.

All sorts of people have some influence over us. The most important influences in our lives are family and friends. They teach us, depend on us, take care of us, help us and love us. If we live alongside and interact with other people it stands to reason that they also have a major influence on the way we behave.

This chapter looks at the certain ways our behaviour is influenced by others: the power they have over us; the ways in which they lead or manage us; and our tendencies to obey or disobey, conform or resist.

OBJECTIVES

→ Deduce how status and power operate in groups, with reference to the Stanford Prison experiment (Haney, Banks & Zimbardo 1973)

→ Predict how obedience, conformity and social norms (Robert Cialdini *et al.* 2006) lead to behaviour change

→ Evaluate historical social psychological research, with reference to studies conducted by Stanley Milgram (1963) and Solomon Asch (1951).

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

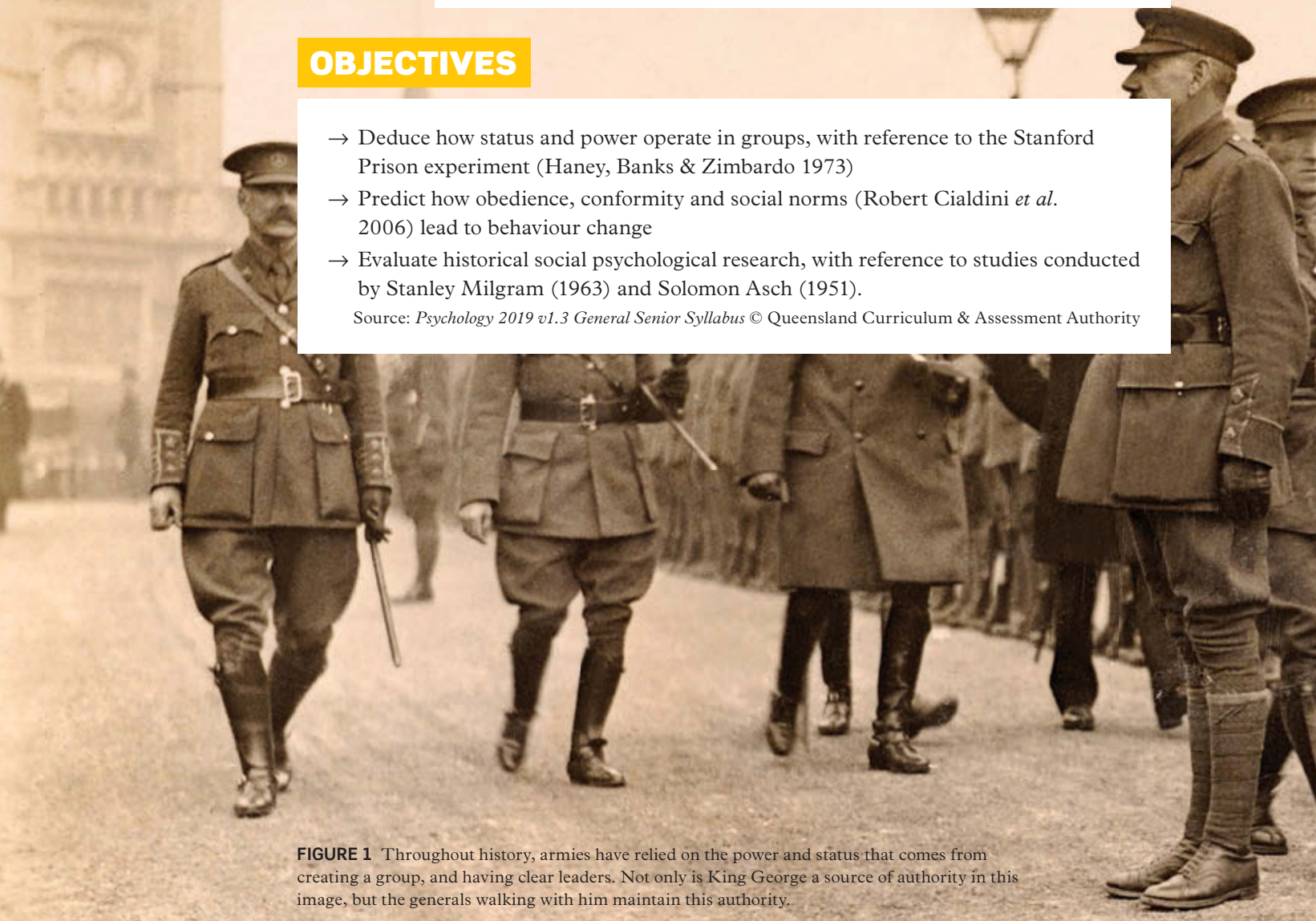


FIGURE 1 Throughout history, armies have relied on the power and status that comes from creating a group, and having clear leaders. Not only is King George a source of authority in this image, but the generals walking with him maintain this authority.

SUGGESTED RESEARCH

SUGGESTED RESEARCH	**12.3** Obedience (e.g. the 'Shock the puppy' experiment in Sheridan & Kind 1972)
SUGGESTED RESEARCH	**12.3** Obedience and the authority gradient (e.g. the 'Hospital' experiment in Holfing *et al.* 1966)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

12.1 Groups and power

KEY IDEAS

In this section, you will learn about:

+ what constitutes a group: size, interaction, influence and purpose
+ power within groups and styles of leadership.

Consider the following scenarios and decide which of these describes a group:

1 Twenty people are travelling on a bus towards the Gold Coast.
2 Three people are sharing a taxi to the airport.
3 Two people are playing chess.
4 The Broncos' cheer squad is making the banner for next week's game.
5 Twenty people attend a school reunion.
6 More than 35 000 Cowboys supporters attend the opening game of the season.

group
two or more people who interact over a period of time, have influence on each other and share a common goal

There needs to be a certain set of rules to help us define a **group**:

- A group consists of two or more people.
- Individuals in the group must interact with each other over a period of time.
- Individuals in a group must influence each other.
- Members of a group must have a common purpose.

We can decide whether the six scenarios above represent groups by completing a table such as Table 1.

TABLE 1 Examples of groups

Scenario	Number	Interaction	Influence	Common purpose	Group or non-group
1	Yes	Slight	No	Slight	Non-group
2	Yes	Yes	Yes	Yes	Group
3	Yes	Yes	Yes	Yes	Group
4	Yes	Yes	Yes	Yes	Group
5	Yes	Yes	Yes	Yes	Group
6	Yes	Slight	Slight	Yes	Non-group

CHALLENGE 12.1

What makes a group?

You are part of many groups: your school year level, any sports teams that you play in, any clubs that you are part of, your family group, your friendship group, etc. Certain groups are innate, such as your family, and the sources of power within these groups are typically innate too. Other groups, such as your friendship group, are more diverse and the sources of power in these are not predetermined.

Select a group that you belong to and decide what makes it a group, and then identify any sources of power within that group.

Power within groups

A person is said to have **power** over another if there is a reasonable expectation that the second person will behave in the way the first person desires, even against the second person's own wishes. For example, a motor mechanic has power over a customer with little mechanical knowledge. However, the employer has power over the mechanic, who needs the job to remain employed.

FIGURE 1 Motor mechanics have a type of 'expert' power over their customers due to the skills and knowledge they possess.

Sources of power

Where does power come from? Social psychologists have identified six sources of power, as shown in Table 2.

TABLE 2 Types of power and their sources

Type of power	Source of power	Example
Reward power	Ability to provide a desired response	Teacher can allow students to leave early
Coercive power	Ability to provide an unpleasant response	Teacher can detain students
Information power	Having knowledge that others desire	Librarian knows where all information is filed
Legitimate power	Power is given by a higher authority and may be due to role or position	Police officer or coach of sports team has authority
Expert power	Power is due to skills and depth of knowledge	Doctor or motor mechanic has specific knowledge
Referent power	Power from another's desire to relate to the person	Sports star or a good friend is admired

power
a person has power if they can influence the thoughts or behaviour of others

In addition to the types of power identified in Table 2, a person's **status** within a group can provide them with a position of power. Status is defined as being the relative standing of a person within a social or professional group.

status
the position of an individual within a group

Styles of leadership

The possession of power is one thing; the ability to provide leadership is quite another. A distinguished experiment investigating leadership style was carried out by Lewin, Lippit and White (1939). Three groups of boys were allocated to groups with an adult leader. The leaders applied one of three different styles of leadership:

- **Democratic**: Tasks were negotiated with the children.
- **Authoritarian**: The leader made all the decisions and controlled the behaviour of the boys.
- **Laissez-faire**: The leader took no part in proceedings.

As predicted, the democratic group was happier and more productive than the other two. The authoritarian group was productive, but only when the leader was actively managing the process. The laissez-faire group was low in productivity and its members were less happy than members of either of the other groups.

Another study, by Blake and Mouton (1964), described a 'managerial grid' with two dimensions: concern for people's wellbeing and concern for productivity. This enabled the researchers to identify five major styles of leadership and management.

democratic
a style of leadership where the leader negotiates decisions with the group

authoritarian
a style of leadership where the leader actively makes all decisions and has control over the group

laissez-faire
a style of leadership where the leader does not actively make any decisions, and lets the group control themselves

FIGURE 2 If you are the captain of a sports team, your coach might have legitimate power, the team's best player might have expert power and the goal scorer might have reward power.

FIGURE 3 Police officers' power is given to them by the state and is an example of legitimate power.

TABLE 3 The five major leadership styles

Leadership style	Description
Country club leadership (low productivity/high wellbeing)	This style shows most concern about the needs and feelings of members of the team. Managers assume that as long as team members are happy and secure then productivity will follow. This creates a work environment that is fun and relaxed, but production suffers because of lack of direction and control.
Authoritarian leadership (high productivity/low wellbeing)	This style is also known as 'produce or perish' leadership. Managers believe that employees are just a means to an end. Employees' needs are less important than the need for an efficient and productive workplace. Authoritarian leaders are very strict, have rigid work rules, policies and procedures, and use coercive power to motivate employees.
Impoverished leadership (low productivity/low wellbeing)	This style is ineffective. Such management results in a workplace that is disorganised, workers who are dissatisfied and a workforce lacking harmony.
Middle-of-the-road leadership (medium productivity/medium wellbeing)	This management style is a balance between the two dimensions. It looks like a good compromise, but in fact neither wellbeing of employees nor productivity is achieved to a satisfactory level. Leaders using this style settle for average performance.
Team leadership (high productivity/high wellbeing)	This is the ideal managerial style that values production needs and the needs of workers equally. It creates a team environment based on trust and respect, which leads to high satisfaction and motivation, and results in high productivity.

CHECK YOUR LEARNING 12.1

Describe and explain

1 **Identify** three features of a group.
2 **Define** what a group is.
3 **Explain** what power is and **compare** this with leadership.
4 **Recall** three different types of power.

Apply, analyse and interpret

5 **Compare** coercive power with legitimate power.
6 **Consider** the difference between expert power and reward power.
7 **Analyse** the five major leadership styles. **Determine** the best style for happy employees.

obook assess

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 12.1

» **Challenge**
Worksheet: 12.1 What makes a group?

» **Increase your knowledge**
Exploring power

12.2 Effects of status and power within groups

KEY IDEAS

In this section, you will learn about:

- Zimbardo's Stanford prison experiment
- ethical concerns and criticisms.

Study tip

When reading any study take notes about the participant selection, methodology and ethics. This will help you find strengths and limitations of the study.

In 1971, one of the most famous experiments in social psychology was performed at Stanford University by Philip Zimbardo and his colleagues (Haney, Banks & Zimbardo, 1973).

To obtain participants for this experiment, an advertisement was placed in the university newspaper offering volunteers US$15 per day (about $120 today in Australian currency). All 70 of those who applied were interviewed and given personality tests. The 24 applicants who showed the highest levels of physical health and mental stability were selected. Eighteen of them were randomly allocated to be either 'prison guards' or 'prisoners'; the remaining six stayed on call to make up numbers if a participant dropped out during the experiment.

Method

Participants

The prison superintendent (high status) was Dr Philip Zimbardo.

The guards (high status) were given military-style uniforms and reflective sunglasses to disguise their individuality and cause them to have fewer inhibitions about the way they behaved (this process is called **deindividuation**), and whistles and batons to emphasise their authority.

deindividuation a sense of anonymity and loss of individuality that comes from being in a situation where individuals can't be identified personally; individuals are more likely to commit antisocial acts

The guards were instructed:

- to impose their will on the prisoners using psychological intimidation
- not to use physical violence on prisoners
- to blindfold prisoners when they needed to leave the prison to use the toilet
- to touch the prisoners with their batons if necessary, but not hit them.

The prisoners (low status) were given short, sack-like smocks to wear, with no underwear; hats made of ladies' stockings to cover their hair; a prison number; and a chain around the ankles, to ensure that they could never forget their status.

The prisoners were instructed:

- to obey all instructions from the guards
- to ask permission to use the toilet, smoke a cigarette or write a letter
- to refer to themselves by their prison number, not their name; together with their garments, this meant that deindividuation applied to the prisoners, with the effect of reducing their sense of self.

The setting

The setting was the basement of the Psychology Department at Stanford University, which had no windows. Cells, 2 by 3 metres in size, opened off a corridor, which was boarded up at each end. Opposite the cells, a cupboard of 60 × 60 × 213 centimetres, tall enough to stand up in, was used as the solitary confinement cell.

Procedure

FIGURE 1 Student volunteers were assigned roles as guards or prisoners in the experiment.

1. In the early hours of a Sunday morning, each prisoner was picked up at his home by genuine police officers, charged, warned of his legal rights, spread-eagled against the police car, searched and handcuffed, often in full view of amazed neighbours.
2. The police car then raced to the Palo Alto police station with sirens at full blast.
3. Each prisoner was taken inside, fingerprinted, blindfolded and left to wait.
4. The prisoners were transported in a prison van to the Stanford University 'jail', where they were interviewed by the 'superintendent' who told them of the serious nature of their offences.
5. The prisoners were stripped naked and sprayed with a de-lousing agent.
6. The prisoners were issued with prison clothing: a smock and a stocking hat.
7. The guards worked 8 hour shifts with three guards in each shift. Prisoners were three to each cell.
8. At 2:30 am on the first night, and several times in each shift afterwards, the prisoners were woken with blasting whistles and shouts to attend roll-call.
9. Guards administered punishments, such as making prisoners do push-ups and perform humiliating acts (e.g., walking like Frankenstein's monster or telling other prisoners 'I love you').

CHALLENGE 12.2

The Stanford prison experiment

Dr. Philip Zimbardo was an active participant in the Stanford prison experiment. Propose two negative effects that this could have had on the results of the study, and suggest a solution to each of these.

You might want to revisit Chapter 1 to answer this challenge.

What happened?

- Everything went smoothly for the first day and night, as all participants adjusted to their roles. On the second day, the prisoners protested and rebelled. The guards quickly stopped the rebellion by spraying freezing carbon dioxide (dry ice) from fire extinguishers on the prisoners.

- The guards then entered each cell, stripped the prisoners of their clothes, removed the beds from the cells and forced the leaders of the rebellion into solitary confinement. From this time on, the level of harassment of the prisoners by the guards increased and psychological abuse intensified.
- One of the cells was now labelled a 'privilege cell', and the prisoners least involved in the rebellion were given their clothes and beds, allowed to wash and clean their teeth, and given special food to eat in front of the other prisoners, who received no food. This resulted in breaking down the solidarity of the prisoner group.
- After a few hours, the guards took some of these 'good' prisoners and exchanged them for 'bad' prisoners, who were put in the 'good' cell, which unsettled all the prisoners who now thought that some of them must be informers. The prisoners became distrustful of each other. This tactic is used by real guards in real prisons to break prisoner solidarity.
- The rebellion produced greater solidarity among the guards, who now saw the prisoners as trouble-makers. The guards now even refused to allow prisoners to go to the toilet, making them use a bucket in their cell and sometimes even refusing to allow them to empty the bucket.
- When one prisoner began to suffer severe emotional distress less than 36 hours into the experiment, the warden and superintendent would not let him leave. Eventually he became so distressed that they realised that they had gone too far with the 'reality' of the prison and allowed him to withdraw.

FIGURE 2 The Stanford prison experiment became so real for participants that it had to be terminated prematurely due to emotional distress.

- Over the next two days, two more prisoners were similarly released. One was so emotionally distressed that he developed a psychosomatic rash over his whole body.
- On day 3, friends and relatives of the prisoners were allowed to visit, so the cells were cleaned and polished, and the prisoners were showered, shaved and well fed to create a good impression. Some of the parents complained, but none insisted that their son should be released.
- Next, there was a rumour of an attempt to escape. This never happened, but the guards were so angered by the inconvenience they suffered that they increased the abuse further, making prisoners clean out toilets with their bare hands.
- By day 5, the guards had fallen into three categories; about one-third in each:
  - tough but fair guards who followed prison rules
  - good guys who did little favours for the prisoners and never punished them
  - aggressive and cruel guards who thought of creative ways to humiliate prisoners.
- On day 6, the project was abandoned, less than halfway through the proposed 14-day experiment. This occurred for two reasons:
  - Zimbardo and his colleagues realised, through watching closed-circuit television footage, that the guards were increasing their abuse of prisoners during the night when they thought no one was watching.
  - Christina Maslach, a recent doctoral graduate from Stanford who was dating Phillip Zimbardo at the time, came to the 'prison'. She took one look at the degraded prisoners and soundly abused Zimbardo, even telling him that if this was a true indication of the sort of person he was, there would be no hope for their relationship. (They have now been married for more than 40 years.)

Criticisms of the experiment

Among the many criticisms of the experiment, the following two were deemed the most serious:

1 **Violation of the no harm principle**: Although counselling was offered to participants, some were still reporting negative effects 40 years later.
2 **Violation of withdrawal rights**: Note the pressure that was put on the 'inmate' who became distressed and wished to withdraw.

Some good did come out of this experiment, however; it caused a government review of the way in which youth detention was carried out in the United States.

Further, one of the participants was so concerned with what he had seen happen that he changed his university course and became a forensic psychologist. He has spent the last 40 years working to improve conditions for prisoners in United States jails.

Status and power within groups

The Stanford prison experiment demonstrated the interaction within a group, especially in regard to status and power. The guards and prisoners were assigned their roles and rapidly fulfilled them, going beyond 'playing their part', despite knowing there were no legitimate prisoners.

CHECK YOUR LEARNING 12.2

Describe and explain

1 **Identify** the independent variable in the Stanford prison experiment.
2 **Describe** the effects of power in the Stanford prison experiment.
3 **Define** deindividuation.

Apply, analyse and interpret

4 **Compare** the role of the guards and the role of the prisoners.
5 **Consider** the types of power that the guards exerted over the prisoners.
6 **Deduce** how power operates in a group.

Investigate, evaluate and communicate

7 **Design** a methodology to test the effects of status and power within groups.
8 **Evaluate** this statement: 'The prison warden could have exerted more power over the guards to change the result of the Stanford prison experiment'.
9 **Appraise** the ethics of the Stanford prison experiment. Note any breaches and make a suggestion for correcting these.
10 **Consider** the study design used in the Stanford prison experiment. **Comment** on whether you think the results would have been different had a double-blind procedure been used.

obook assess

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 12.2

» **Increase your knowledge**
Reactions to the Stanford Prison Experiment

» **Weblink**
The Stanford Prison Experiment

12.3 Milgram's experiment and obedience

KEY IDEAS

In this section, you will learn about:

- Milgram's obedience experiment
- ethical concerns and criticisms.

obedience
where an individual or group behaves in a certain way on the orders or rules set down by a figure of authority

authority
the power to order individuals to behave in a certain manner

One of the most horrific examples of **obedience** was the attempted genocide of the Jews during the Second World War, when an estimated six million Jewish men, women and children were murdered by the Nazis between 1939 and 1945. Obedience is when an individual complies with an order or request when directed by someone with perceived or legitimate authority. Someone in a position of **authority** has the power, or the right, to make decisions on behalf of others and order others around.

CHALLENGE 12.3

Obedience and the Nazi party

Hitler's Nazi regime relied on the status and power of Hitler and high-ranking Nazi officials alongside the concurrent obedience of Nazis with lower paramilitary ranking. Many of the atrocities committed by the Nazis were strongly influenced or directly caused by lower ranking members being commanded by higher ranking members. Based on your understanding of status and power, propose an explanation for why this obedience occurred.

FIGURE 1 Nazi party rallies demonstrated obedience to authority.

In 1961, an American social psychologist at Yale University, Stanley Milgram, set out to discover whether there was a special characteristic that made Germans more obedient to authority than other races. This was a popular theory in the United States and Europe in the years after the Second World War.

The experiment

Aim

The aim was to discover whether participants would obey an authority figure and carry out actions that caused severe pain to another person.

FIGURE 2 Stanley Milgram with his experimental 'teaching machine'

Background

Participants were told that there had been little research on the use of punishment as a method of teaching and that this was to be a valuable scientific experiment that could be of great benefit to society.

Method

Participants

The participants were 40 male volunteers, aged 20–50 years. Their occupations ranged from company owners to truck drivers to students and the unemployed. Milgram paid them each US$4.50 for the hour of participation. In 1961, this amount would have covered the week's grocery bill for a family in Australia. Participants were told that they would keep the money even if they did not complete the experiment.

Materials

The 'teacher' sat at a control panel with 30 switches and several imposing dials and lights. The switches were labelled with their power output: from 15 to 460 volts in 15-volt increments.

The 'learner', in another room but within earshot of the teacher, was strapped into a chair with his arms bound to the arms of the chair and electrodes strapped to his bare wrists (see Figure 3). These electrodes were perceived to be connected to the switches the teacher was controlled.

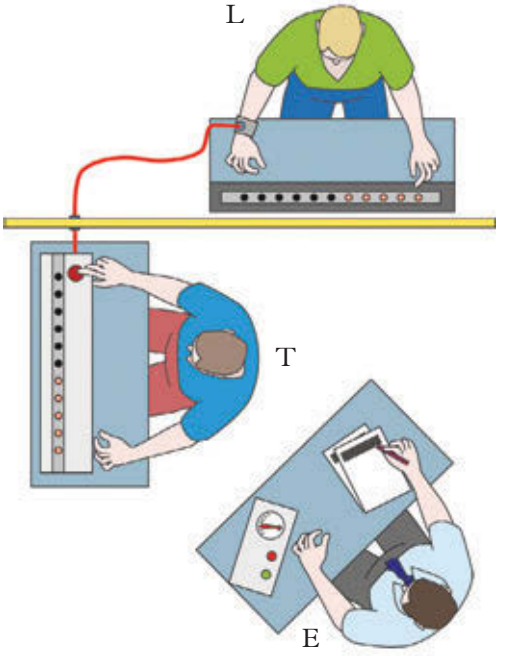


FIGURE 3 The Milgram experiment setup. The experimenter (E) orders the teacher (T), the subject of the experiment, to give what the latter believes are painful electric shocks to a learner (L), who is actually a confederate planted by the experimenter.

Procedure

The 'learner' was an accountant named Mr Wallace. As Milgram's confederate, he was there to help stage the experiment by agreeing to play the part of the learner.

When Mr Wallace and the participant entered the room they were introduced to each other as participants and then drew a piece of paper from a hat to see who would be the learner and who would be the teacher. The draw was fixed so that the participant always became the teacher.

The 'experimenter' (Mr Williams, a biology teacher who had volunteered for the job) then took the teacher and Mr Wallace to another room, strapped Mr Wallace into the chair and showed the teacher what the shocks would be like by giving him a 45-volt genuine shock from another machine. The shock stung quite a bit!

Next, the teacher returned to the desk with the shock machine and asked Mr Wallace a series of questions. When Mr Wallace (deliberately) gave the wrong answer, the teacher was required to say, 'That is incorrect. The correct answer is … This will be 15 volts', then press the switch to give the shock. Each wrong answer, or refusal to answer, earned another shock at the next higher level of intensity.

Williams, the experimenter, used some carefully worded prods to make the teacher continue whenever they wanted to stop. These were used one at a time in the following sequence:

- Prod 1: 'Please continue, please go on!'
- Prod 2: 'The experiment requires that you continue!'
- Prod 3: 'It is absolutely essential that you continue!'
- Prod 4: 'You have no other choice, you must go on!'

If the teacher asked at any stage if the shocks could harm the learner, the researcher said:

- Prod 5: 'Although the shocks may be painful, there is no permanent tissue damage so please go on'.

If the teacher said that the learner did not want to go on:

- Prod 6: 'Whether the learner likes it or not, you must go on until he has learnt all the word pairs correctly, so please go on!'

In the first experiment, the learner did not make any complaints until the 300-volt level and at that stage he simply pounded his fist on the wall. After this he did not give any answers and pounded the wall again at 315 volts, after which he gave no answers at all and remained silent.

The switches on the machine that the teacher 'controlled' were labelled describing the strength of the shock:

- slight shock (15 volts)
- medium shock (75 volts)
- strong shock (135 volts)
- very strong shock (195 volts)
- intense shock (235 volts)
- extreme intensity (315 volts)
- DANGER – severe shock (375 volts).

The last two switches (435 volts and 450 volts) simply had XXX printed above them.

Results

All 40 participants obeyed up to the 300-volt level. The rate of response is shown in Table 1.

TABLE 1 Participants obeying the experimenter in Milgram's experiment (1961)

Shock level	Obedient participants	
Up to 300 volts	40	100%
315 volts	35	87.5%
330 volts	31	77.5%
345 volts	29	72.5%
360 volts	28	70%
375 volts	27	67.5%
390 to 450 volts	26	65%

Conclusions

From this initial experiment, and the many variations he performed, Milgram concluded that people are very likely to perform actions contrary to their beliefs and wishes if they are instructed to do so by an authority figure.

Additional research

In a further experiment, to make the pain appear more realistic, the learner (Mr Wallace) had a carefully written script to follow during the course of the experiment:

- From 75 volts to 150 volts, Mr Wallace would make louder and louder grunts of pain.
- At 150 volts, he complained that his heart was bothering him.
- At 165 volts, he grunted in pain and shouted to be released.
- At 180 volts, he cried out that he could not stand the pain.
- At 195 volts, he cried out again and repeated several times that his heart was bothering him.
- At 210 volts, he called to the experimenter to let him out and said he refused to go on.
- At 215 and 240 volts, he gave loud cries of pain.
- At 255 volts, he cried out in pain and begged to be released.
- At 270 volts, he let out a scream of pain and cried hysterically, 'Let me out of here. Let me out of here. Let me out, do you hear? Let me out of here!'
- At 285 volts, he gave a scream as if in agony.
- At 300 volts, he gave a further scream of agony and called, 'I absolutely refuse to answer any more. Get me out of here. You can't hold me here. Get me out. Get me out of here!'
- His cries increased at 315 volts and 330 volts, and then there was silence.

Study tip

When reviewing older research, keep in mind that ethical considerations may not have existed, and that this can impact results and future modifications.

Amazingly, with this level of feedback about the intensity of the pain, the obedience rate dropped by only 2.5 per cent, meaning that only one extra participant refused to go all the way to 450 volts (though in this version, one participant did refuse to go beyond 175 volts).

Milgram performed many other versions of this experiment. These versions validated the original results.

TABLE 2 Levels of obedience in various versions of the Milgram experiment

Version	Percentage obedient	
	Initial study	65
1	Where two other teachers (actors) continued to 450 volts	73
2	With women as participants	65
3	With verbal feedback from learner	62.5
4	In a low-prestige setting (a shabby office in Connecticut)	48
5	Where the teacher and the learner were in the same room	40
6	Where the teacher had to physically force the learner's hand onto a metal plate to administer the shock	30
7	Authority figure not in the room with teacher	21
8	Non-authority figure providing the prods	20
9	Two other teachers (both actors) refusing to obey	10
10	Actor administering the shocks while the teacher read the questions	7
11	The teacher able to nominate the level of shock to be used	2.5
12	Experimenter says 'Stop'; learner asks to continue	0

Milgram suggested that there are nine reasons for the high level of obedience in his initial study:

1 Yale University is a prestigious institution.
2 Participants believed they were taking part in valuable scientific research.
3 Participants believed that the learner had volunteered.
4 Participants felt obliged.
5 Payment increased the sense of obligation.
6 Participants believed that the roles of teacher and learner had been allocated at random.
7 Participants were not aware of their rights or the expectations of participants in scientific research.
8 Participants were assured that the shocks were painful but not dangerous.
9 The learner had responded to each question up to the 300-volt level, indicating his willingness to participate.

Criticisms of the experiment

Milgram's studies have been criticised for many flaws in their design and the way they were carried out.

Ethical issues

No harm principle

Participants showed extreme anxiety about what they were asked to do; nervous laughter from 14 participants and uncontrollable seizures from three participants meant that their rights were violated.

Withdrawal rights

The prompts used by the researcher to ensure that the experiment continued even though participants expressed the desire to stop were a direct violation of participants' rights. Participants must be allowed to withdraw at any stage without any attempt to prevent them from doing so.

Deception

Participants were deceived about the purpose of the experiment as well as by the procedures used. It is unlikely that this design had received approval from an ethics committee; indeed, it is unlikely that ethics committees existed when the first of these experiments took place in 1961.

Public announcement

We will pay you $4.00 for one hour of your time
Persons Needed for a Study of Memory
We will pay five hundred New Haven men to help us complete a scientific study of memory and learning. The study is being done at Yale University.

Each person who participates will be paid $4.00 (plus 50c carfare) for approximately 1 hour's time. We need you for only one hour: there are no further obligations. You may choose the time you would like to come.
No special training, education, or experience needed. We want:

Factory workers, businessmen, construction workers, city employees, clerks, salespeople, laborers, professional people, white-collar workers, barbers, telephone workers and others.

FIGURE 4 The wording of the original advertisement for participants in Milgram's experiment

Procedural issues

Sampling

The sample was not representative of the population about which Milgram wished to draw conclusions (adult Americans). The sample contained males only and they were all white Americans.

Setting

The experiment (and the majority of later variations) was conducted in a laboratory. There is no evidence that similar results would be found outside a formal laboratory setting.

Replication of the studies

Milgram's studies have been reproduced many times in many countries. It is interesting that the figure of between 60 and 65 per cent total obedience has been the result for all studies following Milgram's original procedure – even in Australia, where we are renowned for our tendency to rebel against authority!

In one particularly appalling study, 13 men and 13 women administered real shocks to inflict pain on a helpless live puppy. Six male participants refused to shock the puppy to maximum level, but seven men (54 per cent) and 100 per cent of the female participants obeyed and administered shocks to the maximum level, although several of the women were distressed and openly crying as they did so (Sheridan & King, 1972).

In all these studies the percentages of those who were willing to harm an innocent victim are quite startling. Milgram's research and subsequent studies demonstrate the use of power and authority to encourage obedience.

CHECK YOUR LEARNING 12.3

Describe and explain

1 **Explain** the following:
   - **a** obedience
   - **b** authority

2 **Identify** the type of power that the 'teacher' had over the 'learner' in Milgram's study.

Apply, analyse and interpret

3 **Compare** the role of the researcher and the teacher.

4 **Consider** the types of power that the researchers exerted over the teachers.

5 **Determine** the effect the prompts of the researcher had on the results of the experiment.

Investigate, evaluate and communicate

6 **Comment** on the ethical implications of Milgram's study.

7 **Evaluate** the role of obedience to authority in Milgram's study.

8 During an excursion the class teacher, Mr Smith, instructed all students that they were not allowed to touch anything or leave the group. When students went to touch an exhibit, Mr Smith reminded them that they were not allowed. With reference to Milgram's study, **evaluate** Mr Smith's use of authority and the students' obedience.

9 Milgram proposed nine reasons for the high level of obedience in his initial study. **Identify** two of the nine reasons that would be eliminated if the study had been ethical. **Comment** on the inclusion of these in Milgram's reasons.

10 Research such as Milgram's and Zimbardo's challenge current ethics in psychology. **Assess** the validity and reliability of their results.

obook assess

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 12.3
- **» Suggested research**
  12.3 Obedience
- **» Suggested research**
  12.3 Obedience and the authority gradient
- **» Challenge**
  Worksheet: 12.3 Obedience and the Nazi party

12.4 Factors affecting conformity

KEY IDEAS

In this section, you will learn about:

- conformity and social groups
- Asch's conformity experiment.

Humans are highly sociable beings. We like to belong to a group and share our personal experiences with friends and family.

Sometimes people will behave in strange ways just to fit in with the group. For example, Kalat (2008) reported that in Koversada (a small town in Croatia) people only wear clothes if they are going out to dinner at a restaurant. If a person enters the town fully clothed, other people stare at them and openly express disapproval – visitors to the town quickly learn that they feel more comfortable if they are naked in public!

As we saw in the previous section in relation to Milgram's work on obedience, the presence of one or two other people, and their responses, can have considerable influence on the way a person behaves. Milgram expected this, because he was aware of earlier research performed by Solomon Asch in 1951, which was published in 1958.

The presence of others can encourage people to behave in the same manner, and show similar interests and beliefs. This is called **conformity**.

conformity behaviour, beliefs and actions that comply with a group's behaviour, beliefs and actions

CHALLENGE 12.4

Conformity

Asch's study (p. 266) provided evidence for conformity. Participants gave the same answer as confederates despite knowing that the answer was wrong, or not what they originally thought. Write a list of things that you have conformed to, despite disagreeing with them. Comment on whether you think conformity plays a role in peer pressure.

FIGURE 1 Some people like to conform to a group and this may influence what they do, what they wear and even how they speak.

Asch's experiment

Aim

The aim was to investigate the extent to which an individual within a group will conform to the majority opinion.

Method

Participants

In the first experiment, participants were 50 first-year college students.

Materials

The materials were two cards, as shown in Figure 2.

Procedure

1. Participants were told that this was an experiment to study visual perception.
2. Participants were placed in a group with seven to nine confederates (planted actors).
3. The participant was always the second-last in the group to give an opinion.
4. The group was shown the two cards and asked, 'Which line on Card B is closest in length to the line on Card A?'

In 12 of the 18 trials, the confederates all gave the same wrong answer; in the other six trials they gave the correct answer.

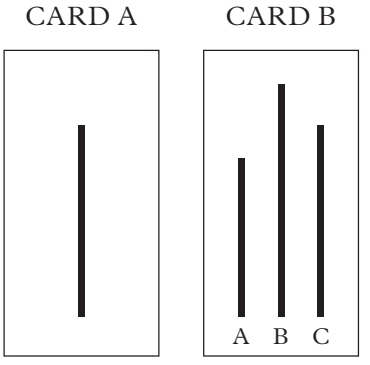


FIGURE 2 Participants in Asch's experiment were presented with images like this to test conformity.

Results

- Of the 50 participants, 37 (74 per cent) conformed on at least one occasion, giving the same wrong answer as the confederates.
- Fourteen participants conformed in more than six of the 12 trails.
- The mean conformity rate was four out of 12 trials.

Conclusion

Asch concluded that participants conformed for two main reasons:

1. Participants wanted to feel that they belonged in the group.
2. Participants believed that other group members were better informed than they were.

Asch himself commented (1955) that it is a matter of concern that we have so strong a tendency towards conformity in our society, calling into question our education system and society's values.

Variation in conformity

In order to discover which factors influence conformity, Solomon Asch performed several variations of his original experiment. Other researchers have repeated the experiment in many different countries and the degree of conformity has been shown to be affected by different factors. Rod Bond and Peter Smith (1996), of Sussex University in the UK, conducted a meta-analysis of 133 studies from 17 countries that had used a similar procedure to Asch's. The aim of this analysis was to find the moderator variables that caused variation in levels of conformity.

A meta-analysis is research that examines the results of many other studies and combines the results and findings of many other studies. This means that the researchers can have increased confidence in the conclusions because the results support each other, effectively increasing the size of the sample used and making statistical procedures more rigorous.

Of course, there are some difficulties with this, as not all researchers have used exactly the same procedures or methods of reporting. For example, Bond and Smith wanted to discover whether there were any gender effects: 'Are men more likely to conform than women?' But of the 133 studies examined, 22 did not report which participants were male and which were female.

Among the most significant moderator variables, Bond and Smith found the following:

- normative influence
- culture
- social loafing.
- informational influence
- group size
- unanimity
- deindividuation

Normative influence

Normative influence refers to a person's tendency to go along with the group so that they will fit in and gain the approval of other group members.

normative influence
the tendency of people to agree with a group so that they fit in

It has been found that if group members are very similar to each other (such as in age, race and gender), there will be greater normative influence, increasing the pressure towards conformity. Almost all studies replicating Asch's experiments have used college students as participants, which has been a significant factor.

If other group members are people from whom the participant wants to gain approval – possibly teachers, family members or friends – the tendency towards conformity is further increased.

Culture

In studies undertaken in Asian countries, the level of conformity has been found to be significantly higher than in Western cultures. In the United States, the level of conformity has been found to be decreasing since the 1950s. Australians tend to follow social norms, such as supporting the underdog and disliking people who are openly self-promoting or who appear arrogant or conceited. We conform to the norms of a community and protect our mates and isolate those who take offence or complain.

It has been argued that the reason for this difference in conformity lies in the cultural differences between individualist and collectivist cultures.

- An **individualist culture** is one in which individuality and independence are highly valued, and it is considered important for people to achieve their individual goals.
- A **collectivist culture** is one in which the individual's goals are less important than group goals, and each person is encouraged to consider the needs of the group to be more important than their individual requirements.

individualist culture
the importance of oneself achieving goals is prioritised over the needs of society

collectivist culture
priority of society's goals as a whole are emphasised above personal goals

Certainly there is a tendency towards individualist culture in Western societies and collectivist culture in Eastern societies, but there could be other explanations for the difference in the level of conformity. For example, in Eastern cultures it is considered impolite to point out another person's mistakes, even indirectly. Therefore there is a tendency to conform in order for the other group members to save face (Takano & Osaka, 1999).

Informational influence

informational influence
the increased likelihood that an individual will conform when they do not believe they have the same ability as others to provide a correct response

Informational influence refers to the increased tendency to conform when the participant wants to provide a correct response but is not certain of their ability to do so, believing that others are more capable of making accurate judgments. This is a very common cause of conformity. For example, if you are cooking a new dish for dinner and you are not certain which spices to use, you could ask a friend's opinion. If you believe your friend has good judgment in this area, you conform and follow their advice.

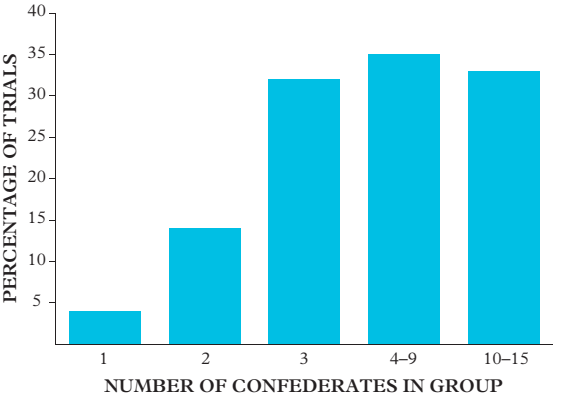


FIGURE 3 The percentage of trials in Asch's study where participants conformed with unanimous majorities (various sizes); conformity reached a maximum with a group size of four, then remained fairly constant.

Group size

Asch varied the number of confederates from one to 15. He found that conformity rates increased to a maximum with three of four confederates, and then remained approximately the same (see Figure 4).

FIGURE 4 Conformity is higher in a collectivist culture where the individual is less important than the group. Eastern cultures and more likely to be collectivistic than Western cultures.

Unanimity

If one of the confederates did not conform with the group, but gave the correct answer, the conformity rate dropped from the average of four out of 12 to one out of 12. Asch believed that there are three factors influencing this significant difference:

1 The participant observed that the majority did not criticise or make fun of the dissenting confederate.
2 There was now social pressure in two directions – from the dissenter as well as the majority.
3 The dissenter increased the participant's belief that the majority were wrong.

Deindividuation

We discussed deindividuation earlier in this chapter when Philip Zimbardo deliberately removed the individual identifying characteristics of the Stanford prison guards and prisoners.

A form of deindividuation, in which the participant cannot be identified by other group members, has also been used in variations of the Asch experiment, when groups of participants were placed in individual booths and given false feedback about the responses of the other group members. There is evidence that the level of conformity is higher in face-to-face groups than in simulated groups (Bond & Smith, 1996).

In studies where the participants believed that only the experimenter would have access to their responses, participants were much less likely to conform to the majority of responses.

Social loafing

Social loafing is the tendency of an individual to reduce their effort when working in a group, compared with when they are working alone.

social loafing when an individual puts in less effort when in a group then they do individually

In terms of conformity, when a task requires some effort (e.g., if the lines in the Asch stimuli are similar in size and require careful scrutiny in order to distinguish the correct answer), the participant may conform with the majority simply to avoid the effort involved in making a personal judgment.

CHECK YOUR LEARNING 12.4

Describe and explain

1 **Summarise** Solomon Asch's experiment in conformity.
2 **Describe** conformity.

Apply, analyse and interpret

3 **Compare** the impact of conformity when it relates to culture with when it relates to group size.
4 **Describe** what a social norm is, and then **determine** how this affects conformity.

Investigate, evaluate and communicate

5 **Assess** the ethics that were used in Asch's study.
6 **Evaluate** conformity in terms of Asch's study. Write a brief response using an example from your own life.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 12.4

» **Challenge**
Worksheet: 12.4
Conformity

» **Weblink**
Conformity and survival

CHAPTER 12

Review

Summary

12.1
- A group is defined as two or more people who interact over a period of time, have influence on each other and share a common goal.
- Within a group, a person is said to have power over another if there is a reasonable expectation that the second person will behave in the way the first person desires, even against the second person's own wishes.
- There are six significant sources of power: legitimate power, reward power, coercive power, expert power, information power and referent power.
- Lewin, Lippit and White first investigated leadership style in 1939 and described three styles: authoritarian, laissez-faire and democratic.

12.2
- In the Stanford prison experiment, Zimbardo and his colleagues showed that the environment and roles assigned to people can have significant influences on behaviour. Deindividuation was identified as a significant influence, increasing the cruelty of the guards and the sense of helplessness of the prisoners.

12.3
- Obedience is when an individual or group behaves in a certain way based on orders or rules provided by a figure of authority.
- Authority is the power to order individuals to behave in a particular way.
- Milgram's experiment aimed to discover whether participants would obey an authority figure. The experiment involved a researcher instructing a teacher who was instructing a learner. The teacher was told by the researcher to administer electric shocks to the learner whenever the learner got a question wrong.
- Milgram's study provided evidence that people would obey someone despite feeling bad about it. This study had ethical breaches.

12.4
- Conformity is when behaviour, beliefs, attitudes or actions are adjusted to be in line with a group's behaviour, beliefs, attitudes and actions.
- Solomon Asch conducted research that found that individuals in a group will conform with majority opinion, even when the majority opinion is different from theirs, or incorrect.
- There are several reasons that people may be more or less likely to conform, including normative influence, culture, informational influence, group size, unanimity, deindividuation and social loafing.

Key terms

- authoritarian
- authority
- collectivist culture
- conformity
- deindividuation
- democratic
- group
- individualist culture
- informational influence
- laissez-faire
- normative influence
- obedience
- power
- social loafing
- status

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: ★ = low, ★★ = medium, ★★★ = high.

Multiple choice

1 Which of the following best describes a group?

A two or more people who share a common goal and help each other to achieve it

B three or more people who interact and influence each other and share a common goal

C two or more people who interact and influence each other and share a common goal

D people who know each other and share many goals and interests.

2 Power that derives from the ability of a person to provide pleasant consequences to reinforce a response is referred to as:

A referent power.

B reward power.

C recreational power.

D coercive power.

3 The type of leadership characterised by high concern for both productivity and people is referred to as:

A country club style.

B middle-of-the-road style.

C impoverished style.

D team leadership style.

4 When Zimbardo and his colleagues set up the Stanford prison experiment in 1971, what was the independent variable in the experiment?

A The inmates or guards had lasting psychological problems as a result of the experiment.

B The participants did not remain in the prison for the full two weeks.

C The guards started to bully the prisoners.

D There was no experimental hypothesis; no independent variable or dependent variables were identified.

5 In the Zimbardo experiment the guards wore military uniforms and dark glasses and carried batons. What was the purpose of this?

A depersonalisation

B desensitisation

C detachment

D deindividuation

6 The best explanation of the meaning of conformity is the tendency of a person to adjust their _____ so that they match the expectations of another person or group of people.

A thoughts

B attitudes

C feelings

D behaviours

7 Bond and Smith discovered seven factors that affected conformity. Which of the following is *not* one of these factors?

A age of participants

B informational influence

C normative influence

D unanimity

8 Approximately what percentage of participants agreed with the confederates' estimates at least once in Asch's experiment?

A 25 per cent

B 50 per cent

C 74 per cent

D 100 per cent

9 Milgram conducted his experiment with a number of variations. In which version was obedience the lowest?

A when the authority figure was in the room with the teacher

B when the authority figure gave instructions by telephone

C when the teacher had seen another teacher administer the high-level shocks

D when the learner was in the room with the teacher

10 What percentage of participants administered the electric shock up to an intensity of 175 volts in Milgram's experiment?

A 100 per cent
B 85 per cent
C 65 per cent
D 45 per cent

11 In other variations of his experiment, Milgram found which of the following?

A Obedience was lower when female participants were used.
B Obedience decreased if other participants had already been observed to disobey.
C Obedience decreased if the authority figure was not in the room with the teacher.
D Obedience decreased if the researcher was in the room with the teacher.

12 Which overriding principle in ethical considerations for research with human subjects was breached by the Milgram experiment?

A Participants must volunteer.
B Informed consent procedures must be followed.
C No physiological or psychological harm may come to the participant.
D Confidentiality must be maintained.

13 In the 1971 Stanford prison experiment, the prison guards were given _____ power, while the researchers had this form of power as well as _____ power.

A legitimate; information
B coercive; expert
C legitimate; expert
D reward; referent

14 What does information power refer to?

A power due to having skills and knowledge
B power due to having depth of knowledge
C power due to having knowledge that others desire
D power due to having knowledge to provide the desired response

15 Which of the following best describes power within groups?

A A person has power if it can be reasonably expected that another person will behave in the way they desire, even if the other person does not agree with behaving that way.
B A person has power if they can make another person agree with them.
C A person has power when they can make a person behave the same way they do.
D A person has power when it can be reasonably expected that another person will behave in the way they desire, and the other person comes to agree with behaving that way.

16 Asch's experiment tested _____, whereas Zimbardo's experiment tested _____, and Milgram's experiment tested _____.

A obedience; power; conformity
B power; conformity; obedience
C authority; conformity; obedience
D conformity; power; obedience

17 Which of the following was *not* a criticism of the Stanford prison experiment?

A The withdrawal rights of participants were violated.
B The no harm principle was violated.
C No social benefit was derived from the experiment.
D Counselling was offered to participants, but negative effects were still reported.

18 A judge's authority in a court room is an example of:

A legitimate power.
B expert power.
C referent power.
D professional power.

Short answer

Describe and explain

★ **19** **Summarise** what a group is and provide an example.

★ **20** **Explain** what is meant when it is said that one person has power over another.

★★ **21** **Explain** the source of each of these types of power:

a reward power

b coercive power.

★★ **22** **Select** one of the seven factors shown to have an effect on conformity to group opinion (as identified by Bond & Smith, 1996). Name this factor and **identify** the conditions under which conformity is more likely to occur.

★★ **23** **Select** one of the nine factors that Milgram showed to have an effect on obedience to authority. Name this factor and **identify** the conditions under which obedience is more likely to occur.

Apply, analyse and interpret

★ **24** **Determine** the minimum number of people needed to form a group.

★ **25** **Determine** how social loafing influences culture, and **provide** an example to illustrate this.

★★ **26** **Explain** what is meant by the term 'referent power'. Give an example and **consider** when this is most likely to be used.

★★ **27** **Compare** and contrast authoritarian leadership styles with team leadership styles. Give an example of a workplace situation where each leadership style might excel.

★★★ **28** **Critique** the lack of ethics used in Zimbardo's and Milgram's experiments.

Investigate, evaluate and communicate

★ **29** **Discuss** why the wording of the advertisement for Milgram's experiment may have raised ethical concerns.

★★ **30** **Explain** at least one of the ethical concerns with the Stanford prison experiment. **Assess** whether the experiment could be replicated today with the elimination of this ethical concern.

★★ **31** **Comment** on why levels of conformity have been found to be decreasing in recent times; **use** individualistic and collectivist cultures to support your answer.

★★★ **32** Deindividuation allows people to perform actions that they would be unlikely to perform if they were on their own and could be individually identified. In the past, police would sometimes remove their identifying number, wear reflective sunglasses and become violent when engaged in crowd control. Provide another example, from real life, where people have shown socially unacceptable behaviour as a result of deindividuation. **Discuss** how this example demonstrates deindividuation.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 12 Review
- **» Revision notes**
  Revision notes for Chapter 12
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 12

CHAPTER 13

Prosocial & antisocial behaviour

Why might people ignore a man slumped over his steering wheel in a busy Queensland street? What makes 100 people stand by and watch as a man is beaten outside a hotel, without intervening or calling authorities for help? Why has there been such huge public support for Australian farmers and their families during recent times of drought? And why did the Australian public show such overwhelming support for the people traumatically affected by the Victorian Black Saturday bushfires of 2009? These are all real Australian examples of antisocial and prosocial behaviours, each with its own unique set of social contexts and outcomes.

In this chapter we will examine the different theories used to explain people's helping behaviour from the perspective of social psychologists. Factors such as socialisation, biology and the environment can help explain why people help others without the incentive of immediate benefit or reward. However, these same set of factors can also help explain why people choose not to help others and to act in antisocial ways. The bystander intervention model explores what influences helping behaviour. We will also address the phenomena of helping – the actions, patterns of behaviour and motivations that contribute to both prosocial and antisocial behaviour.

OBJECTIVES

- → Analyse Bibb Darley & Jon Latane's (1968) model of bystander intervention.
- → Describe social factors that influence prosocial behaviour with reference to the reciprocity principle and social responsibility.
- → Describe personal characteristics that influence prosocial behaviour, with reference to empathy, mood, competence and altruism.
- → Consider factors that influence antisocial behaviour, including groupthink, diffusion of responsibility, audience inhibition, social influence and cost–benefit analysis.

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

FIGURE 1 Each Australian state has SES (State Emergency Service) volunteers. Being a SES volunteer is a form of prosocial behaviour

SUGGESTED RESEARCH

SUGGESTED RESEARCH	**13.2** Cross-cultural altruism (e.g. kin selection in UK and South African students in Madsen, Tunney, Fieldman *et al.* 2007)
SUGGESTED RESEARCH	**13.3** Review the case study of Kitty Genovese (Gainsburg 1964) demonstrating Darley and Latane's (1968) model of bystander intervention.

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

13.1 Prosocial behaviour

KEY IDEAS

In this section, you will learn about:

- an explanation of prosocial behaviour
- Darley and Latane's (1968) bystander intervention model.

prosocial behaviour helping behaviour that benefits other people and society in general

Helping behaviour is also known as prosocial behaviour. **Prosocial behaviour** is that which benefits other people and society in general.

Prosocial behaviour is usually voluntary, because it is intended to benefit others. It includes aiding and assisting, charity, cooperation, friendship, rescuing, sacrificing, sharing, sympathy, trust and bystander intervention. Sometimes helping behaviour can be altruistic because it involves helping others for no reward, and this might also be at a personal cost to the helper. Helping behaviour can be an automatic response to an immediate situation, or it can be deliberate and occur over time.

Explanations of prosocial behaviour

Why do people help others? Prosocial behaviour is of interest because psychologists have found that it is explained partly by nature, and partly by nurture. Table 1 summarises these explanations of prosocial behaviour.

TABLE 1 Explanations of prosocial behaviour

Explanation	Description
Biological (nature)	This explanation is part of socio-biology, which sees prosocial behaviour as genetic – humans naturally assist others as a way of protecting our common gene pool.
Environmental (nurture)	This is the view that prosocial behaviour is not innate, but that it is learnt during the socialisation process. It suggests that classical and operant conditioning, and social learning (also referred to as observational learning) all contribute to the development of prosocial behaviour. Children can learn prosocial behaviour by copying the prosocial behaviour of others around them, and through being rewarded for appropriate behaviour.
Interaction between biological and environmental factors (nature and nurture)	This approach suggests that although we might be born with an innate tendency to help others, exactly how we help is the product of social learning.

Factors influencing prosocial behaviour

There are several specific influences on the likelihood of people engaging in prosocial behaviour. These include the situation (the characteristics of the situation), social norms, personal characteristics of the helper and altruism.

The characteristics of the particular situation will have an influence on whether an individual will behave in a prosocial way. If a situation is a clear-cut need for help, it is more likely that people will assist. If the situation is ambiguous, then help might not be forthcoming.

The environmental setting can also influence the likelihood of help being offered to people in need: for example, people in rural settings are often more inclined to help each other than people living in densely populated urban settings.

Whether the situation is an emergency or not is one relevant factor that affects how a potential helper might react. Emergency situations (e.g., a flash flood, car accident, explosion, heart attack or mugging):

- are usually dangerous
- are unusual occurrences; something rarely experienced by the helper
- are sudden and unexpected
- require immediate action to offset the risk to the victim's life or wellbeing.

Non-emergency situations on the other hand:

- are less dangerous (e.g., ongoing illness, disability or poverty)
- are a familiar occurrence (e.g., problems associated with old age or young children needing support)
- are predictable and expected happenings (e.g., old age, drought-affected families, ongoing illness or poverty)
- require deliberate and planned action (e.g., planning to work with a charity, or donating money or time on an ongoing basis).

Bystander intervention

One of the most influential aspects of a situation is whether a potential helper is alone or with other people. **Bystander intervention** is where a person voluntarily helps someone else. The bystander effect is where a bystander is more likely to help others in an emergency when there is no one else around, than when there are other bystanders.

bystander intervention
the act of a person voluntarily helping someone else

FIGURE 1 The number of bystanders in any situation can influence the likelihood of help being offered. If you are the only one, you are more likely to help than if there are many people present.

The decision-stage model of helping

The decision-stage model of helping (Latane & Darley, 1970) is a model of the situational influences on bystander intervention. It says that when confronted with a situation that might require their assistance, potential helpers go through five stages in deciding to help:

1 Notice the need for help.
2 Decide that it is an emergency.
3 Decide to take responsibility.
4 Decide on a way to help.
5 Take action to help.

If a bystander stops at any one of these steps, they will not provide assistance. Most bystanders tend to stop at stage 3, where they decide that it is not their responsibility to help (Figure 2). For example, an off-duty doctor who witnesses a person collapse in the street may feel that they have the responsibility and ability to help due to their medical training, when compared with an accountant who is also on the scene.

How people interpret a situation will influence whether they will help. Sometimes, for example, a bystander will look at other bystanders and see that they are taking no action. The bystander assumes that they are the only person who is confused about what to do. However, the other people on the scene are also making the same assumption, and therefore no help is given to the person who is genuinely in need.

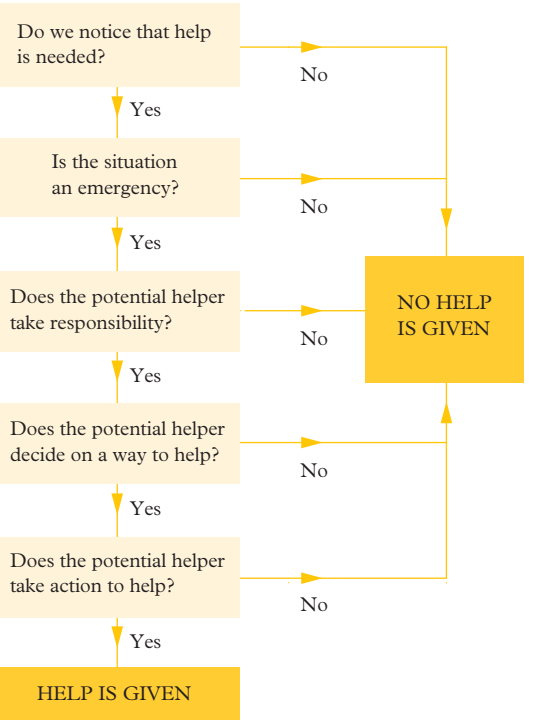


FIGURE 2 The decision-stage model of helping (adapted from Latane & Darley, 1970)

CHALLENGE 13.1

Why didn't they help?

In 2014, Brisbane woman Kylie Reid stood up for a woman who was being racially abused by a man while riding the bus home. It has been suggested that fellow passengers failed to support Reid or the victim as a result of the bystander effect. Research the event online. Explain why other passengers did not assist Kylie Reid in her defence of the victim. Then using the decision-stage model of helping, explain the actions of Kylie Reid during the incident.

TABLE 2 The effect of various factors on bystanders

Factor	Elements	Effect on bystanders
The victim	Similarity of victim to the bystander (in terms of gender, age, race)	More likely to help
	Some relationship to bystander	More likely to help
	Bleeding or injured	Less likely to help
	Member of a stigmatised group	Less likely to help
The situation	Many bystanders	Less likely to help
	No other bystanders	More likely to help
	Limited time	Less likely to help
	Urgent need for help	More likely to help
The bystander	Similarity to victim (gender, age, race)	More likely to help
	Some relationship to victim	More likely to help
	Negative responses to features of the victim (prejudices, judgments about grooming, presence of blood)	Less likely to help
	Empathy	More likely to help
	Knowledge or expertise in how to help the victim	More likely to help
	Mood (good)	More likely to help
	Arousal (high)	More likely to help
	Altruistic	More likely to help

CHECK YOUR LEARNING 13.1

Describe and explain

1 **Explain** prosocial behaviour.
2 **Describe** environmental influences on prosocial behaviour.
3 **Identify** and **describe** two factors that will influence prosocial behaviour.

Apply, analyse and interpret

4 **Consider** the decision-stage model of helping, by Darley and Latane (1970).
5 **Compare** the reasons bystanders are more likely to assist a victim.

Investigate, evaluate and communicate

6 Recall a situation when you were a witness or involved in a situation that required intervention. **Discuss** the reactions of bystanders with reference to bystander intervention.
7 **Investigate** an example of the bystander effect in Australia and **propose** a way of overcoming this in the future.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 13.1
- **Challenge**
  Worksheet: 13.1 Why didn't they help?
- **Weblink**
  Antisocial behaviour

13.2 Factors influencing prosocial behaviour

KEY IDEAS

In this section, you will learn about:

- the influence of reciprocity and social responsibility on prosocial behaviour
- personal characteristics that are likely to encourage prosocial behaviour.

There are many factors that will increase or decrease the likelihood of someone helping in a situation. Some of these depend on social expectations and cues; others are related to the characteristics of the person involved.

This section expands on the different social and personal factors that influence the likelihood of someone helping.

Social factors influencing prosocial behaviour

A very important influence on the development and maintenance of prosocial behaviour is social norms. A norm is a form of action or behaviour that is standardised and expected in a society; in other words, behaviour that society regards as 'normal'. Norms are learnt, and they provide a background for human social interaction.

It is expected in most societies that prosocial behaviour is normal, especially when there is minimal cost to the helper. Society might approve of, and even reward, examples of prosocial behaviour through recognition and acknowledgment. On the other hand, antisocial behaviour is disapproved of. In extreme cases, antisocial behaviour is punished with a jail sentence.

Two norms that are influential in prosocial behaviour are the reciprocity principle and the social responsibility norm.

Reciprocity principle

reciprocity principle the social expectation that you will respond in kind to someone who has helped you or done you a favour

The **reciprocity principle** is often expressed as 'Do unto others as they do unto you', because it describes the social expectation of reciprocity between people. We feel grateful if someone does us a favour and often feel the need to do that person a favour in return. If the favour someone does us involves a significant effort, then we are likely to feel more indebted to that person.

Social responsibility

social responsibility norm the expectation that members of a society will provide help to people who are dependent or in need, without the expectation of favours being returned

The **social responsibility norm** is where members of a society are expected to provide help to people who are dependent or in need, without the expectation of favours being returned. Examples of this include donating money or time to charity, helping family, and assisting the frail, impaired and sick.

However, people are only expected to help others who are genuinely in need. People who have behaved irresponsibly and are perceived to be responsible for their own problems – for example, gamblers experiencing financial hardship – are less likely to receive help.

CASE STUDY 13.2

Saving a drowning stranger

Why do people risk their own lives to help complete strangers? Putting yourself in danger to protect family and friends is one thing, but why endanger yourself when there is nothing to gain from it personally? Whatever the motivation, acting altruistically is a common occurrence.

Take the case of Brisbane tradesman Lincoln Sherlock. The morning of 15 July 2015 started off like any other work day for Lincoln. At around 7am, he was driving along busy Kingsford Smith Drive to a roofing job in the Brisbane suburb of Eagle Farm when things took an unexpected turn. Right in front of his eyes, Lincoln saw a ute careen across three lanes of traffic, crash through a fence and plunge into the Brisbane River. The driver, 51-year-old Shayne Wood, suffered a medical episode and blacked out at the wheel, causing him to lose consciousness and control of the car.

Lincoln, 39, was among many drivers on the busy road who immediately pulled over to check what was happening as the car started to sink beneath the surface. But unlike the other bystanders, who simply stood back watching, Lincoln leapt into action. He raced down a steep embankment and jumped into the chilly water on his own, swimming out to the car. Lincoln managed to haul the barely conscious Shane through a slightly open window and into a nearby tinny. He then secured the ute with a strap so it didn't slide deeper into the river. Once the rescue was completed, Lincoln simply left straight to get to his roofing job, as if what he'd done was no big deal.

Speaking a few days later, Lincoln remained humble about what had occurred.

'I didn't think it was a really dangerous thing. The minute he went into the water I knew I'd probably have to go and get him … just to make sure he was all right'.

Lincoln would later receive a Commendation for Brave Conduct at the 2016 Queensland Bravery Awards (Government House Queensland, 2016).

Lincoln Sherlock's story of bravery is an excellent example of prosocial behaviour. Using your knowledge of what causes people to act in prosocial ways, outline some of the factors that may prompt the brave actions of bystanders.

FIGURE 1 Lincoln Sherlock rescued a man with little to no thought of his own personal safety or gain.

Personal characteristics influencing prosocial behaviour

We have already noted that both biological (nature) and environmental (nurture) factors influence prosocial behaviour (Section 13.1). Although we might be born with a predisposition to act in a particular way, past experiences and the immediate circumstances of the individual will influence a person's prosocial behaviour.

FIGURE 2 Donating time or money to charity, such as conservation programs around Australia, or personally helping someone in need, are examples of the social responsibility norm.

Empathy

empathy
the capacity to understand and respond to the distress of emotions of others, which often leads to prosocial behaviour

Empathy is our emotional response to another person's distress. We find it unpleasant to see another person suffering, so we take action to help and thus alleviate the suffering. There are several different explanations for why empathy causes prosocial behaviour:

- **Arousal:** Bystanders help others in distress because it relieves the unpleasant emotional feeling that comes from empathising with those who are suffering. This explanation sees bystanders assisting others for selfish reasons rather than a genuine concern for others in distress. Helping others reduces the bystander's unpleasant levels of arousal, as well as allowing the bystander to avoid any feelings of guilt that might result from a failure to help.
- **Similarity:** We are more likely to feel empathy if we perceive those in need to be similar to ourselves: the greater the similarity, the stronger the feelings of empathy and arousal are likely to be. This is because the helper can more easily identify with the person in need.
- **Genuine desire to help:** Some helpers genuinely feel sad for the victim. By helping the victim, the helper also feels better.

Mood

mood
an emotional state that can affect our perceptions, thoughts and behaviours

A person's **mood** has been found to influence their propensity to behave in prosocial ways. Generally, people who are in a good mood are more likely to demonstrate prosocial behaviour than people who are in a bad mood.

Research has also found that when people are made to feel good by succeeding at a task, they are more likely to be helpful than those who have failed in a task. Similarly, people who hear good news or experience good weather are more likely to feel optimistic and positive towards others and help them.

Research has also found that when people feel bad or depressed, they are more likely to focus inwardly towards themselves rather than outwardly towards others in need.

SUGGESTED RESEARCH

13.2 Cross-cultural altruism
Go to your obook assess »

Competence

The way bystanders perceive their **competence** to deal with an emergency will influence whether they will provide help. For example, a study has found that people with first-aid training are more likely to help in emergencies than people who have no such experience (Shotland & Heinold, 1985).

Altruism

Altruism is a unique influence on prosocial behaviour where, for no personal gain and sometimes at great personal cost, a person helps others due to a deeply felt concern for fellow human beings. Altruistic behaviour is typically selfless and only concerned with the welfare of others. Case Study 13.2 could be described as an act of altruism.

FIGURE 3 Following natural disasters, such as the Queensland floods, many people volunteered to assist victims in the clean-up.

competence
an individual's ability to respond effectively to a situation or to perform a task successfully

altruism
a prosocial behaviour that involves selflessness or helping others, even if there is nothing to be gained personally or if there is some personal cost

CHALLENGE 13.2

Acting on empathy

The caption to Figure 3 reads, 'Following natural disasters, such as the Queensland floods, many people volunteered to assist victims in the clean-up'. Why might this story exemplify empathy as a motive for prosocial behaviour? Explain your answer.

CHECK YOUR LEARNING 13.2

Describe and explain

1 **Define** the reciprocity principle.
2 **Explain** what social responsibility is.
3 **Summarise** how empathy may influence prosocial behaviour.

Apply, analyse and interpret

4 **Compare** competence and empathy as reasons for engaging in prosocial behaviour.
5 **Differentiate** between altruism and social responsibility.

Investigate, evaluate and communicate

6 **Evaluate** the following statement: 'Individuals cannot act out of pure altruism when their friends or family are involved'.
7 **Design** a methodology to test that people in a better mood are more likely to act with prosocial behaviour.
8 Read Case study 13.2 and **evaluate** Lincoln Sherlock's behaviour. **Comment** on any other examples of altruism you can think of (you may also include a personal example).

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 13.2
- **» Suggested research**
  13.2 Cross-cultural altruism
- **» Challenge**
  Worksheet: 13.2 Acting on empathy
- **» Weblink**
  Altruism in action

13.3 Antisocial behaviour

KEY IDEAS

In this section, you will learn about:

- characteristics of antisocial behaviour
- factors that influence antisocial behaviour, including groupthink, diffusion of responsibility, audience inhibition, social influence and cost–benefit analysis.

antisocial behaviour behaviour that is harmful to others and, ultimately, to the community (e.g., prejudice, aggression)

The opposite of prosocial behaviour is **antisocial behaviour**. Antisocial behaviour is behaviour that is harmful to others and, ultimately, to the community.

Antisocial behaviour can take many forms. It can be hostile (meaning emotional, impulsive and driven by pain or distress) and in response to an immediate situation; or it can be instrumental and the result of deliberate planning over time.

Two types of antisocial behaviour that are particularly harmful to individuals and to society are aggression and prejudice.

Explanations of antisocial behaviour

Why do people engage in antisocial behaviour? As with prosocial behaviour, there are several possible explanations. Table 1 summarises these.

TABLE 1 Explanations of antisocial behaviour

Type of explanation	Description
Biological (nature)	Antisocial behaviours, such as aggression, are seen as genetic, where humans instinctively behave to protect themselves and other members of their species, and to compete for scarce resources.
Environmental (nurture)	This is the view that antisocial behaviour is not innate, but is learnt during the socialisation process. It suggests that classical and operant conditioning and also observational learning all contribute to the development of antisocial behaviour.
The interaction between nature and nurture	This approach suggests that, although we might be born with an innate tendency to some forms of antisocial behaviour, exactly how we act in antisocial ways is the product of learning from the environment.

The bystander effect

bystander effect the likelihood of bystanders helping is influenced by the number of bystanders at the scene

We have seen that bystander intervention is where a person voluntarily goes to the aid of another who is in need. The **bystander effect** is where the likelihood of bystanders helping is influenced by the number of bystanders present at the scene – the more bystanders there are, the less likely it is that one of them will provide help. This is demonstrated in Case study 13.3, which reflects on the case of Kitty Genovese.

SUGGESTED RESEARCH

13.3 Review the case study of Kitty Genovese
Go to your obook assess »

CASE STUDY 13.3

Kitty Genovese

The attack and murder of Kitty Genovese in New York, in 1964, inspired a major area of research into prosocial and antisocial behaviour.

The way in which she was murdered shocked and appalled New Yorkers. What also disturbed many people was that nobody responded to her screams for help as her murderer attacked her repeatedly.

The attack occurred late at night in the respectable borough of Queens in New York. Kitty was on her way home from her work as a barmaid. Her attacker struck and, initially, her screams and struggles drove him away. However, when he realised that nobody was coming to help her, he attacked again. Once more, she screamed for help and managed to escape. Again, nobody came to her aid. In the third attack, Kitty was stabbed eight more times and sexually molested.

Being late at night, most residents of the apartment block near the attack were at home and would have heard her repeated cries for help. About half an hour after the attack began, the police received a call from a witness who wanted to remain anonymous because he 'did not want to get involved'.

The next day, the police discovered that at least 12 people in the area had heard the victim's cries for help. All of these people had time to do something to help her but failed to act. Some had telephones in their homes, but still did not call the police.

Although these people may be excused for not rushing to Kitty's aid because they feared being attacked too, the question arose: Why didn't they call the police when they heard Kitty's screams?

This question prompted Bibb Latane and John Darley to seek the answer through research on bystander intervention and the bystander effect. Their research revealed that the lack of response by Kitty's neighbours was typical of the bystander effect, where the presence of other people actually inhibits helping behaviour. This effect occurs in a range of situations, where each bystander experiences a diffusion of responsibility if there are other bystanders present.

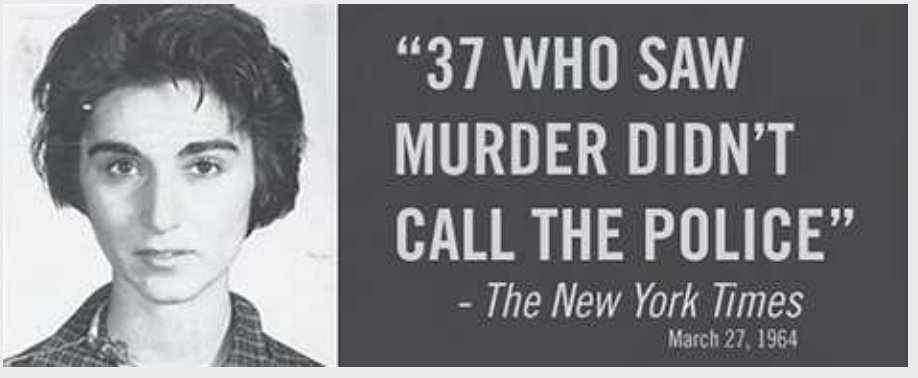


FIGURE 1 Kitty Genovese's face alongside a news headline from the time of her murder

The research of Latane and Darley (1970)

In 1970 Latane and Darley conducted a study where participants (volunteer students) were each placed in individual cubicles connected by an intercom. Through the intercom, the students participated in discussion groups of three different sizes. Because the students were in separate cubicles, the researchers could observe how each individual behaved. At the start of the discussions, an accomplice of the researchers, posing as one of the students, said that he was prone to suffer from seizures. Later on during the discussion, he pretended to have a seizure and call for help. The researchers found that although most students tried to get help for him, the larger the group size, the less likely it was that group members would seek help.

In another study, the researchers found that the bystander effect occurs even when a person's own safety is at risk (Latane & Darley, 1968). The researchers asked students to complete a questionnaire about the problems of city life. Not long after they had started to fill out the questionnaire, artificial smoke began to pour into the room. Where there was only one participant in the room, at least 50 per cent of the participants reported the smoke within 4 minutes. However, when there were three participants in the room at one time, only one of the 24 participants reported the smoke within the first 4 minutes, and only three did so within 6 minutes. This study showed that people might fail to act even when their own safety is at risk.

Reasons for the bystander effect

The bystander effect (or bystander apathy) occurs in a variety of situations, and a number of factors can be involved, including diffusion of responsibility, audience inhibition and social influence.

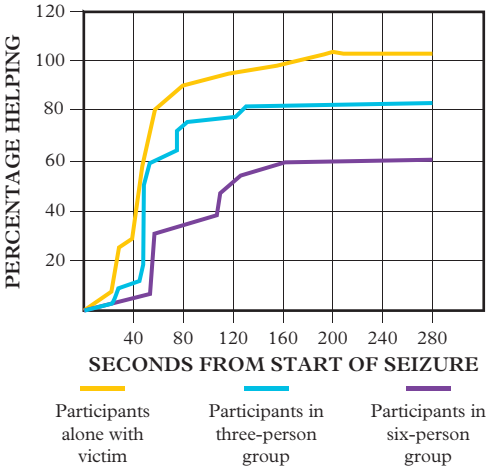


FIGURE 2 Latane and Darley found that the number of bystanders present influenced whether or not people attempted to help the victim of a seizure, and the time it took to provide help.

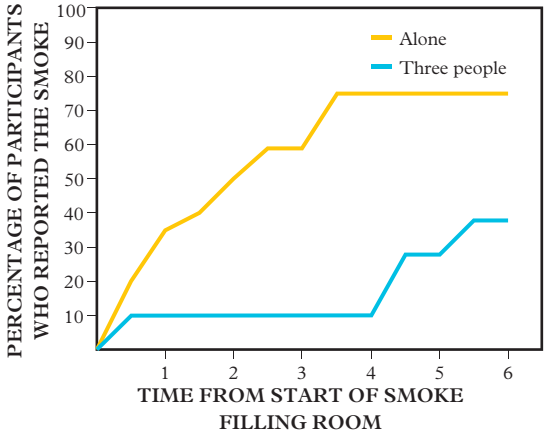


FIGURE 3 Latane and Darley (1968) found that the number of people present in a room when it began to fill with smoke influenced the time it took for the situation to be reported.

Diffusion of responsibility

Sometimes when there are several bystanders, they look at each other to see how they are reacting to the emergency. If nobody in the group responds to the emergency, then it is possible each bystander has experienced a **diffusion of responsibility**. This is where the presence of others leads each bystander to feel less responsibility for helping the person in need. Each bystander believes that it is the responsibility of the other bystanders to take charge and provide help. Conversely, if you are by yourself, then the responsibility to take action is yours alone.

diffusion of responsibility the idea that bystanders are less likely to take responsibility for helping in the presence of others

Audience inhibition

The presence of other bystanders or onlookers can make a potential helper feel self-conscious and thus inhibit helping behaviour. This is also known as 'fear of social blunders', where people are afraid that others will judge them by their actions if they make an incorrect move, and they experience **audience inhibition**.

audience inhibition the reluctance of bystanders to help due to the perceived negative appraisals of others (or due to feelings of self-consciousness)

Social influence

The reaction of other bystanders will influence the likelihood of help. If the other bystanders appear unconcerned, then potential helpers might not perceive the situation to be one that warrants assistance. On the other hand, if the crowd appears concerned, then it is likely that bystanders will provide help. This is called **social influence**.

social influence the likelihood that bystanders will be more likely to help based on the reaction of others

CHALLENGE 13.3

Party reactions

On the weekend, Tom celebrated his 18th birthday party at home. His parents hired security guards to check the guest list and to occasionally walk through the party. They also invited their friends, Mike and Priya, to help keep an eye on how the party was going. Tom's girlfriend, Cat, walked past a group of boys bullying another guest. Cat noticed that no one else was reacting to the fight, so she didn't think much of it. Cat mentioned it in passing to Mike who said he'd go and have a look. Mike brushed it off, as he assumed someone else would come and investigate. Eventually, the security guards diffused the incident.

The bystander effect offers several explanations for the behaviour of everyone at the party. In the above scenario, propose a reason for the reaction of Cat, Mike and the security guards. Then discuss a potential reason for each of them to act as well. Decide if your reasons align with the bystander effect.

Cost–benefit analysis

The **cost–benefit analysis model** by Piliavin and colleagues (1981) suggests that bystanders weigh up the pros and cons of helping before deciding whether to provide help in emergency situations. The cost–benefit analysis model includes both cognitive and physiological processes. It suggests that when bystanders are confronted with emergencies, they weigh up the costs and benefits of providing help compared to those for not helping.

According to this model, bystanders work their way through three stages before they respond to an emergency:

cost–benefit analysis model a model of behaviour that suggests that when bystanders are confronted with emergencies, they weigh up the pros and cons of providing help compared to those for not helping

1 **Physiological arousal** (e.g., increased heart and respiratory rate): This is triggered by witnessing a victim's distress. The greater the arousal, the more likely it is that the bystander will help.
2 **Labelling the arousal with a specific emotion**: In an emergency, this might be either personal distress or empathetic concern. Personal distress is a feeling of anxiety and tension when someone else is in distress. Bystanders take action to make themselves, rather than victims, feel better. Empathic concern is the ability to recognise someone else's emotional state and express appropriate concern if that state is negative.
3 **Evaluating the consequences of helping**: This involves working out whether the costs of helping outweigh the benefits. Costs usually involve time and/or effort. The greater these costs, the less likely it is that a bystander will help. A helper must weigh up the personal costs and the empathy cost of their helping or failing to help.

According to the cost – benefit analysis model:

- The more onlookers, the less likely it is that a bystander will help because there is a reduced personal cost for not helping (e.g., in terms of public disapproval or self-blame).
- The greater the victim's need for help, the greater the personal distress of not helping. For example, a child attacked by a dog is more likely to get help than a man in the street begging for money to buy cigarettes.
- If the victim is a relative or friend, or is perceived to be similar to the bystanders, then the bystanders are likely to help because they will experience both greater physiological arousal and more empathy costs (such as guilt for not helping).

Groupthink

groupthink
the tendency of a group to make decisions based on maintaining group cohesion rather than by critically analysing the realities of the situation

Individuals in a group tend to be influenced by the actions, thoughts and behaviours of those around them. This is especially true when it comes to making group decisions in times of extreme stress, when a group is highly cohesive, or when a group has a strong, charismatic leader. **Groupthink** refers to the tendency of group members to make decisions based on maintaining group harmony and cohesion rather than critically analysing and realistically appraising the situation (Burton, Westen & Kowalski, 2019; Park, 2000). Individuals in these situations characteristically tend to put aside their personal beliefs and adopt the beliefs of the group. Likewise, people who are opposed to group decisions tend to remain silent rather than cause disruption by voicing their opinion.

Groupthink has been used to explain instances of poor decision-making when social justice or foreign policy decisions have been made by groups in power or in times of crisis, such as war. For example, researchers have used groupthink to explain the contentious decision of the United States government to not heed the possibility of an attack on Pearl Harbour during the Second World War, despite the certainty of civilian casualties (McCauley, 1989).

FIGURE 4 President Franklin D. Roosevelt signing the Declaration of War against Japan

Social psychologist Irving Janis (1982) outlined a model of groupthink that included interactions between characteristics or antecedents of the group (e.g., strong group cohesiveness); symptoms of groupthink (e.g., rationalising and illusions of vulnerability); and symptoms of poor decision-making (e.g., not examining all available options). This model explains why groupthink results in poor decisions that are often misaligned with prosocial thinking.

FIGURE 5 Groupthink has been used to explain the United States' decision not to heed the possibility of an attack on Pearl Harbor during WWII.

CHECK YOUR LEARNING 13.3

Describe and explain

1 **Summarise** antisocial behaviour.
2 **Identify** biological reasons for antisocial behaviour.
3 **Describe** the bystander effect.
4 **Identify** the characteristics of groupthink that can lead to poor decision-making when a group of young people witness an emergency situation outside the school grounds. Give an example to illustrate.

Apply, analyse and interpret

5 **Compare** diffusion of responsibility and social influence.
6 **Critique** the cost–benefit analysis model.
7 **Differentiate** between antisocial behaviour and prosocial behaviour.

Investigate, evaluate and communicate

8 Read Case study 13.3. The murder of Kitty Genovese sparked research and outrage. **Evaluate** the behaviour of the bystanders, considering if the behaviour was antisocial.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 13.3
- **» Suggested research**
  13.3 Review the Kitty Genovese case study
- **» Challenge**
  Worksheet: 13.3 Party reactions
- **» Weblinks**
  The bystander effect: Kitty Genovese

CHAPTER 13

Review

Summary

13.1
- Helping behaviour refers to acts that are favourably viewed by society, including altruistic behaviour, and acts that are intended to help other people.
- Factors that influence helping behaviour include whether a situation is an emergency or a non-emergency. This is known as bystander intervention.
- The decision-stage model of helping suggests that potential helpers go through up to five stages in a decision-making process about whether to provide help.
- The bystander effect is influenced by factors such as the situation, the number of bystanders, social influence, audience inhibition, proximity, the characteristics of the victim and the characteristics of the bystander.

13.2
- The development and maintenance of helping behaviour is influenced by social norms, including the reciprocity principle and social responsibility.
- Social norms and the personal characteristics of an individual are variables that influence the chances of the person behaving in prosocial ways.
- Helping behaviour is influenced by personal factors such as empathy, mood, personal competence and altruism.
- Altruism is behaviour that is driven by a desire to help others without any expectation of reward.

13.3
- The bystander effect refers to scenarios where the presence of others diffuses responsibility and inhibits the likelihood of prosocial behaviour. It was highlighted by the Kitty Genovese murder in New York.
- An individual is likely to combine cognitive processes and physiological arousal levels in a cost–benefit analysis of whether to engage in prosocial behaviour.
- Groupthink refers to the tendency of group members to make decisions in an emergency situation based on maintaining group harmony and cohesiveness rather than critically analysing and realistically appraising the situation.

Key terms

- altruism
- antisocial behaviour
- audience inhibition
- bystander intervention
- competence
- cost–benefit analysis model
- diffusion of responsibility
- empathy
- groupthink
- mood
- prosocial behaviour
- reciprocity principle
- social influence
- social responsibility norm

Revision questions

The relative difficulty of the short answer questions is indicated by the number of stars beside each question number: ★ = low, ★★ = medium, ★★★ = high.

Multiple choice

1 Helping behaviour and altruism are two expressions of:
- **A** bystander effect.
- **B** reciprocity.
- **C** prosocial behaviour.
- **D** antisocial behaviour.

2 A person who demonstrates prosocial behaviour is likely to:
- **A** avoid groupthink.
- **B** use outrageous behaviours to get attention.
- **C** have an individual personality.
- **D** come to the aid of strangers.

3 Which of the following plays a role in the development of prosocial behaviour?
- **A** classical conditioning
- **B** operant conditioning
- **C** social learning
- **D** All of the answers are correct.

4 People often give generously to victims of natural disasters and have no expectation of personal gain for their generosity. What explains this?
- **A** the bystander effect
- **B** social responsibility norm
- **C** compliance
- **D** All of the answers are correct.

5 Which three processes help to explain the bystander effect?
- **A** diffusion of responsibility, audience inhibition, social influence
- **B** empathy, arousal, social influence
- **C** apathy, audience inhibition, diffusion of responsibility
- **D** audience inhibition, arousal, social influence

6 When a group of people witness a person in distress, under which circumstance is the bystander effect likely to occur?
- **A** The group is small.
- **B** The group is large.
- **C** The witnesses are male.
- **D** The victim is a child.

7 Which of the following is an explanation for the bystander effect?
- **A** compliance
- **B** social facilitation
- **C** diffusion of responsibility
- **D** all three of the answers above

8 Under which circumstance is there a greater likelihood that a bystander will help in an emergency?
- **A** The bystander is similar to the victim.
- **B** The bystander is in a good mood.
- **C** The bystander knows how to help the victim.
- **D** All of the answers are correct.

9 According to the cost–benefit analysis model, when bystanders perceive someone in need of help, they work through three stages before they respond. What are the stages?
- **A** evaluation, responsibility, action
- **B** labelling arousal, evaluation, action
- **C** arousal, labelling arousal, evaluation
- **D** evaluation, action, arousal

10 Anthony's company often consults outside organisations when making decisions during crises. Petra's committee is bound by a strong sense of loyalty and run by a charismatic president. Marcello's boss is a strong leader who values the opinions of others. Which of these groups is most vulnerable to groupthink?
- **A** both Petra's and Marcello's groups
- **B** Petra's group
- **C** Anthony's group
- **D** Marcello's group

11 What are some of the personal characteristics that affect prosocial behaviour?

A similarity, empathy, mood

B mood, empathy, competence

C arousal, empathy, competence

D knowledge, empathy, mood

12 What is altruism?

A the selfless helping of others without the expectation of reward

B an act only performed if there is social benefit to be gained

C an act only performed if the helper feels competent

D an example of the bystander effect

13 Which of the following is not a stage in Latane and Darley's decision-stage model of helping?

A Take action to help.

B Decide to take responsibility.

C Notice the need for help.

D Predict expected outcomes.

14 'Do unto others as they do unto you' is an expression of:

A the social responsibility norm.

B the reciprocity principle.

C bystander empathy.

D the helper principle.

Short answer

Describe and explain

★ 15 **Explain** what happens in the decision-stage model of helping.

★ 16 **Describe** personal characteristics that influence social behaviour. Give examples with reference to empathy, mood, competence and altruism.

★ 17 **Explain** how diffusion of responsibility and social influence can affect antisocial behaviour. Give examples to illustrate.

★ 18 **Describe** how factors related to the victim can influence the prosocial behaviour of bystanders.

★★ 19 People in a hurry are less likely to help someone than people who are not in hurry. **Use** the cost–benefit analysis idea to **explain** why people in a hurry are unlikely to help in an emergency.

★★ 20 **Explain** how groupthink may lead to poor decisions being made in groups that are highly cohesive. **Use** an example to illustrate.

★★ 21 Some factors can cause people to be less likely to come to the assistance of a person in need. **Summarise** the following terms:

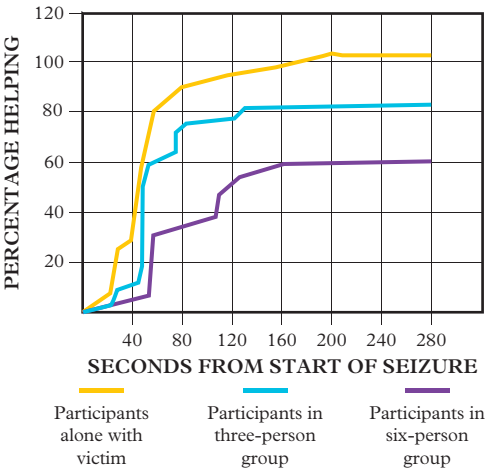
a cost–benefit analysis

b audience inhibition.

Apply, analyse and interpret

★ 22 **Consider** how social norms influence prosocial behaviour.

★ 23 **Interpret** the graph below. Apply your understanding of the bystander effect to explain the results.



★ 24 **Determine** how biological theories may explain why people act aggressively in situations where they feel threatened.

★★ 25 In the decision-stage model of helping, individuals ask themselves a series of questions. A key question is 'Am I responsible?'. Susannah notices that her son is struggling to swim offshore. **Consider** the responsibility Susannah would feel in this situation, compared to a bystander who noticed.

★★ 26 Mel was falling asleep in her apartment when she heard a woman screaming for help. She could see that the victim was a young woman. She could also see that people in

the woman's apartment block were looking out and watching the events. Mel hesitated before calling 000, but decided it was the right thing to do. When Mel spoke with the operator, they informed her that despite there being other onlookers, hers was the first phone call about the incident. Mel wasn't surprised because she has studied psychology. **Consider** why Mel acted in this situation. In your response, refer to bystander intervention.

★★ **27** Although 'altruism' is helping without expectation of personal gain, **determine** why some psychologists argue that it might also be motivated by self-interest.

★★ **28** **Compare** bystander intervention with helping behaviour.

★★★ **29** **Use** your knowledge of prosocial behaviour to **consider** why people living in rural settings may be more likely to engage in helping behaviour than those living in urban areas.

Investigate, evaluate and communicate

★ **30** Marcel was stand up paddle-boarding one day when a rogue wave knocked him off his board. As he fell down he hit his head and didn't resurface. Several onlookers from the beach witnessed this, and watched as a lifeguard swam out to rescue him. **Discuss** the role of the lifeguard in this scenario. **Identify** the behaviour that the lifeguard was displaying.

★ **31** For each of the following events **identify** if it is an emergency, and **propose** one reason someone may assist and one reason why they might not.

a A car is stopped at a set of lights with their emergency lights on. An onlooker notices that a large spider is on the window and that the driver is terrified of moving.

b Flood waters are surrounding a primary school, with most students evacuated to the roof.

c On a trip to the zoo, your friend falls over the railing into the chimpanzee enclosure.

d Your mother screams from the kitchen, when you get there she has accidentally cut her finger, the bleeding can be stopped with a Band-Aid.

★★ **32** Myra lives in a small town in NSW. Her bedroom is on the bottom floor of her house, with a large window. One night, Myra heard a violent fight outside her window, and instead of helping, Myra shrunk into her doona, and pretended she couldn't hear anything. The next morning, Myra discovered that the victim had been murdered. **Propose** why Myra did not act in this situation.

★★ **33** Helping behaviour depends on several groups of factors. Provide an example of each of the following and **discuss** how these factors influence helping behaviours:

a situational factors

b personal factors.

★★★ **34** **Assess** the non-action of the bystanders in the case of Kitty Genovese using what you know about the bystander effect.

★★★ **35** **Discuss** possible explanations for the bystander effect. **Use** an example to illustrate.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 13 Review
- **» Revision notes**
  Revision notes for Chapter 13
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 13

CHAPTER 14

Aggression

In psychological terms, aggression is referred to as verbal or physical behaviour carried out with the intention of harming another person (Burton, Westen & Kowalski, 2019). Evolutionary psychologists suggest that aggressive behaviour has an adaptive purpose – think of two lions fighting each other to mate with the same lioness. Researchers have identified neurological circuits in the human brain that become activated in response to threatening environmental stimuli or in response to certain social situations (e.g., engaging in a tackle during a rugby game; Blair, 2016). Aggressive behaviour can be considered a form of antisocial behaviour that is problematic if used persistently, out of context or to achieve a goal (e.g., to gain money by mugging an innocent bystander).

Aggression is a multifaceted behaviour influenced by biology, the social environment and, in many instances, our culture. Aggressive behaviour has been associated with various forms of media influence; for example, watching violent television programs or playing violent video games. However, the results are inconclusive.

In this section, we will review aggression as an antisocial behaviour by exploring two major types of aggression (hostile and instrumental) before exploring the various explanations for aggressive behaviour. We will then review the current ways in which media influences aggressive behaviour.

OBJECTIVES

→ Discuss the general aggression model (GAM).
→ Explain how media can influence aggression, with reference to advertising, video games and social media.

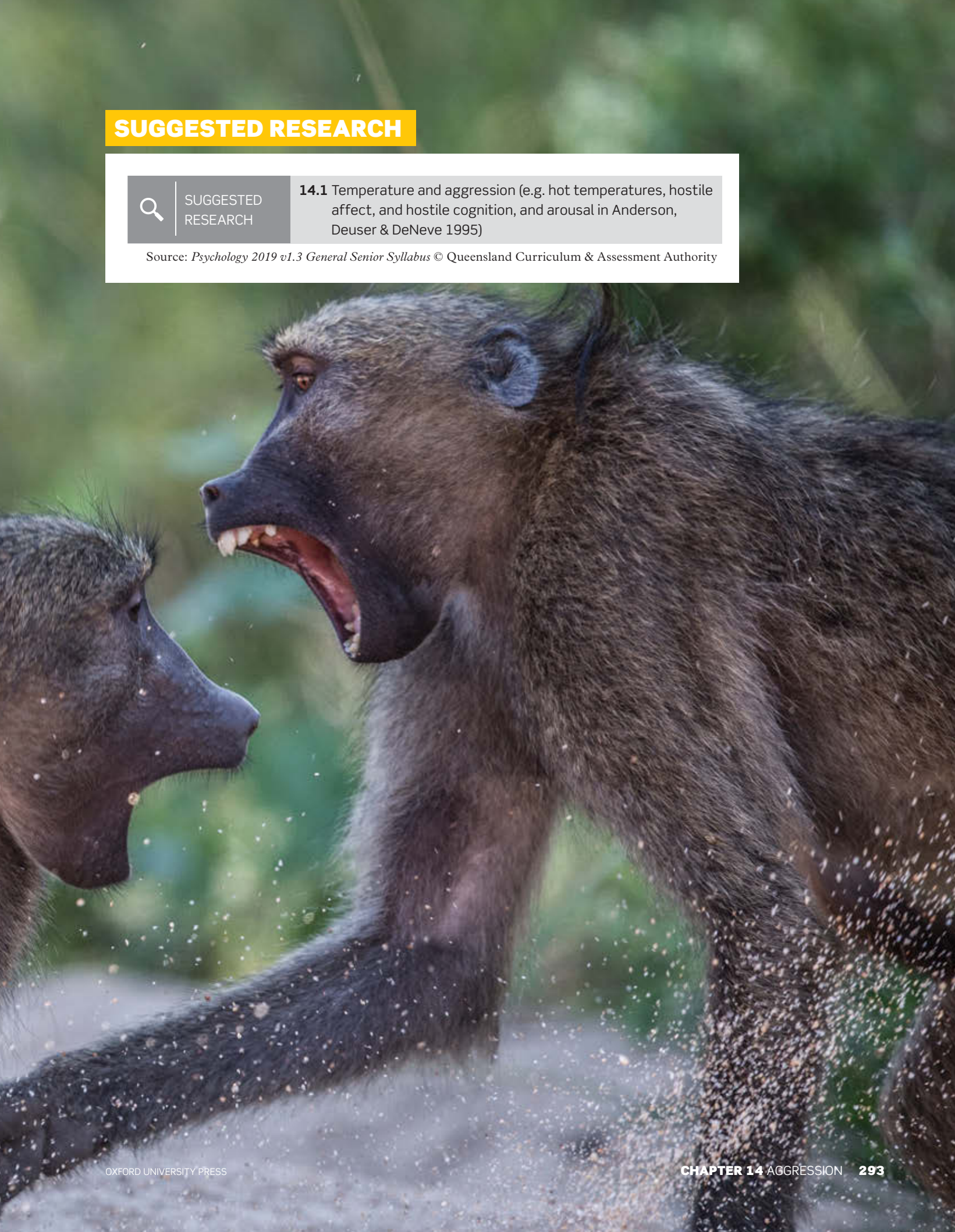
Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

FIGURE 1 Baboons often display aggressive behaviour.

SUGGESTED RESEARCH

SUGGESTED RESEARCH	**14.1** Temperature and aggression (e.g. hot temperatures, hostile affect, and hostile cognition, and arousal in Anderson, Deuser & DeNeve 1995)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority



14.1 Aggression

KEY IDEA

In this section, you will learn about:

+ aggression as a behaviour.

aggression
a behaviour directed towards others that is intended to cause harm

Aggression is behaviour, directed towards another person or people, which is intended to cause harm. Gang fights, riots, child abuse, bullying, homicide, road rage, rape, domestic violence, ethnic cleansing and verbal abuse are all examples of aggression as an antisocial behaviour. In legal terms, even an aggressive attitude can be called an assault.

Forms of aggression

Aggression can be the act of an individual or a group of people. Aggression can be physical, involving behaviour such as pushing, shoving, hitting and assault. Aggression can also be non-physical, involving behaviour such as threatening speech, verbal insults and unpleasant facial expressions.

Generally, any form of aggression is antisocial behaviour. However, in some circumstances and in some communities, aggression can sometimes be seen to be prosocial and therefore valued, such as when fighting a common enemy, playing sport (where the aggression is controlled by strict rules) or in legitimate acts of self-defence.

There are two types of aggression:

hostile aggression
emotional, impulsive aggression that is a reaction to pain or distress

instrumental aggression
aggression that is deliberately planned

- **Hostile aggression** is emotional, impulsive and driven by pain or distress. It is intended to hurt another person, even if it results in damage to personal relationships or property. This aggression is usually a response to pain, perceived danger or threats, or an uncomfortable environment, such as extreme temperature.
- **Instrumental aggression** is the result of deliberate planning, where the aggressor (e.g., an assassin, bank robber or embezzler) has no personal feeling towards the person or people they are hurting.

FIGURE 1 People may react aggressively to bad or stressful news. This is hostile aggression not instrumental, as it is directly related to the moment.

The General Aggression Model

A lot of research has been dedicated to explaining the motivation behind aggression. Brad Bushman and Craig Anderson were instrumental in developing a model to offer an explanation for aggression. They developed a social-cognitive model that accounted for the biological, situational and individual factors that explained why people react in aggressive ways (Allen, Anderson & Bushman, 2018). It focused on how our knowledge structures – our beliefs, attitudes and expectations – influence our perceptions of when and how aggressive behaviour might occur.

Bushman and Anderson provided the **General Aggression Model (GAM)**. Their 2002 study sought to investigate if short-term exposure to violent or aggressive stimuli could induce aggressive interpretations by making hostile situations accessible. The study concluded that exposure to violent video games in the

short-term could increase expectations about situations, and these expectations were more likely to be perceived as aggression.

The model proposed by Bushman and Anderson suggests that when shown violent or aggressive stimuli for a short period, this can increase someone's aggression, and that this will be seen through their cognitive, affective and arousal measures.

Playing a violent video game may 'prime aggressive conditions … increase arousal, and create an aggressive affective (Bushman & Anderson, 2002). The GAM also recognises that social knowledge structures are developed over time, and that these will determine how people react when presented with a situation. Figure 2 shows the video game *Fortnite*, which illustrates points made by Bushman and Anderson's research.

FIGURE 2 The GAM suggests that people who play video games are more likely to interpret ambiguous situations as hostile. Recent research implies *Fortnite* is increasing violent behaviour.

CHALLENGE 14.1

Justified aggression?

People often automatically associate aggression and violence. This mental association creates tension between the necessity of aggression and whether or not it is ever justified. Based on your understanding of hostile and instrumental aggression, provide an example of when aggression is justified and another for when aggression cannot be justified.

General Aggression Model (GAM)
a social-cognitive theory of aggression that suggests that exposure to violent video games increases the likelihood of perceiving a situation as aggressive

When you play a video game, you are presented with a situation. Your brain takes different cognitive routes to appraise this situation (see Unit 2). This appraisal will cause you to react possibly aggressively or not. The General Aggression Model (see Figure 3) proposes that increased exposure to violence and aggression encourages your brain to take a cognitive route to aggression.

This occurs because aggression is 'largely based on the activation of aggression-related knowledge stored in memory' (Bushman & Anderson, 2002). This research was based on previous findings that had found people who act aggressively have a tendency to interpret ambiguous information as hostile.

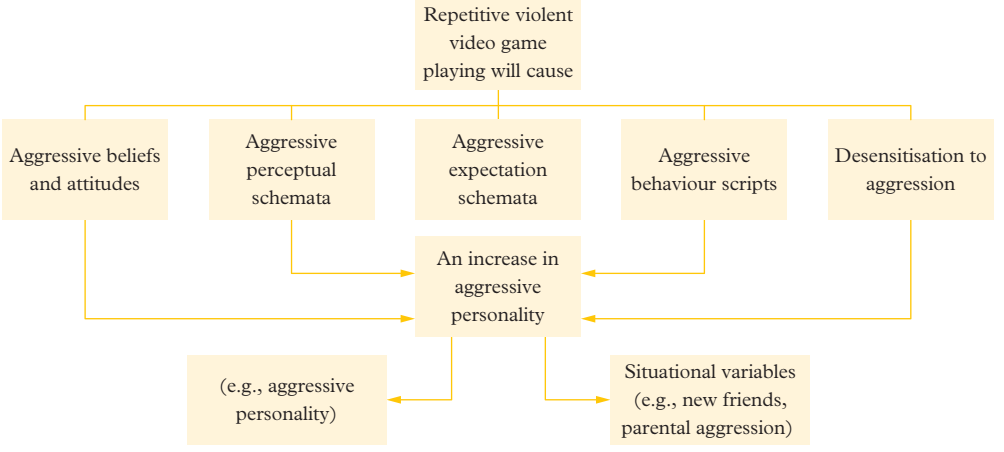


FIGURE 3 The General Aggression Model

Hostility

hostile attribution bias
the tendency to interpret the behaviour of others as having aggressive intent, even when it may be accidental or ambiguous

hostile perception bias
the tendency to interpret social interactions as aggressive instead of pleasant events

Bushman and Anderson identify different types of hostility that contribute to someone's perception and interpretation of a situation. The first of these is the **hostile attribution bias**. This bias is the 'tendency to perceive harmful actions by others as intentional' instead of interpreting these actions or behaviours as accidental. Further, the **hostile perception bias** is a tendency to see social interactions as aggressive, instead of happy, peaceful events.

CASE STUDY 14.1

The General Aggression Model

In 2002, Bushman and Anderson sought to find out why violent media affects aggression. The study's participants were 224 undergraduate students, who were enrolled in introductory psychology courses. The students received course credit for their participation.

Participants were told that they were helping researchers select stimuli for future studies. They were then randomly assigned to play either a violent or nonviolent video game for 20 minutes. They were tested individually and had to complete three ambiguous story stems, 'The car accident', 'Persuading a friend' and 'Going to a restaurant'. Each story ended with 'What happens next?'. Participants had to suggest what the main character in the story would do, say, think and feel if the story continued. After this, participants were debriefed and none reported any suspicion that the study was investigating aggression.

The study found that people who had played a violent video game for just 20 minutes were more likely to assume that a potential conflict situation would be handled aggressively. There was an increase in aggressive content in thoughts, feelings and behaviours.

CHECK YOUR LEARNING 14.1

Describe and explain

1 **Explain** what aggression is.
2 **Summarise** the General Aggression Model.
3 **Describe** hostile behaviour.

Apply, analyse and interpret

4 **Compare** aggression and violence.
5 **Consider** how violent video games can induce aggressive interpretations of situations.

Investigate, evaluate and communicate

6 **Appraise** the General Aggression Model.
7 Read Case study 14.1. **Comment** on the ethics used during Bushman and Anderson's 2002 study and **decide** if they were appropriate.
8 **Evaluate** the participants used in Bushman and Anderson's 2002 study. **Consider** if they were reflective of the population.

obook assess

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- **» Student book questions**
  Check your learning 14.1
- **» Suggested Research**
  14.1 Temperature and aggression
- **» Challenge**
  Worksheet: 14.1 Justified aggression?
- **» Weblink**
  The General Aggression Model

14.2 Influence of advertising on aggression

KEY IDEA

In this section, you will learn about:

+ the influence of various forms of media on behaviour and aggression.

Media includes anything from newspapers, radio, magazines and television to social media or blogging. It is where we get our information and connect with the outside world on a global scale. Using technology, we can access this information from many different devices, such as our phones, tablets or computers, from practically any location.

The messages and information coming from the media can have an impact on our attitudes and behaviour, whether we are aware of it or not. As we are fed more and more information through images, sounds, slogans and branding, we are incorporating what the media shows us into our knowledge of the world.

There is little doubt that the media has positive and negative influences on individual and group behaviour. Advertising, television, social media and video games play an important role in shaping society and individuals.

The power of advertising

Imagine you are watching your favourite television series and the ads are becoming annoying. Sometimes, the amount of time allocated to advertising seems longer than the show itself! Despite this, a new advertisement from KFC is making you salivate.

Advertising is directed at *you* and fosters artificially created 'needs' to have the latest, best most desirable consumer item on the market or to make you behave in a particular way. Do you have an Apple or an Android device? Do you drink Coca-Cola or Pepsi? Do you really think 'the burgers are better at Hungry Jacks'?

Advertising sends the message that 'the only way to secure pleasure, popularity, security, happiness or fulfilment is through buying more … regardless of how much we already have' (Lewis, 2011).

Advertising also likes to grab our attention – sometimes by using subtle forms of aggression. This strategy is particularly effective when combined with humour.

Although this may seem quite harmless (think 'Captain Risky', the stuntman for Budget's car insurance campaign), researchers argue that this form of advertising can lead to desensitisation of the impacts of aggressive behaviour and can influence social norms, making aggressive behaviour more acceptable (Gradinaru, 2016).

FIGURE 1 After witnessing an advertisement for KFC, you may really want to eat fried chicken.

CASE STUDY 14.2

The $30 million campaign against domestic violence

By Jessica Marszalek *The Courier-Mail*, 27 April 2015

Boys as young as nine will be targeted in the new fight against domestic violence.

Social media will also become the new way to deliver the Federal Government's $30 million education campaign.

The Assistant Minister for Women, Michaelia Cash, has revealed boys aged between nine and 12, non-English-speaking women and Aboriginal and Torres Strait Islanders are among the groups chosen for special focus.

Senator Cash said extensive research was already underway into who needed the messages most, what would work and when, and how they should be delivered.

She said starting with young children aged nine to 12 years meant respectful attitudes could be shaped while they were forming relationships and opinions.

'We want them to understand the girl standing next to you is the same as the boy standing next to you,' she said.

Unlike major attitudinal-change campaigns such as drink-driving and seatbelt awareness, this year's push to change the way some think about domestic violence won't be seen on TV screens but delivered to personal devices.

Technology will be used to target messages to specific groups deemed at risk of abuse or of holding bad attitudes towards women.

'It'll be looking at how we get to different age groups and what is the most effective medium to get to them,' Senator Cash said.

'A lot of kids don't watch TV but they do have an iPhone.'

'And that's the exciting thing about the internet, we have the reach we didn't have during road safety campaigns.'

Social marketing campaigns regularly feature aggression to raise awareness of the impact of aggressive behaviour. For example, government campaigns targeting domestic violence often use shock tactics to help change attitudes and social practices that tolerate violence towards the perpetrator's partner and children (Queensland Government, 2016).

Advertising can also be a powerful vehicle to distribute important health and wellbeing messages as well as education. There are many examples such as the Transport Accident Commission (TAC) advertisements, 'If you drink and drive you're a bloody idiot' or 'Speed kills', where graphic scenes played by actors illustrate what can happen when people drink and drive or drive too fast.

It can also deliver very important socially responsible messages to the masses. Following the brutal unprovoked hit to the head that left Daniel Christie in a coma, the media reframed the incident as a 'coward's punch'.

Daniel's family made the painful decision to turn off his life support 11 days later and donated his organs. Social media showed immense support for Daniel and his family – a great example of how these vehicles of communication can have a positive effect on individuals and groups.

The murder of Luke Batty on 12 February 2014 at the hands of his father spurred his mother, Rosie Batty, to raise public awareness of domestic violence for women and families in Australia. The horrendous circumstances of Luke's death led to a broader discussion through television, newspapers, social media and magazines. Rosie Batty was awarded Australian of the Year for her work in this area. Following Luke's death and Rosie's persistence, laws on domestic violence are changing for the better and the government has pledged $30 million dollars to fund an advertising campaign that will be delivered through social media to target boys as young as nine. Social media has been a vehicle for this campaign as younger generations tend to use their phones more than they watch television. Case study 14.2 (p. 300) illustrates this.

Despite advertising and social media campaigns against domestic violence, particularly violence against women, some advertisements still include violence towards women, or negative treatment of women. These advertisements reinforce the idea that women are men's property and that they can be treated with disrespect and aggression. Increased exposure to these advertisements can cause an increase in aggression.

FIGURE 2 Domestic violence awareness has been raised throughout Australia through a series of aggressive campaigns, including advertising.

CHECK YOUR LEARNING 14.2

Describe and explain

1 **Describe** the effects of advertising on aggression.

2 **Explain** how advertising can change our attitudes.

Apply, analyse and interpret

3 **Consider** how advertising can be used to positively influence individuals and groups.

Investigate, evaluate and communicate

4 **Investigate** online for news stories about the 'coward's punch' campaign. Describe how this campaign came about and **evaluate** how the media was utilised to encourage change.

5 The media has rallied to communicate the message that domestic violence against women is socially and morally wrong. Find two sources of media (digital, print, social media, etc.) that relate to domestic violence against women and **evaluate** each. In your evaluation, refer to the type of media, the message and whether or not it is effective.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 14.2
- **Increase your knowledge**
  Aggression in advertising
- **Weblink**
  Advertisements and aggression

14.3 Social media and aggression

KEY IDEA

In this section, you will learn about:

+ the positive and negative influence of social media on behaviour.

Social media can influence society in a positive or negative way. There are many benefits in having greater connectivity and as a result, access to more information. Below we will look at both the positive and negative influences of social media on society, focusing on aggression.

Positive influences

So far, we have discussed the power of advertising on individuals and groups, and briefly examined both the negative and positive influences that this form of communication has on individuals and society.

Is your phone in your pocket or sitting on your desk? How often do you actually turn it off or leave it at home when you go out? Is your answer 'Never'?

The reality of technology today means that most of us are connected to our friends, family, news feeds, social media and the global community 24 hours a day. We can call, email and message, as well as use FaceTime, Skype, WhatsApp, Twitter, Facebook and Instagram. Our smartphones also allow us to play video games with friends, share photos with our loved ones and organise events with ease. The opportunity to be part of the global community is literally in the palm of your hand.

Negative influences of social media

It is clear that there are many benefits to accessing the great range of media at our fingertips. However, there is also a dark side. Cyberbullying, a form of aggression, can be traumatic and lead to self-harm or, in some cases, suicide. Internet 'trolls' have become an unfortunate online presence and find pleasure in deliberately creating arguments, putting people down, and being sarcastic, cruel and emotionally destructive. Recent statistics reveal that as many as one in five Australian children aged between eight and 15 years have experienced cyberbullying (Mamamia, 2015). Social media can also encourage aggressive thoughts and behaviour. This can happen by normalising aggressive behaviour or thoughts, as well as making them appear socially acceptable.

FIGURE 1 With your phone you have instant access to global news in 'real time', online job seeking and shopping, social outlets, as well as access to gossip, cyberbullying and aggressive content.

Online social media provides a platform for a specialised form of bullying where people are deliberately hurt – psychologically or emotionally – via electronic technology. There are multiple social media tools that cyberbullies can use to 'bully' another person. These include mobile phones, chat rooms, Instagram, messaging and other social networking forums. Cyberbullies can engage in verbal and socially aggressive behaviour such as harassment, insults, threats and rumour spreading. Unfortunately, cyberbullying can occur any time of the day or night – 24 hours a day, seven days a week. This means, the effects of

cyberbullying can be profound and hard to escape (Australian Human Rights Commission, 2012; Gordon, 2018).

As you may remember from Chapter 13, the bystander effect explains why people may not respond when they see another person in trouble. This has particular relevance for cases of cyberbullying. Quite often, people in the same social groups are aware of what is happening but choose not to assist or become involved. Australian researchers found that school students may refrain from assisting those being cyberbullied out of:

- fear of becoming the next target for bullying behaviour
- rejection from peers who may disapprove of bystander action
- lack of knowledge of the history of the bullying situation to know whom to support and how
- uncertainty about whom to tell to get help to resolve the situation.

FIGURE 2 The Slender Man is an online myth that is shared through various social media sites. Acts of violence and aggression have been linked with the Slender Man.

Social media has also been implicated in aggressive acts by teenagers. You may have heard of the Slender Man. The Slender Man is an online viral image and story that has been shared by adolescents around the world, particularly in the United States. Eventually, the Slender Man was made into a video game. What's interesting about the Slender Man is that it sparked very violent and aggressive acts among teenagers. In 2014, two 12-year-old girls stabbed their friend in the woods in an attempt to please the Slender Man. The girls had no previous violent or aggressive tendencies, and stated that they only acted this way for the Slender Man. While there were other issues involved in this case, it prompted a discussion about how much teenagers were influenced by social media, and if it could be blamed for violent, aggressive and negative social behaviour. The case also saw social media and internet outlets use the positive networking they provide to raise money for the victim and discourage this sort of behaviour.

CHECK YOUR LEARNING 14.3

Describe and explain

1 **Describe** two positive and two negative effects of social media on aggressive behaviour.

2 **Explain** how social media can influence aggressive behaviour.

Apply, analyse and interpret

3 **Compare** the effects of social media with advertising.

Investigate, evaluate and communicate

4 Think about your use of social media, and the types of information you encounter. **Evaluate** the effects of this on your general mood and feelings of aggression.

5 **Create** a research question for the following claim: 'Social media makes teenagers more aggressive'. **Design** a method to test this.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 14.3

» **Weblink**
Social media and aggression

» **Weblink**
Headspace

14.4 Video games and aggression

KEY IDEAS

In this section, you will learn about:

- the positive and negative effects of gaming
- research linking aggression and gaming.

Although video games are often discussed in negative terms, emerging research also links gaming with positive social functioning, including positive mental health and wellbeing of young players.

Research suggests that gaming results in the formation of online friendships that are similar to real-life friendships, especially for teens who play popular multi-user games (Yee, 2006). These friendships can become an important source of emotional support for teens.

Researchers have found links between online gaming and self-determination theory (Goode, 2014; Jones *et. al.*, 2014). They argue that gaming helps players gain a sense of competence and mastery when they win or advance through levels. Players also relate to others in meaningful ways by sharing online gaming experiences and developing a sense of autonomy (Jones *et al.*, 2014).

There is also evidence that online gaming promotes friendships, enables a state of flow (a positive state of mind achieved by total immersion in an enjoyable activity; Csikszentmihalyi (1992) promotes positive affect and mood, and reduces stress levels in children and adolescents (Jones *et al.*, 2014). Online gaming can be a fun, social and rewarding activity; this explains why so many young people enjoy playing together.

Negative influence of video games

Research generally indicates that watching violence on television, in movies or video games promotes aggression (LoBue, 2018). Simply watching violent movies or playing violent video games will not cause someone to become aggressive. However, repeated exposure to television violence in childhood has been shown to predict aggressive behaviour in adulthood (Huesmann *et al.*, 2003).

FIGURE 1 Video games are said to improve a player's cognitive function through the repetitive practice of quick responses, tactical thinking and problem-solving skills.

A large-scale survey by Australia's Interactive Games and Entertainment Association highlights the worrying effects of young people spending too many hours a week playing video games, especially violent ones. Their research shows that children who are constantly exposed to violent multimedia are more likely than other children to engage in aggressive behaviour when placed in a conflict situation. It is therefore clear that frequent exposure to media violence increases the likelihood of engaging in aggressive behaviour at a later point in time (Flynn, 2012).

Craig Anderson (2002) found strong evidence that playing violent video games on a frequent basis (approximately 20+ hours a week) increased aggressive behaviour and decreased positive social behaviours in children and young people. Anderson suggested that this was due to improved computer graphics and the development of visually realistic games that involved brutal mass killings as the main goal of scoring points

and winning the game. Games such as *Grand Theft Auto*, *Call of Duty* and the *Battlefield* series all involve wounding or killing opponents in graphically lifelike settings. They show realistic people, blood and wounds, and use various weapons such as shotguns, explosives and knives. Although there has been much support for Anderson's position, with many stating that violent video games desensitise people, there are other researchers who have found that those who become obsessed with violent video games already possess an aggressive and possibly violent predisposition. However, one of the common threads with many of the perpetrators of mass shootings is that they tend to be quiet and reclusive, and may have a history of spending countless hours playing violent video games.

FIGURE 2 People who play *Halo* may become predisposed to violence.

The American Psychological Association (2015) cautions that there has been very little substantive research actually examining whether violent video-game use causes lethal violence. Their findings suggest that the public and media exercise caution when blaming video-game playing for large-scale public massacres, especially after tragedies such as American school shootings. There is, however, no denying that there is evidence linking frequent exposure to gaming with different forms and levels of aggression, but care should be taken when interpreting this evidence and applying it to video gamers in general.

CHALLENGE 14.4

Aggression in video games

Based on your understanding of violence, aggression and the role of video games, design a method to investigate whether aggressive video games increase aggression.

CHECK YOUR LEARNING 14.4

Describe and explain

1 **Explain** the relationship between aggression and video games.

2 **Describe** the effect of violent video games on aggression.

Apply, analyse and interpret

3 **Consider** Section 14.1 on the General Aggression Model, and how this interacts with long-term video-game use.

Investigate, evaluate and communicate

4 **Hypothesise** the following statement: 'Playing nonviolent video games will lead to a decrease in aggression in society'.

5 **Discuss** the potential effects of long-term exposure to violent video games.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 14.4
- **Challenge**
  Worksheet: 14.4 Aggression in video games
- **Increase your knowledge**
  The murder of Stephanie Scott
- **Weblink**
  Violence and video games

CHAPTER 14

Review

Summary

14.1
- Aggression is a behaviour that is directed towards another or a group and has the intention to cause harm.
- Hostile aggression is reactive and emotional, typically as a result of pain or distress.
- Instrumental aggression is planned and deliberate with little to no personal feeling.
- The General Aggression Model (GAM) suggests that exposure to violent video games will increase the likelihood of perceiving a situation as aggressive.
- People can perceive behaviour as aggressive (hostile attribution bias) or interpret situations as aggressive (hostile perception bias).

14.2
- Advertising can influence acceptable standards in society; aggressive advertisements can make aggression seem normal, but aggression can also be used in advertisements to deter violence.
- Social marketing campaigns use violence to attract attention and encourage attitude change regarding aggressive behaviour.
- Advertising can use violent behaviour to attract attention to its message, which encourages desensitisation and could alter social norms in relation to aggression.

14.3
- Social media can have positive influences on behaviour but also negative influences such as social isolation, normalising violence, cyberbullying and aggression exposure.

14.4
- Emerging research links gaming with positive social functioning, including positive mental health and wellbeing of young players.
- Anderson found that young people who play more than 20 hours a week of violent video games have increased aggressive behaviour and decreased positive social behaviours. Anderson attributed this to the graphic nature of the games. Other researchers who have conducted similar studies have attributed this to the belief that it desensitises the player.
- Research links aggression with video gaming; however, the results must be interpreted with caution especially when applied to lethal forms of aggression.

Key terms

- aggression
- General Aggression Model (GAM)
- hostile aggression
- hostile attribution bias
- hostile perception bias
- instrumental aggression

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: ★ = low, ★★ = medium, ★★★ = high.

Multiple choice

1 Which of the following are considered media?
- **A** online newspapers
- **B** magazines
- **C** news websites
- **D** all of the answers are correct.

2 What type of aggression is caused by a person wanting something that another person has?
- **A** reciprocal
- **B** hostile
- **C** greedy
- **D** instrumental

3 The General Aggression Model suggests that:
- **A** previous exposure to violence will make a person more likely to expect others to react to a situation with aggression.
- **B** people who play video games are more aggressive than people who don't play video games.
- **C** all people will react aggressively when provoked if they have previously been exposed to violence.
- **D** all three of the answers above are correct.

4 Which of the following is *not* true regarding video gaming and aggression?
- **A** There is extensive research linking gaming to lethal violence.
- **B** There is extensive research linking frequent gaming to aggressive behaviour.
- **C** Research suggests video gaming can be good for players' mental health.
- **D** People who played a violent video game for 20 minutes were more likely to think that potential conflict would be handled aggressively.

Short answer

Describe and explain

★ 5 **Describe** a positive influence of video games on aggression and society.

★★ 6 **Explain** how the bystander effect facilitates cyberbullying. **Use** a specific barrier to **explain** why people may not want to help a victim of cyberbullying.

★★ 7 **Use** your own words to **explain** how the General Aggression Model facilitates aggressive behaviour.

Apply, analyse and interpret

★ 8 **Compare** the negative effects of video games with the negative effects of social media.

★ 9 **Consider** how aggression may promote survival of a species from an evolutionary perspective.

★★ 10 **Select** an advertisement that promotes or discourages aggression. **Identify** how the advertisement does this, and **consider** how this affects society.

★★ 11 **Differentiate** between hostile aggression and instrumental aggression.

Investigate, evaluate and communicate

★★ 12 **Apply** the General Aggression Model to society. **Discuss** the impact that research like this can have on media regulation.

★★★ 13 Violent video games have been linked with violent crimes. **Investigate** this further and, based on your research, **assess** whether there is a causal link between video games and violence.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 14 Review
- **» Revision notes**
  Revision notes for Chapter 14
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 14

CHAPTER 15

Attraction & relationships

Have you ever wondered what makes that boy sitting across the room from you look so good? Or why that girl who walked past you in the hallway smells so enticing?

Attraction can be explained using biological, social or cognitive viewpoints, with each perspective identifying different factors that aid in explaining the formation of attraction with another. The biological framework suggests that the best partner is one who will serve the best evolutionary purpose: we find the best person to help us to survive the big world (Buss *et al.*, 1996).

The cognitive and social perspectives suggest that we seek a partner whom we perceive to have a similar personality to our own and who reciprocates our love. The research suggests that long-term love and happiness may depend on this level of 'likeness' (Markey & Markey, 2007).

Given all the factors that need to be considered regarding attraction, we should also consider the factors that may hasten a relationship breakdown. In this chapter, we will investigate why relationships end based on Duck's model of dissolution. In addition, we will also explore alternative explanations for why relationships change, such as communication breakdowns and attributions.

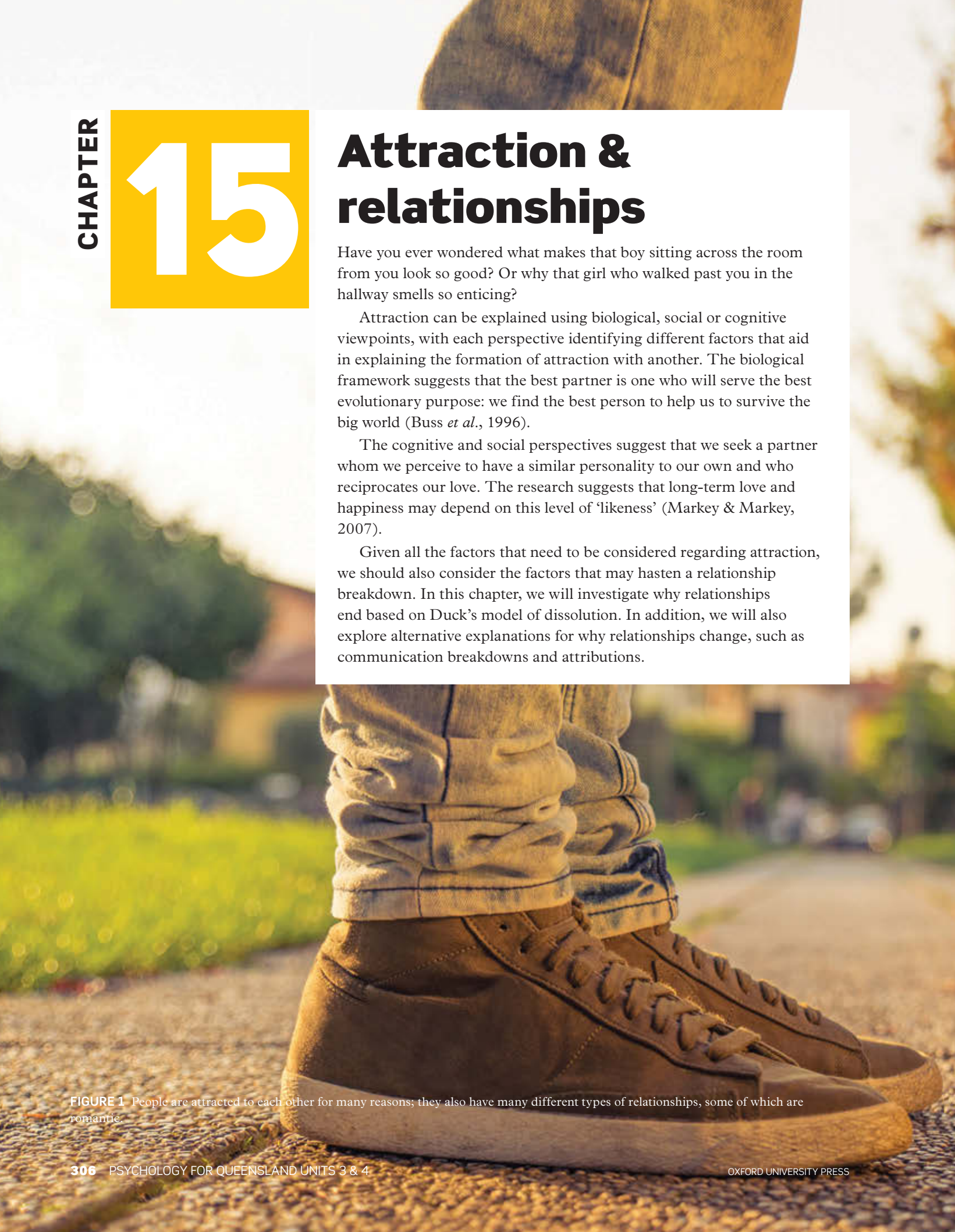

FIGURE 1 People are attracted to each other for many reasons; they also have many different types of relationships, some of which are romantic.

OBJECTIVES

→ Describe biological theories of attraction (Buss, Abbott, Angleitner, Ahserian, Biaggio *et al*. 1990).

→ Recognise social and cognitive origins of attraction, including proximity, reciprocity and similarity.

→ Predict why relationships change and end, with reference to Duck's stages of dissolution (i.e. intrapsychic stage, dyadic stage, social stage, grave-dressing stage and resurrection stage) (Stephanie Rollie and Steve Duck 2006)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

SUGGESTED RESEARCH

SUGGESTED RESEARCH	**15.1** Biological attraction theories (e.g. partner selection based on genes expressed through body odour in Wedekind *et al*. 1995)
SUGGESTED RESEARCH	**15.2** Social and cognitive origins of attraction (e.g. the similarity–attraction hypothesis in Markey & Markey 2007)
SUGGESTED RESEARCH	**15.3** Relationship dissolution and media influence (e.g. navigating romantic relationships in social media in LeFebvre, Blackburn & Brody 2014)
SUGGESTED RESEARCH	**15.3** Attraction, relationship satisfaction and relationship dissolution (e.g. correlation between heterosexual and homosexual relationship satisfaction and stability in Gottman, Levenson, Gross, Fredrickson, McCoy, Rosenthal, Ruef & Yoshimoto 2003)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

15.1 Biological theories of attraction

KEY IDEA

In this section, you will learn about:

+ biological theories of attraction including partner selection.

relationships
the connection between two or more people

Relationships are necessary in order to meet life's demands, whether they be social support from friends, finding your first love or growing old with your partner by your side. As human beings, there is a need for us to feel like we belong, and there seems to be an evolutionary benefit to having relationships that are successful and a negative consequence if there is an absence of social relationships.

Relationships, whether they are romantic or otherwise, increase the chances of survival, according to Darwin's theory of evolution (Buss *et al.*, 1990). As social animals, humans live in communities to benefit from each other's strengths and weaknesses. Evolutionary psychologists believe that **attraction** is based on wanting a partner who is most likely to keep the family or offspring alive. For example, women are often physically attracted to men who are likely to be able to provide for them, and men are likely to be physically attracted to women who give the impression of being fertile. Age preferences and physical attractiveness in partner choice among homosexuals also suggest a similar pattern to those seen in heterosexual couples (Gotmann *et al.*, 2003). Regardless of sexual orientation, it appears females tend to prefer a partner the same age or slightly older than themselves, as this will enhance the chance their partner will financially provide for them. In contrast, men generally look for a younger partner, as this will enhance their chance of reproductive success (Kenrick *et al.*, 1995). This evolutionary preference for age of partner is replicated across cultures worldwide. Some of the physical attributes that lead to attraction will be considered in this chapter.

attraction
the ability to evoke interest and attention

FIGURE 1 Michael Douglas is 25 years older than his wife, Catherine Zeta-Jones.

Physical attraction

Physical attractiveness is not just about vanity: it may actually have an evolutionary purpose. Research has supported the idea of physical attractiveness as a measure of **reproductive fitness**, which can be defined as the likelihood our genes are passed to the next generation (Leventhal & Krate, 1977). Therefore, characteristics that attract a partner include those that signal health, fertility and also traits that suggest better reproductive

physical attractiveness
attributes that can be seen on the exterior of a person that draws people to that person

reproductive fitness
a measure of how likely a person is to pass their characteristics to the next generation

success. Physical attractiveness is thought to benefit reproduction, as it signals to a partner the 'quality' of a person's genes (Leventhal & Krate, 1977). Apart from playing a role in determining attraction by a possible partner, physical attractiveness can also influence marketing and sales numbers (e.g., using beautiful celebrities as sales people). Attractiveness can also influence a candidate's perceived suitability for a workplace and even influence the length of prison sentences.

Leventhal and Krate (1977) investigated this phenomenon by setting up a mock trial in order to investigate the relationship between a criminal's perceived attractiveness and the length of sentencing. They found that regardless of ethnicity or gender, the more attractive the defendant, the shorter the prison sentence assigned. A study by Eagly and her colleagues (1991) provided additional evidence that physical attraction is 'good' or beneficial. They found that physical attractiveness strongly determines perceptions of social competence, and perceptions of intellectual competence to an extent.

This phenomenon is called the **attractiveness halo effect**, which suggests that because someone is physically attractive people assume that they have additional positive qualities. According to this effect, people will often believe that an attractive person is more intelligent and successful than others who are not as physically attractive (Eagly *et al.*, 1991). Research suggests this halo effect is unconscious and people are unaware of their bias towards those they deem to be physically attractive (Eagly *et al.*, 1991).

attractiveness halo effect
the theory that people who are physically attractive are assumed to have additional positive qualities

Factors that affect attractiveness

Facial symmetry

Scientists can use graphic design software to engineer perfectly symmetrical faces for the purpose of research. Interestingly, when participants were asked to rank the level of attractiveness of faces that ranged from perfectly symmetrical to asymmetrical, overwhelmingly the results skewed towards the symmetrical faces.

The reasons for this preference are widely debated, with two prevailing explanations. Firstly, the **evolutionary advantage view** suggests that symmetrical faces indicate healthier or better genes. Research has found that certain infections and diseases contracted during development can actually cause changes to physical appearance, causing small imperfections, including asymmetries, which indicate ill health (Rhodes, 2006). Therefore, individuals with symmetrical faces are less likely to have been exposed to as many infections or diseases and thus are likely to have a stronger immune system (Rhodes, 2006). Animal research also supports this theory. For example, peacocks with symmetrical tail feathers are more likely to mate and pass on their genetic material (Rhodes, 2006).

evolutionary advantage view
the theory that suggests the reason why symmetry in facial characteristics is so attractive is because symmetry suggests good health

FIGURE 2 Like humans, peacocks have been known to show preference for symmetry when selecting a partner.

perceptual bias view
a theory that states the reason why symmetrical faces are more attractive is because the visual centres of the brain find symmetrical information easier to process

Secondly, the **perceptual bias view** proposes that we are more likely to think of symmetrical faces as attractive because our visual system is able to recognise and process symmetrical information more easily than asymmetrical information. This preference for symmetrical information is generalised to all stimuli, not only faces. Research into preferences for art, sculptures and architectural designs shows that symmetrical versions are the most popular and sought after pieces compared to asymmetrical versions (Rhodes, 2006).

FIGURE 3 Ryan Gosling and Amber Heard have highly symmetrical faces.

CHALLENGE 15.1A

Try it yourself!

Using programs online, you can find out what your face, or another person's, looks like when it is completely symmetrical (left or right symmetry).

Scarlett Johansson has a scientifically symmetrical face. Search online to find people with symmetrical faces. You will find images that have been modified so that you can see a right symmetrical version of the face, a left symmetrical version of the face and a 'normal' face. Decide if you prefer one of these, or if you think that it is more attractive than the others. If you do, based on your understanding of attraction so far, comment on why you prefer that image.

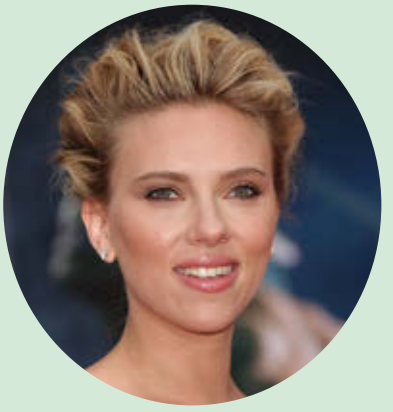

FIGURE 4 Scarlett Johansson has a scientifically symmetrical face.

Little and Jones (2003) investigated which of the two theories was more likely when looking at human faces. The experiment was conducted using pictures of asymmetrical and symmetrical faces for both males and females, with half of the images presented right side up and the other half presented upside down. The upside-down images were presented to eliminate the effect of the participants feeling only the right-side-up faces could be potential mates. Therefore by inverting the images, participants could view the faces as objects rather than as people and enable both the perceptual bias view and the evolutionary advantage view to be tested simultaneously. The results showed that only for the right-side-up images did participants find the symmetrical image to be more attractive, supporting the evolutionary advantage view.

Masculinity–femininity and averageness

Although you might think that faces that are rare or unusual are more desirable than faces that are common, this is not true. In fact, familiar or average faces are more attractive than faces that are rare. Grammer and colleagues (2002) found that faces that we frequently see are the ones that are picked out and ranked as most attractive by the majority. The reason for this phenomenon is that we feel more familiar with people who are average or whom we are similar to and, therefore, we are more likely to prefer them as partners compared to foreign faces that are less familiar (Rhodes, 2006).

In addition to average faces being more attractive, typical or expected faces such as those that have traditionally feminine or masculine features, are found to be more attractive than less traditional faces. Scientists suggest that these sex-specific characteristics (i.e., having features that are typically feminine or masculine) are preferred because they exaggerate a person's health and reproductive ability and, according to the evolutionary theory, are more preferable as mates (Grammer *et al.*, 2002).

Perrett and colleagues (1998) manipulated pictures to exaggerate masculinity and femininity of male and female faces to see if it changed perceived attractiveness. It was found that both male and female participants preferred the femininised female faces as well as the femininised male faces. To date, no studies have found that masculine features on both male and female faces are more attractive, with one exception – during ovulation (when an egg is released during a female's menstrual cycle), women are more likely to find masculine men attractive. This finding possibly occurs because falling pregnant is most likely to occur during ovulation, so a masculine male who is likely to father offspring is preferred. At other times, however, females tend to find feminine males more attractive, viewing them as more likely to be caring and trustworthy. These traits often attributed to femininity (Penton-Voak *et al.*, 1999) and are therefore perceived to lead to longer lasting relationships.

FIGURE 5 Research has found that more feminine faces on both males and females are preferred most of the time.

genes
a portion of your DNA that codes for a particular characteristic

phenotype
the physical representation of what your gene codes for (e.g., brown hair, blue eyes)

DNA
genetic information that is inherited from your parents

pheromones
a chemical substance released by the body that can affect other people

natural selection
mechanism for evolution that can predict the likelihood of survival based on an organism's phenotype

Genetics and attraction

Genes, which are inherited from our parents in varying combinations, along with our environment, determine our **phenotype** (our physical characteristics). In addition, these inherited genes, which are sections of **DNA**, also determine the hormones, neurotransmitters and **pheromones** that are produced by our bodies which, in turn, determine how our bodies and brains function. Therefore, given that physical appearance plays a key role in perceived attractiveness, it is important to understand the underlying biological factors within humans that determine these characteristics.

Natural selection is an evolutionary process that aids in determining which genes are more likely to be passed on to offspring. The process suggests that genes beneficial to the survival of the species are more likely to result in mating and, therefore, be passed along to the next generation (Wedekind, 1995). In terms of attraction, this means that genes that increase the likelihood of a mate selecting you to build a romantic relationship with will increase the chances of those genes being passed to the next generation.

Claus Wedekind (1995) investigated a specific set of genes suggested as important in the process of attraction (Case study 15.1). The group of genes are collectively called the major histocompatibility complex (MHC) and are responsible for the formation and maintenance of the human immune system. These genes allow the immune system to readily detect pathogens and therefore decrease the chances of infection in humans. Genome research has found that the more diverse the genes are within the MHC, the higher the chances that an individual will have a stronger immune system. According to the biological theories of attraction, especially the evolutionary view, seeking a partner who has a different set of genes within their MHC from yourself is beneficial, as this increases the diversity in the genes within the MHC of the offspring, which increases their chance of survival.

Research by Beer and colleagues (1985) provides further support for the evolutionary perspective of attraction. This study found that couples who suffer from repeated miscarriages often shared a high percentage of their MHCs, suggesting that because of decreased immunity due to limited variation in MHC genes, the offspring was less likely to survive.

Although there is strong scientific evidence supporting the evolutionary theory of mating, it is not the only explanation for attraction in human relationships. The decision to choose a mate based on genes is not a conscious one and, therefore, this perspective ignores many other factors that can influence attraction. For example, your culture can also affect what you perceive to be attractive.

FIGURE 6 A person's genetics, in particularly their MHC similarity can increase or decrease attraction to another.

CASE STUDY 15.1

The Sweaty T-Shirt Study

Claus Wedekind (1995) conducted the Sweaty T-Shirt Study. The aim was to see if women would be attracted to a man unconsciously based on just his natural scent, which can signal the uniqueness of his MHC. A total of 93 students (49 females and 44 males) from the University of Bern, Switzerland, were recruited for the study and each participant was tested for the combination of genes present in their MHC. A wide variety of MHCs were included in the final sample and women who were on oral contraceptives (which includes high levels of estrogen and sometimes progesterone) were recorded. The men in the experiment were asked to wear a T-shirt to bed for two nights and they were also given perfume-free washing detergent to clean their bodies, clothes and linens. They were asked not to use deodorants or after-shave to avoid confounding variables in the experiment. In an attempt to control as many extraneous variables as possible, the men were asked to refrain from alcohol, tobacco and sexual activity, and to avoid any spicy or strongly flavoured foods. In contrast, the women were tested during the second week of their menstrual cycle, where possible, as their sense of smell would be the highest at this time.

After the two days, the women smelled seven T-shirts, each with a different combination of MHCs from the men. Out of the seven T-shirts, three of them came from men who had a similar MHC to the woman, three men with a MHC dissimilar to the woman, and one of the T-shirts was unworn and acted as the control. Women were tested one at a time and every T-shirt and its associated odours were rated for intensity on a scale from 0 to 10. The T-shirts were also rated for pleasantness and sexiness (0 = unpleasant, 5 = neutral and 10 = extremely pleasant).

The results of the study supported the evolutionary theory of attraction. The women consistently chose MHCs that were dissimilar from their own. They scored male body odours as more pleasant when the MHC of the men was different from their own and less pleasant when the MHC was similar to their own. When asked, the women also suggested that the odours from the T-shirts of men who had dissimilar MHCs reminded them of past relationships, suggesting that MHC genes may influence human attraction – or at least the action of choosing a mate.

The Sweaty T-Shirt Study supports the evolutionary view for attraction in humans, especially the notion that genes have some influence on the level of attraction you feel for another person. This study was replicated in 2010 (by Lie and colleagues).

The 2010 study investigated MHC similarity and scores for facial attractiveness in females by males. Their study found that males who rated females with high facial attractiveness also had MHCs dissimilar to these women.

FIGURE 7 During the study, the intensity, pleasantness and appeal of a males sweat was rated by women.

CHALLENGE 15.1B

Extending the Sweaty T-Shirt Study

In their experiment, Wedekind and colleagues investigated women who took the contraceptive pill and women who did not take the contraceptive pill. Women who did not take the contraceptive pill found men with the opposite MHC to themselves the most attractive. Interestingly, women on the contraceptive pill found men who had a similar MHC as themselves to be the most attractive.

The contraceptive pill fools the body by producing a large amount of hormones that mimic how the body responds to pregnancy. Therefore, because it makes the body think it is already pregnant, ovulation does not occur and an individual cannot fall pregnant.

Given this, why do you think women on the contraceptive pill are more likely to like men who have similar MHC to themselves? What might happen in a relationship if the woman stopped taking the contraceptive pill? Predict possible outcomes based on the biological factors associated with attraction.

Cultural survival and attraction

The evolutionary perspective for attraction suggests that attraction is influenced by biological factors. Evolutionary psychologists as well as sociologists have aimed to find the answer to the age-old question of how we become attracted to others. Evolutionary psychologists are especially interested in finding universal characteristics in mate selection, which means looking at attraction preferences across cultures in order to investigate possible biological factors that affect attraction that are consistent.

All evolutionary theories make the assumption that males and females have different requirements when finding a partner. This can be seen in the theories and physical appearances that have already been discussed.

The International Mate Selection Project

Buss and colleagues' (1990) international study of mating preferences searched for these gender differences and preferences in regard to the evolutionary theory of attraction. The study aimed to find universal traits that affect mate selection worldwide through the 'International Mate Selection Project'. A trait that is preferred in mate selection would be considered universal if it had surfaced due to natural selection and the process of evolution. According to evolutionary theory of attraction, **culture** may affect some of the traits preferred by men and women, but the evolutionary traits that are most attractive should be the same across all cultures, because they will benefit human survival regardless of culture.

culture
a collection of ideals, values, belongings and ethics that belong to a group of people and are passed on from generation to generation

In a highly ambitious study, 9474 individuals were recruited across 37 different countries to participate in the study (33 countries were investigated and five islands across six continents were involved). The average age of the participants was 23.15 years, and each of the participants completed two questionnaires in their native language on preferred mate characteristics and preferences.

The results revealed that nearly all cultures valued 'mutual attraction and love' as the most important characteristic in a romantic relationship. For women across all cultures, 'good financial prospects' and 'good earning capacity', as well as ambition and status in men, were more valued than other characteristics. As expected, men in all cultures were more concerned

with 'youth' in their mate selection; however, just how much younger a partner was varied according to cultural background. In addition, as supported by previous research, physical attractiveness had a larger influence on attraction for men than women. Across all cultures, the most important physical characteristics that increase attraction include clear skin, average features and full lips. These characteristics seem to transcend cultural barriers and thus support the evolutionary perspective of attraction.

Interestingly, there were also many features that influenced attraction that were not universal. For example, 'chastity' was preferred and valued in collectivist cultures. Conversely, individualist cultures did not care about chastity at all. A similar trend was also evident for characteristics such as 'religion' and 'community'.

The study had a large sample size and included a diverse group of cultures enhancing the ability to generalise the findings. However, the extent to which the study reliably translated the surveys from English to the native language of the participants and then back to English is uncertain – potentially decreasing the validity of the study. In addition, the samples showed a bias towards metropolitan areas, and participants were generally of high socioeconomic status. Lastly, self-report surveys were used in the study, therefore, participants may have lied or responded with socially desirable answers, rather than responses that were truthful accounts of what they actually thought.

FIGURE 8 Buss and colleagues (1990) research demonstrated that certain traits were universal across different cultures.

Evaluation of biological theories of attraction

There is ongoing debate about the extent to which biological theories can be used in isolation to explain or predict attraction. Some of the major strengths and limitations of the evolutionary theory of attraction are outlined below.

Limitations

- Evolutionary psychologists can use natural selection and evolution to explain behaviour but not necessarily to predict mate selection.
- There is nothing to suggest that attraction behaviour needs to be an evolved behaviour. Traits can undergo the process of evolution; however, behaviours that are too unpredictable and widely varying, may not be due to evolution but actually due to environmental and cultural factors (i.e. chastity).
- The conclusions from evolutionary psychology research support old-fashioned and stereotypical roles about gender; for example, women being more concerned with child-rearing than men.

- The study of McNulty and colleagues (2008) supports this theory and suggests that physical appearance is only relevant to initial attraction. For long-lasting relationships and marriage, it is the perception or cognitive interpretation of love and appearance between individuals that determines relationship success.
- Biological theories cannot explain love or attraction between same-sex partners as these partnerships are not based solely on the production of offspring.
- Evolutionary theories are also difficult to test as, in general, they rely on correlational data and self-reports, such as surveys. Therefore the reliability can be questioned.

Strengths

- Evolutionary theory of attraction is strengthened by the triangulation of evidence. For instance, findings from studies (e.g., Buss *et al.*, 1990), in addition to brain scanning technology and genetic research (e.g., MHC), increase the validity of the theory.

CHECK YOUR LEARNING 15.1

Describe and explain

1 **Define** cross-cultural differences in attraction and **explain** why these cultural differences exist.

2 **Describe** biological theories giving at least one example of how these can explain attraction.

3 **a** **Identify** the aim, method, results and conclusion in the Buss (1990) study.

b **Identify** two strengths and two limitations of the study.

Apply, analyse and interpret

4 Think of a person that you find attractive. **Identify** the characteristics that psychologists would suggest make that person attractive. **Analyse** the person and suggest what characteristics, other than those an evolutionary psychologist may find important, you may consider important in your attraction for that person.

5 **Apply** your knowledge of biological theories of attraction and **create** a survey that could be used to investigate whether symmetry can determine attraction.

Investigate, evaluate and communicate

6 A modelling agency claims that they only hire models who have a 'unique and androgynous (unisex)' face. **Apply** your knowledge of the biological factors and **propose** if this modelling agency is likely to find models that are considered attractive by the majority of the population. **Explain** your reasoning.

7 **Investigate** the claim, 'Attraction is determined only by biological factors'. Create three possible research questions that can be explored for this claim. **Communicate** how you came up with your research questions, in the form of a written rationale.

8 **Evaluate** the biological theories of attraction and **justify** the extent to which they contribute to attraction.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 15.1
- **» Suggested research**
  15.1 Biological attraction theories
- **» Challenge**
  Worksheet: 15.1A Try it yourself!
- **» Challenge**
  Worksheet: 15.1B Extending the 'Sweaty T-Shirt Study'

15.2 Social and cognitive origins of attraction

KEY IDEAS

In this section, you will learn about:

+ the role of proximity, reciprocity and similarity in attraction.

proximity
the physical closeness to another person

reciprocity
how much each person in a relationship is giving to the relationship; satisfaction increases when each person gives the same amount of effort

similarity
characteristics that are alike between those in the relationship

cognitive origins of attraction
the theory that our perception and interpretation of a potential mate is what attracts us

social origins of attraction
the theory that repeated exposure to a potential partner through regular interactions will influence attraction

Social and cognitive origins of attraction include concepts such as **proximity**, **reciprocity** and **similarity**. In light of the evaluation of the biological theories of attraction, it is important to consider theories that originate from the cognitive and social perspectives in psychology, and perhaps combine them with the knowledge gained from the biological theories in order to fully understand the formation of attraction.

Cognitive origins of attraction suggest that our perception and interpretation of the potential mate is what attracts us to them, rather than any evolutionary benefit. In contrast, **social origins of attraction** suggest that living close to a potential partner or being exposed to them over and over again through regular interactions will actually influence attraction more than our perception or biological influences.

Three theories of cognitive and social origin will be explored in order to fully understand all types of theories addressing attraction.

Proximity

Proximity is part of the social origin of attraction and is defined as being physically close to another person. The theory suggests that by increasing your proximity over time with a potential mate, you are more likely to feel attracted to them. This theory applies to both romantic relationships as well as friendship formations.

Evidence supporting the proximity factor in attraction includes research by Festinger and colleagues (1950), who investigated the role of proximity on friendship formation. The researchers recruited students living on campus at MIT University in the United States, where they observed and interviewed the residents regularly.

FIGURE 1 You are likely to develop relationships, romantic or platonic, with people you spend more time with or live closer to, such as your friends at school.

They found that the residents at the dorms who had a greater opportunity to bump into each other on a daily basis were more likely to become friends in the long run. In addition, by living in the same building, this increased the chances of people becoming friends with others in the same building by tenfold. The chances of being friends with the person who lived next door was even higher.

They concluded that proximity increased the opportunity for communication and therefore increased how familiar people became with one another in the housing complex, thus increasing the likelihood of attraction, a phenomenon known as the **mere exposure effect**. More recent research into the proximity effect found that students who sit together more often are more likely to like each other and become friends, compared to those who do not sit together regularly (Back, Schmukle & Egloff, 2008). This finding supports the theory of proximity in attraction, at least in friendship.

mere exposure effect
a psychological phenomenon that predicts individuals who spend more time with someone and become more familiar with them will prefer them over other people with whom they have not spent as much time

The mere exposure effect suggests that the reason we are more likely to prefer those we have seen or interacted with before is because they feel more familiar to us. This justification is supported by research that found infants are more likely to smile at a picture of someone they have seen before rather than a picture of a stranger; individuals looking at a photo of themselves are also more likely to like the reversed image of themselves (because this is how they see themselves in the mirror) rather than the 'real' image of their own faces (Brooks-Gunn & Lewis, 1981; Mita, Dermer & Knight, 1977).

The research findings also suggest that the mere exposure effect may actually have an evolutionary basis as well as a social perspective. If we are faced with something or someone unknown, this is potentially a risk to our survival; therefore, we are more likely to avoid someone we do not know and gravitate towards someone we do know (Zebrowitz, Bronstad & Lee, 2007).

The mere exposure effect applies to the initial stages of attraction, but once we have become familiar with someone, this may change our attraction towards them. For example, once we know someone, we might perceive them as boring. If after the initial phase of attraction we discover that their personality is different from our own, we may lose interest or the liking for that person. It is also possible that a person we initially fall in love with is not reciprocal in their love for us, which may decrease our liking for them, and even end a relationship. Therefore, proximity (e.g., mere exposure and familiarity) cannot explain long-term romantic attraction, so other theories of attraction should be considered.

In today's society, with increasing exposure to the internet and social media, geographical proximity (physical closeness) is less relevant to the development of friendships and romantic relationships. Therefore, psychological closeness may actually replace geographical proximity as a topic in future research focused on the social origins of attraction.

FIGURE 2 You are more likely to like your face in a mirror's reflection than what it actually looks like, as this is what you are used to seeing.

CASE STUDY 15.2

Wearing the colour red can affect your chances of getting noticed!

There are many animals that have a preference for certain colours in their mates, for example, primates prefer red when they are selecting a mate for reproduction.

Elliot and Niesta (2008) conducted a study on colour preference and actually found that just like primates, humans also prefer their partners to be wearing red. They tested this idea by showing half of the participants a picture of a man on a red background, and the other half of participants the same man but on a white background.

FIGURE 3 Betty Boop is a famous cartoon character often thought of as a sex symbol.

Women rated the man to be more attractive when he was in front of the red background when compared to the white. The same result was found when men were asked to look at an image of a woman in front of either a red or white backdrop. This effect was also found when the colour of the shirt only was changed; red shirts were found to be more attractive than white shirts.

Interestingly, when men were asked to rate other men standing in front of a red or white background as a control, there were no differences found in the ratings for attraction. This means that the colour red seems to be important in sexual attraction or mate selection rather than just a colour that is preferred by all. In men, the colour red seems to be associated with social status thus increasing a women's interest in him.

The colour red on a female seems to be perceived as a sexual lure, and so more attractive for a man. According to research, women wearing red is associated with sex and interest. Women using dating sites are significantly more likely to wear red in their profile pictures than in pictures for social media sites or dating sites that are geared towards marriage rather than dating or 'hooking up'.

Although sexual attraction and red are associated, the actual link between them is not clear. Perhaps there is an evolutionary explanation. In the animal kingdom, the colour red signifies power. For example, the female chimpanzee displays the redness of her chest and reproductive organs to signal her ovulation to potential mates.

Reciprocity

The reciprocity effect suggests that giving as much as you receive can influence the attraction and longevity of a relationship. Based on basic human instincts and etiquette in interpersonal relationships, a lack of reciprocity is generally associated with negative emotions (Bram *et al.*, 2011). This expectation for reciprocity applies not only to romantic relationships, but also to friendships, familial relationships and work relationships.

Bram and colleagues (2011) proposed an evolutionary justification for the need for reciprocity: in order to survive, community and teamwork are needed so that individuals can benefit from the strengths of many and increase the likelihood of survival. In other words, because relationships are based on a person's idea of reward and cost in a relationship, if the relationship is perceived as a reward, then attraction is more likely. Reciprocity allows for a relationship to be perceived as a reward rather than a cost; therefore, the amount of reciprocal behaviour within a couple can determine the amount of attraction.

social exchange
meaningful interactions with others

equity
equal investment in the relationship from both parties

The concept of reciprocity is based on **social exchange** and **equity**. Social exchanges are the interactions we have with others in our social circle – and equity can be defined as how equal the exchanges within our social interactions are. Social exchange and equity dictate that similarity in status or behaviour between people who are in a relationship will increase the chances of attraction. For example, if you really like someone and keep leaving your weekends free to hang out with them, but they continually cancel on you, then your chances of being attracted to them will decrease because they have not reciprocated your behaviour. Relationships where there is an imbalance in the amount of attraction or willingness to be in a relationship will always be unstable. Such relationships may struggle to last in the long-term.

A problem with this theory, however, is that it is difficult to quantify many aspects of reciprocity. Therefore, even though research has generally been able to support a correlation between increased reciprocity and positive emotions, the ethical ramifications and the subjective nature of judging reciprocity make this effect difficult to assess.

CHALLENGE 15.2

Relationships

Take a moment to think about the relationships in your life, whether they be romantic, friendly or familial. Think about how you met these people, was it through school, sports, music, or through family?

Select two key relationships and consider how proximity, reciprocity and similarity influence these. Write a brief essay that summaries the influence of each, and determine if you think these relationships would be different if you were not in close proximity.

Similarity

similarity–attraction hypothesis
people who are similar to each other are more likely to find each other attractive and start a relationship, compared to those who are not familiar

Similarities between potential partners can influence the level of attraction felt between them. One of which is the **similarity–attraction hypothesis** proposed by Markey and Markey (2007). The model can be defined as the tendency for people to see those they are attracted to as more similar to themselves.

In order to test the model, Markey and Markey (2007) investigated the extent to which similarity can affect attraction by using questionnaires on a large sample of young students

asking them to describe their ideal partner. The researchers asked the young people to describe values, attitudes and even psychological characteristics of their ideal partner. They then filled out a questionnaire about their own characteristics and the two sets of results were compared. The results showed that the descriptions of the ideal partner were very similar to the self-evaluations that the participants completed.

In order to confirm their findings, a follow-up study with 106 couples was conducted. All of the couples had been together for one year, and both people were asked to fill in a questionnaire about their partner's characteristics as well as their own. The findings were in line with the original study, which suggests that people want someone similar to themselves; they also perceive their partners as more similar to themselves compared to non-romantic partners.

People are more likely to be attracted to those who are similar to themselves because this can help justify their own characteristics and attitudes. In addition, being with someone who is similar to you may boost your self-esteem because your values are endorsed, which then leads to attraction (Singh *et al.*, 2007). Having similar characteristics or values may also make a relationship easier; for example, if you want to live in Portugal but your partner does not, this could cause serious issues in the relationship in the future.

Similarity is said to aid in the development of long-lasting attraction. Normal relationship progression would involve a couple sharing their attitudes, values and external characteristics (i.e. type of school, family, neighbourhood they come from) and through this sharing, if there are perceived similarities, a more substantive attraction is much more likely than if there is very little in common.

Research supports this finding across different cultures, with people who share age, education and IQ being more likely to like each other than if they had differing characteristics (Pinel *et al.*, 2006). The similarity can also be physical, such as height.

Similarity can predict whether or not you like someone. Though people sometimes suggest that opposites attract, when it comes to core personality traits and the values or morals we have, it is similarity that is most important.

FIGURE 4 Ryan Reynolds and Blake Lively are two actors who are happily married, and as you can see in the picture they have very similar facial characteristics. Perhaps their similarity brought them together?

Evaluation of social and cognitive origins of attraction

Although concepts such as proximity, reciprocity and similarity are all relevant to understanding attraction, they cannot alone predict attraction.

One major limitation of these social and cognitive origins relates to the measurement aspects of the research design. Most research in this field is based on surveys, which lack reliability. Respondents are influenced by the **social desirability effect** or research can comprise experimental designs that lack **ecological validity**.

social desirability effect
the tendency to answer questions in a way that frames the person favourably even if it is not the truth

ecological validity
the accuracy of the data in a natural environment

A study by Luo and Zhang (2009) used a naturalistic environment and gained data through observations in an attempt to overcome this limitation. The results of the study, however, contradicted the similarity theory. Luo and Zhang showed that physical attraction is the most important factor in attraction, followed by reciprocity. However, they found no evidence for the similarity theory of attraction. This study refutes the idea that similarity is the strongest predictor of attraction. Rather, it suggests that biological factors are more likely to predict attraction. This suggests that the social and cognitive origins of attraction are likely more relevant when controlled environments are used for research, meaning they lack real-life application.

Also, given the increase in online dating, the application of psychosocial theories of attraction may be outdated, as often these theories suggest physical closeness and face-to-face interactions underpin attraction (Devine, 2000). Future studies should examine how cyberspace and online social networks can influence attraction.

In sum, even though there are limitations to the biological, social and cognitive theories of attraction covered in this chapter, overwhelming empirical evidence supports the reliability and validity of these concepts as important to understanding the origins of attraction. Given the limitations, however, a more holistic view of attraction needs to be considered. A model that includes the complex interplay between the biological, cognitive and social perspectives is needed to fully understand interpersonal relationships such as attraction.

CHECK YOUR LEARNING 15.2

Describe and explain

1 **Define** the three main cognitive and social origins of attraction, giving examples for each.

2 **Describe** the mere exposure effect and **explain** an example where you may have liked someone more because of it.

3 **Explain** how familiarity can increase attraction.

Apply, analyse and interpret

4 Sarah and Thanh met overseas and started a relationship. They found that they were very similar in the way they think and behave, and their relationship was very happy for some time. However, after a while, Thanh had to go back to his home country and the couple did not know if they should be in a long-distance relationship. They have come to you as a psychologist and are asking for your advice. **Apply** your knowledge of the social and cognitive origins of attraction to their situation to **determine** what advice you should provide.

5 **Interpret** how the attraction–similarity model can be applied to the online environment.

Investigate, evaluate and communicate

6 **Investigate** how social and cognitive origins of attraction can be linked to evolutionary theories of attraction.

7 **Evaluate** the statement, 'Opposites attract'. **Justify** your evaluation with empirical research.

8 **Compare** one aspect of biological theories of attraction with one aspect of social and/or cognitive origins of attraction. **Communicate** how they are related to one another and **identify** key similarities and differences between them.

obook assess

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- **Student book questions**
  Check your learning 15.2
- **Suggested research**
  15.2 Social and cognitive origins of attraction
- **Challenge**
  Worksheet: 15.2 Relationships
- **Weblink**
  Colour and attraction

15.3 Why relationships end

KEY IDEAS

In this section, you will learn about:

- relationship satisfaction and relationship dissolution
- reasons why relationships change and end, including Duck's stages of dissolution
- the influence of social media on relationship dissolution.

Sections 15.1 and 15.2 identified and evaluated possible origins of attraction. But the questions remain: How do relationships keep going after the initial attraction has passed? What factors can extend or maintain the level of attraction between two people?

Relationship satisfaction

communication
verbal and non-verbal expression between individuals

A key factor in the development of relationship satisfaction is **communication**. There are many aspects of communication that enable couples to get to know each other better and also increase intimacy, commitment and passion within a relationship.

There are many other factors that can contribute to increased relationship satisfaction, but there are also many factors that can decrease satisfaction and cause the relationship to end. Models and theories regarding relationships ending will be explored next.

Relationship dissolution

Many theories predict the origins of attraction and marriage satisfaction; however, even more theories and models explain why relationships end. Numerous studies have identified factors that predict the end of a relationship. These include marrying young, criticism, defensiveness, stonewalling, contempt and blame (Gottman *et al.*, 2004).

relationship dissolution
the ending of a relationship initiated by at least one partner in the relationship

Relationship dissolution or the breaking up of a relationship (whether it be friendly or romantic) by one or more of the parties involved is a conscious process. Models of dissolution have typically focused on identifying the causes of breakups, especially looking for characteristics within individuals that increase the likelihood of the breakup.

Older dissolution theories saw breakups as a failure and that it is innately bad to be 'broken up'. Now many researchers focus on finding ways to predict relationships in order to save people from staying in bad relationships. Additionally, new theories of 'breakup' acknowledge benefits rather than failures. The Rollie and Duck (2006) model explains why relationships change and end.

FIGURE 1 Relationship dissolution can be caused by many factors. Psychologists seek to predict relationships ending. The Duck theory of dissolution can be used to assess the healthiness of a relationship.

Study tip

Use real-life examples when writing your notes. If you have not experienced a romantic relationship, think about a friendship and apply the principles of attraction and dissolution to your own life. This will help you to remember the concepts.

SUGGESTED RESEARCH
15.3 Relationship dissolution and media influence
Go to your obook assess »

Duck's stages of dissolution

Duck's model of relationship dissolution
a theory addressing the stages of a breakup including five phases: intrapsychic, dyadic, social, grave-dressing and resurrection

Duck's model of relationship dissolution approaches a relationship breakdown in stages rather than an end in itself. According to Duck's theory, there are five phases associated with a breakup. In each of the phases, one or both partners in the relationship perceives a change in the relationship and thus becomes progressively less satisfied in the relationship. The model acknowledges that there are many factors that can initiate a breakup, including the couple feeling like the relationship is not going anywhere, lack of equity in commitment or a lack of communication or time with one another.

The five stages of the dissolution model identify aspects in a relationship that may lead to dissolution and potentially allow a couple to avoid dissolution in the long-run. This model suggests that breaking up is composed of several stages and is a long-term rather than a short-term process. The phases are likely to occur sequentially, though sometimes they may be compounded.

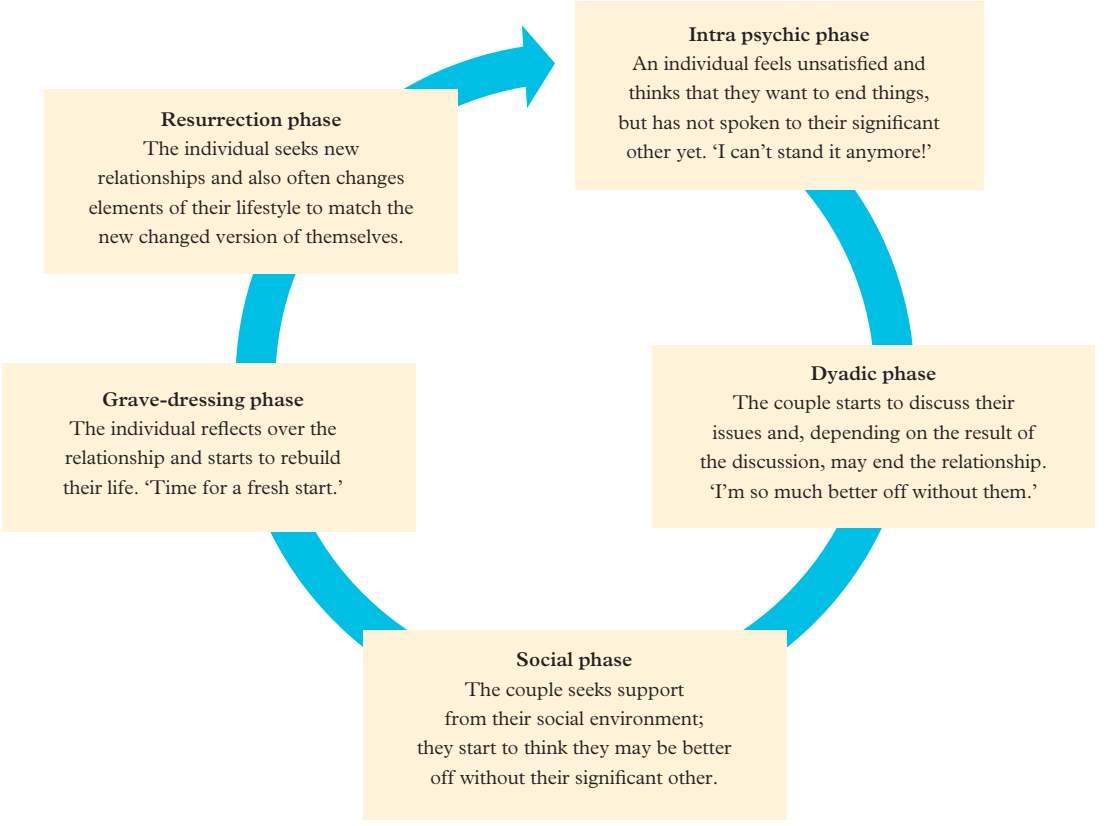


FIGURE 2 Summary of Duck's model of relationship dissolution

Phase 1: Intrapsychic phase

The focus in this phase is on the thinking processes (cognitive interpretation) occurring inside an individual. The person may feel dissatisfied in the relationship but does not verbalise it at this stage. They start to consider whether they will be better off getting out of the relationship

and their thoughts are usually characterised by internal dialogue that suggests a need for change. For example, people in this stage may say to themselves things like, 'It's not worth the effort I'm putting in' or 'I can't be with this person anymore' or even 'I can't stand it'.

Phase 2: Dyadic phase

In this phase, the unhappy person within the relationship will start to discuss the source of their unhappiness. Concerns such as feeling inequality in the relationship, feelings such as resentment, and also status and power imbalances will be addressed in the hope of finding a resolution. If the discussions are honest, open and constructive, it is possible that the relationship can be repaired and the couple may continue with increased satisfaction in their relationship. However, anger from the resentment may also surface through this phase, and if this occurs it can have detrimental effects on the relationship, causing more unhappiness between the couple. Internal dialogue that could show the anger taking over may include self-talk like, 'I am so much better off without him/her'.

Phase 3: Social phase

The social environment around the couple, including mutual friends and family, are now made aware of the breakup/dissolution. The individuals will look for social support and also allies in this painful process. Mutual friends may be asked to side with one of the two individuals and talk can include prevalent judgment or criticism towards the other individual in the relationship. This is where, at times, friends will divulge secrets they have held in, such as cheating, or secrets told behind the other person's back, in efforts to speed up the dissolution. This is not done out of spite, but in an attempt to console the friend who is experiencing the breakup. Internal thoughts in this phase would revolve around thinking like, 'Well it's definitely over! No going back now'.

FIGURE 3 During the social phase people will tell friends and family, and seek support.

Phase 4: Grave-dressing phase

The couple reflects on the breakup and they each have their own perspective on what has happened. It is common for individuals to see themselves in the right and to justify their decision to end the relationship or to blame the other person for ending the relationship. This is partially a defence mechanism to re-build damaged self-esteem from losing a treasured relationship. It is also vital for future relationships so the person can 'bounce back' from the painful breakup. Internal dialogue in this phase is characterised by thoughts like, 'Time to turn over a new leaf' or 'Time to start my life afresh'.

Phase 5: Resurrection phase

After going through the process of dissolution, this last phase includes the individual seeking a new relationship. It may also be accompanied with other changes, such as a new job, house or hobbies. In this last phase, individuals aim to redefine themselves and to learn from their past mistakes and to avoid them in their new relationships.

Figure 2 gives a summary of Duck's model for relationship dissolution.

FIGURE 4 During the Resurrection phase people may take on new hobbies

CASE STUDY 15.3

Application of Duck's model: relationship dissolution and media influence

LeFebvre, Blackburn and Brody (2014) conducted a study to investigate how social networking sites can be used to aid in the social, grave-dressing and resurrection phases of the Duck (2006) model. They studied 208 participants' (77 males and 131 females) post-dissolution behaviours in an online environment to extend the application of Duck's (2006) model to an online environment – specifically Facebook.

The methodology included participants first completing an online survey about a romantic relationship they'd had in the last two years that was now dissolved. They were then asked how frequently they had communicated with their ex-partner face-to-face and how often they used Facebook. Participants were further asked to report on their online behaviour on Facebook both during and after their breakup. The results were analysed using qualitative research methods.

Common online activities during the relationship dissolution included minimal or no Facebook activity, relational cleansing (e.g., deleting messages and pictures of the partner from their page), checking up on what their partner was doing and also engaging in other 'normal' Facebook activities (LeFebvre *et al.*, 2014). After dissolution, these same behaviours were maintained, but virtual mourning, social network support and virtual reconciliation were also present.

These behaviours seen in Facebook match the predicted behaviours seen in the social, grave-dressing and resurrection phases of Duck's model, providing further support for this staged model of relationship dissolution. The behaviours don't necessarily occur sequentially. For example, in this study social network support came at the end of the breakup rather than during the breakup. Also, grave-dressing behaviours, such as relational cleansing, occurred both during and after the breakup. Overall, however, the research suggests that Duck's model is relevant to current social media platforms and results can be generalised to relationships that dissolve in the modern day.

FIGURE 5 As a relationship ends, people may conduct relationship cleansing, where they remove evidence of their relationship from social media.

Evaluation of Duck's model of relationship dissolution

Strengths

- High in face validity because often you can see these phases occur when observing a breakup or going through one yourself.
- The model is supported by empirical studies. Hatfield (1984) found that individuals were likely to have similar feelings of resentment and dissatisfaction as seen in the intrapsychic phase, thereby supporting the initial phase of the model.

- Duck's model also provides real-world applications and opportunities for intervention at the difference phases of dissolution. This enables the individuals in a relationship to 'fix' or repair the relationship at many junctions. For example, in the intrapsychic stage, instead of focusing on negative thinking, a person can be taught to reframe their thoughts in a more positive light. During the dyadic phase, constructive communication techniques can be used to limit blaming.

Limitations

- The model is gender-biased. The model assumes that the process of dissolution is the same in men and women. Research has identified that the experiences of breakup in women and men are often vastly different including the reasons for dissatisfaction in the first place (Argyle, 1988; Kassin, 1996). Therefore, results may vary depending on whether or not you are considering a male or female perspective.
- Individual differences are not addressed. The model does not account for differences in feelings and behaviours within the person who instigated the breakup, versus the person who is being broken up with. It stands to reason that if someone is breaking up with you, your experience of the breakup is likely to be different from the person who is ending the relationship.
- Not all relationships break down in the exact same order; nor do all couples go through all phases of the model. Furthermore, the model does not apply to same sex relationships.
- The model only looks at voluntary relationships without investigating if the model is consistent across cultures where marriages are arranged. Therefore, this makes the model difficult to generalise across cultures.

CHECK YOUR LEARNING 15.3

Describe and explain

1 **Identify** and **describe** the phases of Duck's model of relationship dissolution.

2 **Explain** how the study of LeFebvre, Blackburn and Brody (2014) supports Duck's model of relationship dissolution.

Apply, analyse and interpret

3 Callum is unhappy in his relationship but he has not verbalised this to anyone. Instead he is becoming angry and upset at his partner for not living up to his expectations. **Interpret** the phase Callum is at currently according to Duck's model, predict which stage would come next and **explain** why.

Investigate, evaluate and communicate

4 **Assess** Duck's model for relationship dissolution and **propose** a possible improvement of the model.

5 **Investigate** the claim 'All relationships must end' and suggest two research questions that could be used to evaluate the claim.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 15.3
- **» Suggested research**
  15.3 Relationship dissolution and media influence
- **» Suggested research**
  15.3 Attraction, relationship satisfaction and relationship dissolution

SCIENCE AS A HUMAN ENDEAVOUR

15.4 Arranged royal marriages: are they happy?

KEY IDEA

In this section, you will learn about:

+ how the formation of relationships is influenced by cultural norms and expectations.

The marriage of Meghan Markle and Prince Harry (Figure 1) was all the rage in 2018; celebrities, royals and the rich and famous all gathered to celebrate the couple's wedding. They chose each other because they fell in love, but in the royal family and historical British culture, arranged marriages were the traditional norm.

Marriage in this day and age is still an important institution, even though it is not as vital as it was in the past. More than 90 per cent of individuals will get married at one time or another. Therefore, the satisfaction within a marriage, or at least the perception of satisfaction, is an important point of research.

Cultural expectations or ideals have historically played a part in determining one's marriage partner. Free will to choose whom we love is a relatively recent phenomenon. Culture is defined as the ideals, customs and practices of a particular group in society. Culture can be geographically determined, and similar values encourage individuals to become a cultural group. These practices are often passed from one generation to the next.

One of the cultural expectations still around today is the concept, or cultural practice, of arranged marriages. Historically, these were used to barter for status or even to reunite feuding factions within cultures. Arranged marriages still exist. The rate of divorce among arranged marriages is much lower than among marriages borne out of free will or love; relationship satisfaction is also much higher than in self-chosen marriages.

This increase in satisfaction or longevity of the marriage is suggested to be due to parents understanding their children and choosing the right mate for them, rather than allowing their children to be led by lust or attractiveness.

The families of the man and woman who are to be married will often have lengthy discussions, and get to know each other very well before the arranged marriage proceeds. Therefore, it is possible that, because of the time taken to know the family of the groom or bride and other important financial considerations, the best match for their children is sought – and this enables a longer lasting relationship.

Recent research into arranged marriages has found very little difference in relationship satisfaction for purely love-based relationships compared to arranged marriages. This suggests that arranged marriages generally outlast love-based marriages due to cultural traditions rather than enhanced satisfaction levels.

For example, in the British royal family, divorce is not very favourable within their culture and, as such, married couples tend to work on their relationships to avoid seeking divorce. This was especially important in the royal family historically, as most marriages held important political alliances and divorce could potentially start a war. Therefore, this could further explain why relationships endure in arranged marriages.

The arranged marriage between Queen Victoria and Prince Albert was one that stood the test of time. Although the two did share a love and devotion to each other, the marriage was primarily for the legitimacy of her throne. By marrying Prince Albert, Victoria solidified her claim to the throne. Therefore, this was not only a marriage of love but also of great political advantage.

FIGURE 1 Prince Harry and Meghan Markle married in May 2018.

CHECK YOUR LEARNING 15.4

Describe and explain

1 **Define** culture and cultural expectation using an example.

2 **Explain** why arranged marriages may last longer than love-based marriages.

Investigate, evaluate and communicate

3 **Apply** your knowledge of arranged marriages and **predict** how happy Harry and Meghan's marriage may be compared to an arranged marriage.

4 **Investigate** a modern example of an arranged marriage, and communicate the union and relationship in a short summary.

5 **Evaluate** the benefits of arranged marriages by finding a piece of research that suggests they provide more marital satisfaction compared with purely love-based marriages.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 15.4

» **Weblink**
Arranged marriages

CHAPTER 15

Review

Summary

15.1
- Biological theories of attraction include physical attractiveness (symmetry, femininity versus masculinity), evolutionary theory and gender differences.
- Buss and colleagues (1990) demonstrated universal characteristics across cultures such as female age and male status that increase attractiveness of an individual.
- Wedekind and colleagues (1995) found that people are more attracted to those who have different immune systems (genes in the major histocompatibility complex) from themselves.

15.2
- Social and cognitive origins of attraction include similarity, reciprocity and proximity, which suggests that attraction is due to how we think within a relationship and how similar we are to our partners or how much interaction we have with them.
- The similarity–attraction hypothesis suggests that people are more likely to be attracted to those who are similar to themselves than those whom they identify as less dissimilar. This hypothesis supports the idea of similarity as a possible explanation for attraction.

15.3
- Duck's stages of dissolution explains the five stages in which a relationship will end. It also suggests how couples can prevent relationships from ending. The model can be used to predict the likelihood of a relationship breakup.
- Gottman and colleagues (2003) found a positive correlation between the characteristics that determine relationship satisfaction in both homosexual and heterosexual relationships.

Key terms

- attraction
- attractiveness halo effect
- attribution theory
- cognitive origins of attraction
- communication
- culture
- dispositional attribution
- DNA
- Duck's model of relationship dissolution
- ecological validity
- equity
- evolutionary advantage view
- genes
- mere exposure effect
- natural selection
- perceptual bias view
- phenotype
- pheromones
- physical attractiveness
- proximity
- reciprocity
- relationship dissolution
- reproductive fitness
- similarity
- similarity–attraction hypothesis
- situational attributions
- social desirability effect
- social exchange
- social origins of attraction

Revision questions

The relative difficulty of the short answer questions is indicated by the number of stars beside each question number: * = low, ** = medium, *** = high.

Multiple choice

1 Identify which of the following is a biological theory of attraction.
- **A** attractiveness halo effect
- **B** similarity–attraction hypothesis
- **C** mere exposure effect
- **D** proximity hypothesis

2 Select the correct definition for phenotype.
- **A** the genes passed on from your parents
- **B** a characteristic that is determined from genes
- **C** the effect of the environment on characteristics
- **D** chemicals that make an individual more desirable to the opposite sex

3 State which of the following is an example of dispositional factors.
- **A** Leon is late for work and his boss explains his lateness as the bus being late.
- **B** Billie gets a C for Psychology and blames the teacher for her grade.
- **C** Shalu forgot to buy milk before returning home and her mum explains her forgetfulness by her workload at school.
- **D** José lost an important race in athletics and his coach blames his lack of focus for the loss.

4 Identify which of the following concepts are associated with reciprocity.
- **A** DNA and genes
- **B** halo effect and proximity
- **C** similarity and familiarity
- **D** social exchange and equity

5 Identify the finding from the Buss study on biological theories of attraction.
- **A** Female age is a universal characteristic in attraction.
- **B** Lower male status is preferred over higher status.
- **C** Religion is a key factor in attraction.
- **D** Universal characteristics support evolutionary psychology.

6 Cameron has just broken up with Sharaya and sent a group text to mutual friends about the breakup, asking for a buddy to hang out with on the weekend. He is actively seeking social support. What stage of Duck's model best matches this scenario?
- **A** grave-dressing stage
- **B** intrapsychic stage
- **C** resurrection stage
- **D** social stage

7 Marianna is sending a photo of herself to a modelling competition. She has access to digital manipulation technology. Identify how she can increase her chances of the judges choosing her for the final stage.
- **A** adjusting her facial features so that she looks more unusual than other girls
- **B** adjusting her facial features to reflect more symmetry between the left and right side
- **C** adjusting her features to create a more angular jaw line
- **D** adjusting her features to look more masculine and older

8 Describe why feminine faces are more attractive than masculine features.
- **A** Feminine faces are more beautiful and therefore easier to process in the brain.
- **B** Feminine faces reflect more trustworthiness, which increases attraction.
- **C** Masculine faces are more angular and therefore are more difficult for the visual centres of the brain to process.
- **D** Masculine faces reflect more threat and therefore scare away others, decreasing attraction.

9 Describe why similarity can increase attraction.

A Starting a relationship with someone similar to yourself increases your self-esteem.

B Starting a relationship with someone similar to yourself decreases the need for friends.

C Starting a relationship with someone similar to yourself decreases the need for reciprocity.

D Starting a relationship with someone similar to yourself decreases the familiarity you feel with the person.

10 Define reciprocity.

A assessing the cost and benefit of a relationship

B giving as much as you receive

C one person giving more than another in a relationship

D surrendering to your partner in communications

11 Identify a limitation of the Buss (1990) study.

A It does not match other research.

B Only one culture was considered.

C Self-reports were collected.

D There was a large sample size.

12 Camille has just broken up with her boyfriend and signs up for a dating website. Identify the stage she is likely to be in according to Duck's model of relationship dissolution.

A intrapsychic stage

B grave-dressing stage

C social stage

D resurrection stage

13 State which of the following research designs indicates high ecological validity.

A research performed in a classroom environment, testing school-based assessments

B research performed in a laboratory, testing memory lists

C research performed in survey form, asking people on the street to participate

D research performed in a psychologist's office, asking participants to tell a story about a picture

14 Select an example of cultural difference in attraction.

A Participants prefer one sweaty T-shirt over another.

B Participants all suggest that one factor increases attraction.

C Participants look at a bunch of pictures and pick the most familiar picture.

D Participants in certain countries place a higher emphasis on chastity.

15 Casper was initially interested in a girl who lived across the hall from him in the dorms, but when he got to know her better he found that they were very different and the relationship did not last. State which concepts can be used to explain this attraction.

A initially proximity and the resulting breakup due to a lack of similarity

B initially natural selection and the resulting breakup due to a lack of reciprocity

C initially familiarity and the resulting breakup due to mere exposure effect

D initially reciprocity and the resulting breakup due to Duck's model of dissolution

16 Tommy was running in the park and ran past a girl who had been running for a while and was sweating a fair bit. She smelled really good to him and made him turn his head. Identify the type of theory that could explain why Tommy thought she smelled nice.

A similarity–attraction hypothesis

B attractiveness halo effect

C evolutionary theory of attraction

D mere exposure effect

Short answer

Describe and explain

★ **17** **Describe** two biological factors that can increase attraction.

★ **18** **Identify** the aim, method, results and conclusion of the Buss study.

★ **19 Define** similarity and **explain** how this can increase attraction.

★★ **20 Explain** why facial attraction, especially symmetry in features, can increase attractiveness.

★★ **21 Define** reproductive fitness and **explain** how evolutionary psychologists use this concept to explain attraction.

★★ **22 Use** an example to **describe** how the mere exposure effect can lead to attraction.

★★ **23 Identify** the five stages of Duck's model of relationship dissolution and **describe** each stage briefly.

Apply, analyse and interpret

★ **24 Compare** the biological, and social and cognitive theories of attraction.

★ **25 Contrast** proximity, reciprocity and similarity in explaining attraction.

★★ **26 Analyse** the concept of natural selection and establish how this relates to the evolutionary theory of attraction.

★★ **27 Apply** your understanding of theories of attraction to homosexual relationships, using supporting evidence.

★★★ **28 Apply** concepts of validity and reliability to the research methods used in the study of attraction (i.e. surveys, self-reports).

★★★ **29 Interpret** the results of the Buss study and **explain** how these results support the evolutionary theory of attraction.

Investigate, evaluate and communicate

★ **30 Evaluate** biological theories of attraction using the Buss study.

★ **31 Communicate** the stages of Duck's model of relationship dissolution. Use an example.

★★ **32 Investigate** the effect of social media on the relevance of Duck's model of relationship dissolution and **assess** its relevance in life today.

★★ **33 Evaluate** the Wedekind study and investigate the effects of the contraceptive pill on partner preferences.

★★ **34 Evaluate** the following statement: 'Long-distance relationships never last'.

★★★ **35 Investigate** the effects of communication on relationship satisfaction using a supporting study to **justify** your response.

★★★ **36 Analyse** the following relationship: Snezjana ran the same route around the park near her home every day. Each morning at the same time, she would run past a boy around her age and they would smile at each other. One day, Snezjana wasn't paying attention and ran directly into the boy. After apologising they began to talk and found that they actually study the same subjects at school and also play similar sports. Upon giving the boy a hug on her way home, Snezjana felt a sense of attraction based on his smell.

Apply your knowledge of attraction to **decide** what possible theories may be at play and **predict** the likelihood of their relationship lasting in the long-term.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 15 Review
- **» Revision notes**
  Revision notes for Chapter 15
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 15

CHAPTER 16

Attitudes & bias

Should the Australian government allow more political refugees into Australia? Should students be allowed mobile phones in class? Is a gap year a good idea before commencing tertiary studies or paid work? Is the Gold Coast the best tourist destination in Queensland? Should gambling advertisements be banned during televised sporting events?

How you answer these questions reflects your ideas about different people, issues, events and groups. They are a direct expression of your likes and dislikes, and your previous experiences and knowledge, and of your sociocultural environment. During childhood, our ideas, likes and dislikes may be influenced by what we are taught and the behaviours we observe. As we interact with diverse groups of people and are exposed to different ways of thinking, our ideas become more malleable.

Sometimes, the attitudes that we form about something become internalised and we use them to make decisions and judgments about other people, groups or concepts without even knowing it. At other times, we are highly aware of the decisions and judgments we make as well as the impact that our beliefs and behaviours have on others.

Psychologists view attitudes as the tendency to make positive or negative evaluations about another person, group or concept (Burton, Westen & Kowalski, 2019). The concept of bias is related to attitudes and it also guides how we think and act. It refers to our inclinations or prejudice for or against a person or group based on quick (and sometimes unconscious) decision-making processes. In this chapter, we will discuss attitudes and bias in detail – how they form and operate, how they function in our everyday lives and how they affect not only us, but those around us in both positive and negative ways.

FIGURE 1 Is the Gold Coast the best tourist destination in Queensland? Or is Cairns? Your attitudes and bias influence your opinion on this.

OBJECTIVES

→ Describe implicit and explicit attitudes
→ Predict how discrepancies between attitudes and behaviours can lead to cognitive dissonance (Leon Festinger 1957)
→ Evaluate social identity theory (Henri Tajfel 1970), with reference to social categorisation, social identification and social comparison
→ Describe attributions, and recognise how attributions are used to explain behaviour, with reference to situational and dispositional attributions, and the fundamental attribution error (Lee Ross et al. 1977)
→ Contrast self-serving and confirmation biases

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

SUGGESTED RESEARCH

SUGGESTED RESEARCH	**16.2** Cognitive dissonance in forced compliance (Festinger & Carlsmith 1959)
SUGGESTED RESEARCH	**16.2** Cognitive dissonance in decision-making (Brehm & Cohen 1956)
SUGGESTED RESEARCH	**16.2** Cognitive dissonance in the significance of effort (Aronson & Mills 1959)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

16.1 What is an attitude?

KEY IDEAS

In this section, you will learn about:

+ attitudes and how they are expressed and function
+ implicit and explicit attitudes.

attitude
a learnt, stable and relatively enduring evaluation of a person, object, event or idea that can affect an individual's behaviour

An **attitude** is a positive or negative evaluation of an attitude object (a person, object, event or idea). Gordon Allport (1935) provided a useful and enduring definition of attitude: 'An attitude is a learned, stable and relatively enduring evaluation of a person, object or idea that can affect an individual's behaviour'. This definition is useful because it includes the different dimensions of an attitude:

- An attitude is learnt. We are not born with attitudes. Instead, we acquire our attitudes through experience in our daily lives.
- An attitude is stable and relatively enduring. Stronger attitudes are most resistant to change and longer-lasting.
- An attitude is an evaluation of a person, object or idea. We tend to judge these either positively or negatively.
- An attitude can influence an individual's behaviour. Stronger attitudes are most likely to influence an individual's behaviour. Our attitudes may drive us to behave in particular ways when we vote, buy goods, make friends, choose subjects and make decisions in general.

Expression of attitudes

Attitudes can operate in different forms.

explicit attitude
attitudes that individuals are open about and that are aligned with their behaviour

Explicit attitudes are where people openly state their attitude and behave in a way that reflects this attitude. For example:

- **attitude:** Exercise is good for my health.
- **action:** Visit the gym daily.

implicit attitude
involuntary, uncontrolled or unconscious attitudes that individuals are often unaware they hold, even though they may influence their behaviour

Implicit attitudes are involuntary, uncontrollable and sometimes unconscious. It is possible for individuals to be unaware that they hold a particular attitude until their actions reveal it. For example:

- **attitude:** Moths are harmless.
- **action:** A person screams upon seeing a moth.

Function of attitudes

Without attitudes we would have difficulty dealing with events in our daily lives, making decisions and making sense of our relationships with others.

Attitudes predispose us by:

- guiding us to behave in particular ways
- helping us to get what we want and avoid what we do not want.

- saving us energy so that we do not have to work out our reactions to an attitude object each time we encounter it.

When we interpret, attitudes function by:

- guiding the interpretation and summary of an attitude object
- avoiding worry and confusion when faced with a new attitude object
- helping us to understand and process information.

When we evaluate, attitudes function by:

- helping us to stand up for our values and beliefs
- helping us to reflect on our values
- protecting our self-esteem when we feel threatened or uncomfortable.

FIGURE 1 The attitude that exercise is important for good health can influence a person's behaviour. It might mean they exercise regularly.

Relationship between attitudes and behaviour

It is tempting to assume that a particular behaviour is representative of a particular attitude –however, this is not always the case. For example, have you ever done something that you later regretted or felt ashamed of? Do you really think that all cigarette smokers have a positive attitude towards smoking? Sometimes, people's behaviour does not provide a reliable indication of their true attitude. There are several reasons for this, including attitude salience, attitude specificity, and information about the attitude, the situation and how the attitude is measured.

Attitude specificity

Highly specific attitudes are characterised by particular behaviours. For example, if you specifically prefer one brand of shampoo, you will purchase only that brand, regardless of the price. **Attitude specificity** suggests that attitude and behaviour are more likely to be congruent when the attitude measured is highly specific to the behaviour (Wiegel, Vernon & Tognacci, 1974). For example, if asked about the values of a particular member of a group, an individual's response may differ little from their opinion about the group as a whole.

attitude specificity attitudes and behaviours are more likely to be congruent when the attitude is highly specific to the behaviour

Information about the attitude

Attitudes that are confirmed by our previous knowledge and experiences are more likely to be reflected in our behaviour. For example, we might be familiar with the work of our local member of parliament and therefore be more likely to vote for them at the next election. Another example is brand loyalty – when we are familiar with a particular brand of mobile phone, we might be more likely to purchase the same brand in future.

FIGURE 2 Not all smokers have a positive attitude to smoking.

Situation

The specific circumstances in which we find ourselves can influence our behaviour. For example, although an unemployed person might prefer organic food rather than food produced with pesticides, this person does not purchase organic food because it might be more expensive, and unaffordable for a person with a low income. Also, the way we perceive other people's expectations of us can lead us to behave contrary to the attitudes we hold. For example, you might disapprove of smoking (attitude) but smoke cigarettes (behaviour) at a party because you perceive that other people at the party approve of smoking.

CHALLENGE 16.1

What would you do?

In each of these scenarios, consider if your behaviour or attitudes would change if you were with your friends or with your family. Suggest why/why not.

a After an 18th birthday party, your friend's older sister offers to drive you home. You know that your friend's sister has been drinking.

b Everyone around you is being rude to the other team at your Sunday sports game; they keep looking at you as though you will too.

c You are messaging your boy/girlfriend about sneaking out of the house to meet up.

CHECK YOUR LEARNING 16.1

Describe and explain

1 **Describe** an implicit attitude.

2 **Explain** what an explicit attitude is.

3 **Identify** the type of attitude in each of the following scenarios.

a **Attitude**: Studying will help me pass my exams. **Action**: Studies every night.

b **Attitude**: Walking alone at night is dangerous. **Action**: Always walks with someone at night.

c **Attitude**: The ocean is harmless. **Action**: Refuses to swim at the beach.

Apply, analyse and interpret

4 **Contrast** implicit attitudes and explicit attitudes.

Investigate, evaluate and communicate

5 **Evaluate** this statement: 'The implicit attitudes that people hold are stronger than the explicit attitudes that people hold.'

obook assess

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 16.1

» **Challenge**
Worksheet: 16.1 What would you do?

» **Weblink**
The function of attitudes

» **Weblink**
Different types of atittudes

SUGGESTED RESEARCH

16.2 Cognitive dissonance in forced compliance

Go to your obook assess »

16.2 Cognitive dissonance

KEY IDEA

In this section, you will learn about:

+ discrepancies between attitudes and behaviour, and how this can lead to cognitive dissonance.

cognitive dissonance the theory that emphasises a person will feel uncomfortable and try to maintain an internal consistency and agreement between their beliefs and behaviours by altering beliefs to match behaviours

effort justification a special case of cognitive dissonance where the inconsistency experienced makes the person go to considerable effort to justify the achievement of a relatively modest goal

Have you ever done something and felt uncomfortable about it afterwards? You may have been experiencing cognitive dissonance. According to Leon Festinger (1957), **cognitive dissonance** is an unpleasant feeling of psychological tension that comes when we perceive that our attitudes are inconsistent with our behaviour. People experience cognitive dissonance when they behave in a way that is contradictory to their attitude.

An example of cognitive dissonance in your daily life might be that you dislike dishonesty and always behave truthfully, but find yourself in a situation where you have to tell a white lie to a friend. It is likely that you will feel tense and stressed about your behaviour (cognitive dissonance). To reduce the tension, you change your attitude and devise a justification for lying under the particular circumstances (**effort justification**).

In some instances, effort justification can be extreme, such as where a person justifies their actions even though these might be very different from the person's previously held attitude. For example, people who join cults can sometimes undergo ghastly initiation ceremonies and give up all that they have – including, in extreme cases, their children. This experience then strengthens their attachment to the cult because they think: 'I gave up so much to be in this, so I must really believe in it'.

Another, more common, example is someone who has paid for expensive concert tickets saying that the concert was fantastic, despite the reality that it was only a mediocre performance.

Attitude change through cognitive dissonance involves getting a person to engage in a particular behaviour that differs from the attitude the person holds. In acting this way, the person feels uncomfortable, and so begins to think (cognition) differently about an attitude object and therefore changes their attitude towards it.

Hazing

Hazing rituals are known to occur in sports teams, the military and some university fraternities and sororities (are more common in the USA). Hazing rituals tend to be actions that are designed to humiliate or embarrass the individuals, which causes cognitive dissonance. This occurs because the individual has most likely put effort into being selected, but they are now confused about why they are participating. Because of the humiliation that an individual may experience during these scenarios, the individual is likely to feel more loyalty to the group, as these events make the group's subjective value increase.

FIGURE 1 For an honest person, telling a white lie may cause feelings of discomfort and cognitive dissonance.

SUGGESTED RESEARCH

16.2 Cognitive dissonance in decision-making
Go to your obook assess »

Investigate the role of effort justification and cognitive dissonance in hazing rituals. Find one piece of research that supports this, and another that refutes it.

It is difficult to get large numbers of people to perform counter-attitudinal behaviours, so persuasive approaches are more commonly used in areas such as advertising and politics.

There are many variables that will influence attitude change. In advertising, if a product is relevant to the person, it is best to use strong arguments. If a product is not personally relevant to them, then try to make it seem as if it is. Advertisers try to use emotions (affect) to change attitude. If you are trying to change an attitude, it is best to tailor your message to the kind of attitude that you wish to change.

Sometimes persuasive messages are used by advertisers for consumer goods, by political groups and by public-interest organisations such as anti-smoking and anti-drinking groups to bring about behavioural change. We can resist pressure to change our attitudes, and some attitudes are unlikely to change.

CHALLENGE 16.2

Cognitive dissonance

As a teenager, you have been figuring who you are, what you value, and your attitudes and beliefs. Often you may have felt that your beliefs or attitudes don't match those of your friends, but behaved the same as your friends anyway. Identify a time where you experienced this discomfort, decide if it was just cognitive dissonance or if you also experienced effort justification.

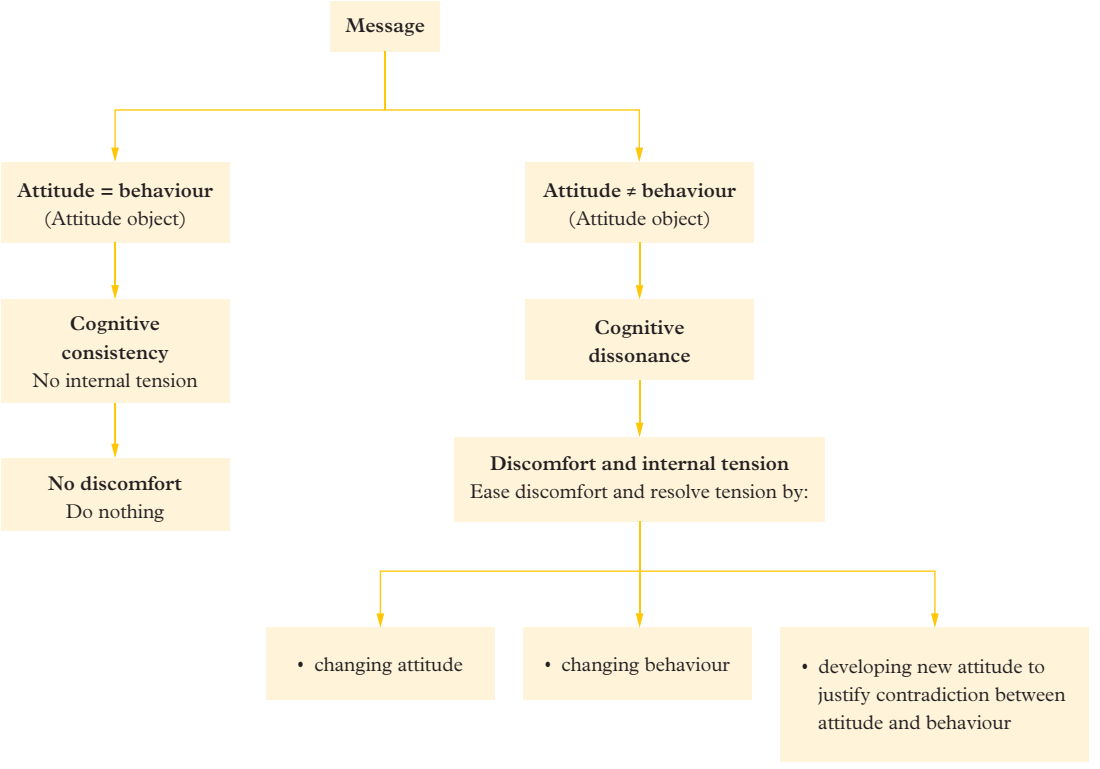


FIGURE 2 Cognitive dissonance

SUGGESTED RESEARCH

16.2 Cognitive dissonance in the significance of effort
Go to your obook assess »

CASE STUDY 16.2

Festinger & Carlsmith

Cognitive dissonance was first demonstrated in a famous study by Festinger and Carlsmith (1959), where participants were paid either $1 or $20 to tell the next participant that they had enjoyed being in the experiment, which had been deliberately designed to be very boring. Later, when asked how they had really felt about being in the experiment, the participants who were paid the smaller amount of money said that they enjoyed being in the experiment! The participants who had been paid more money said they had not enjoyed taking part.

Festinger and Carlsmith concluded that the participants who had been paid less money had felt uncomfortable about lying (saying the experiment was fun). So it made them feel better if they changed their attitude towards the experiment and said that they truly did enjoy being in the (boring) experiment. Those who had been paid the larger amount felt that this was a sufficient reason for enduring the experiment. So they were happy to remember their true level of boredom!

FIGURE 3 Festinger & Carlsmith investigated if certain payments would influence participants' responses in their experiment.

CHECK YOUR LEARNING 16.2

Describe and explain

1 **Describe** cognitive dissonance.
2 **Identify** a discrepancy between an attitude and a behaviour.

Apply, analyse and interpret

3 **Consider** the use of effort justification.

Investigate, evaluate and communicate

4 **Design** a methodology that would test cognitive dissonance and attitude change.
5 **Evaluate** Festinger and Carlsmith's study (see Case study 16.2 – you may need to research further online). In your evaluation, refer to the ethics of the study and the results.
6 **Predict** the attitude, behaviour and cognition of someone who is experiencing cognitive dissonance.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 16.2
- **» Suggested research**
  16.2 Cognitive dissonance in forced compliance
- **» Suggested research**
  16.2 Cognitive dissonance in decision-making
- **» Suggested research**
  16.2 Cognitive dissonance in the significance of effort

16.3 Social identity theory

KEY IDEA

In this section, you will learn about:

+ social identity theory – social categorisation, social identification and social comparison.

Think about the things that you like and dislike. Think about the colour of your hair and the colour of your friend's hair. Think about the sports you play and the sports you don't participate in, the music that you enjoy and the music that you dislike. Now think about the people who you socialise with, compared with the people who you don't socialise with. Think about the sports team you support, and how it feels at the stadium when they are playing, and how you compare the opposition to your team.

In each of the above scenarios, you were comparing yourself to another person – or comparing your 'group' to another group. Each time you did this, you were forming your identity. Our **social identity** is our sense of who we are based on our group memberships. For example, when you think about your rugby team, you may think, 'I go for the Cowboys. We're a much better team than Melbourne Storm!' In doing this, you have made yourself feel better by belonging to the Cowboys and saying that they are better than Melbourne Storm. You have also assigned worth to your team regardless of their ability. The Cowboys may be better than Melbourne Storm, but even if they weren't, you may still say that they are.

social identity
a person's sense of self based on the groups they belong to

But why do we do this? In 1970, Henri Tajfel developed social identity theory to answer this question.

Social identity theory states that we use groups to form our social identity. According to Tajfel (1970), groups are an important source of pride and self-esteem. When we belong to a group, we experience a sense of belonging, and this provides us with an identity in the world that we may not have otherwise had.

social identity theory
a theory that suggests that groups are part of our identity and self-esteem, through three processes: social categorisation, social identification and social comparison

To maintain self-esteem and pride, we increase the status of our group. We may choose to do this by stating something like 'Brisbane is the best city in Australia!' In doing so, we have identified as being part of a group (Brisbane) and increased the status of our group (best city in Australia). To take this further, we can increase our image by comparing it against other groups and being discriminatory towards them, for example 'Melbourne and Sydney are awful. Who would want to live there?'

FIGURE 1 Our social identity comes from many things, such as our hair colour, what we do and don't like, the jokes we enjoy and the music we listen to.

FIGURE 2 When you announce that your sports team is better than another, you are making yourself feel good because you belong to a group that is better than another.

When we belong to a group, we tend to develop an 'us' versus 'them' mentality: we have an **in-group** and an **out-group**. Social identity theory states that our in-group will discriminate against our out-group to make us feel better and give us a better perceived self-image. The in-group will either seek out negatives in the out-group or exaggerate negatives in the out-group.

Examples of in-groups and out-groups:

- **Sport**: AFL fans and rugby fans
- **Politics**: Labor, Liberal and Greens
- **Social classes**: Upper, middle and working classes
- **Religion**: Christian, Jewish and Muslim
- **Employment**: Casual, full-time and part-time
- **School**: Primary school and high school

Tajfel proposed that there were three mental processes that we use to determine and maintain who is part of an in-group or out-group: social categorisation, social identification and social comparison.

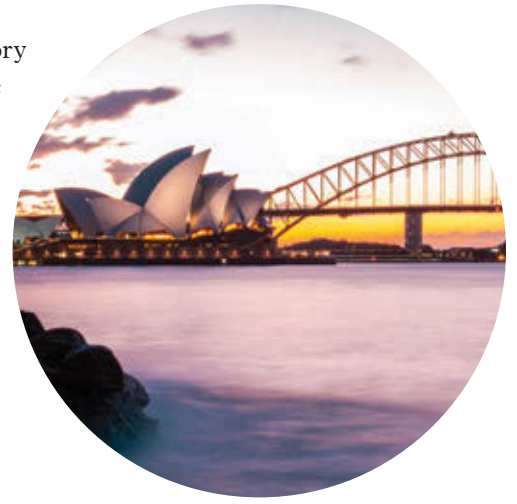


FIGURE 3 When you make negative comments about Sydney, you are building positive feelings towards Brisbane.

Social categorisation

Social categorisation is where we sort people and objects so that we are able to understand and identify them. We extend this to ourselves as well, so that we are able to understand our environment and act appropriately.

For example, if you meet someone from Melbourne, you may assign them to the group 'Victorian'. When you do this, you are probably also assigning ideas to them, such as 'They must enjoy cold weather, because Victoria is always colder than Queensland'. We also assign ourselves to groups. If you assign yourself to being a teenager, you may think that you should behave in a particular way towards adults and teachers as well as children. You may think that you are supposed to listen to a certain type of music or socialise at certain places more; for example, you may socialise at the movies instead of the park where younger children may go. In doing this, we are basing our behaviour on how we believe our group should act.

in-group
a group of people with a shared interest, identity or beliefs

out-group
people or groups that exist outside of someone else's group

social categorisation
assembling similar objects and people so that we are able to identify and understand them

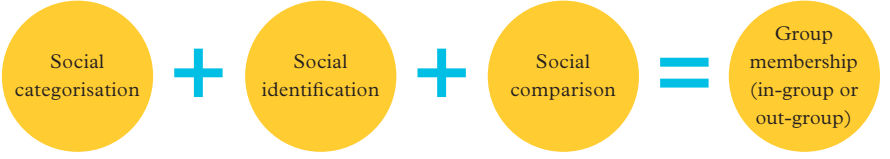


FIGURE 4 The three mental processes that we use to determine who is part of our in-group or out-group: social categorisation, social identification and social comparison.

Social identification

Social identification is where we adopt the behaviour, attitudes and beliefs of the group we belong to. If you identify as being a student, you will probably study more and attend school on a daily basis – you may even complain about homework. If you identify as an athlete, you may go to the gym a lot and try to train as much as possible. In doing so, you are affirming that you belong to a group.

social identification
a process where people modify their behaviour, attitudes and beliefs to match the group that they belong to

Social comparison

social comparison comparing our in-group with other groups to affirm our identity

The final stage of social identity is **social comparison**. Social comparison is where we compare our in-group with other groups to affirm our identity. Tajfel (1970) states that we maintain self-esteem when our group can be compared positively with other groups.

This helps in our understanding of prejudice as once two groups have identified as being different, it is important for them to maintain this difference so that members of each group can maintain their self-esteem. Groups can compete for resources, as much as they are competing to maintain identity.

FIGURE 5 The group we belong to helps us maintain our sense of identity.

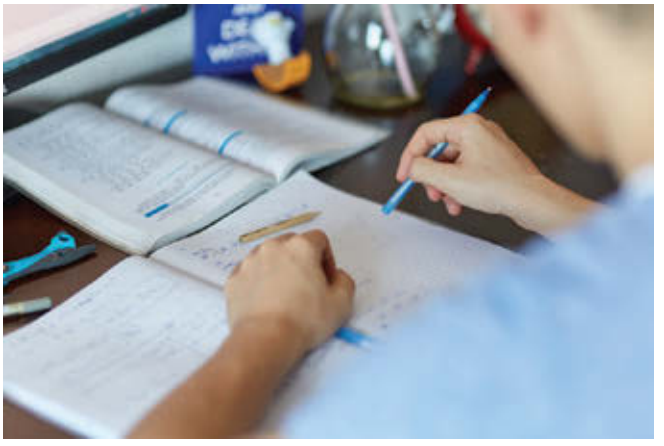


FIGURE 6 When you identify as a particular role, such as student, your behaviours may also match this identification. As a student you might choose to complain about study.

CHECK YOUR LEARNING 16.3

Describe and explain

1 **Describe** social identity theory.
2 **Explain** what social comparison is.

Apply, analyse and interpret

3 Think of two groups that you belong to (e.g., your sports team, your friends, your family, your class). **Compare** and **distinguish** between these two groups.
4 **Contrast** an in-group with an out-group.

Investigate, evaluate and communicate

5 **Discuss** the three components of social identity theory.
6 **Evaluate** the following statement with regard to social identity theory: 'People do not gain their identity from others; identity is entirely from one's self'.
7 **Appraise** the role of social categorisation in forming an in-group.

obook assess

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 16.3

» **Increase your knowledge**
Social categorisation

» **Weblink**
Social identity theory

16.4 Attribution theory

KEY IDEAS

In this section, you will learn about:

- attribution theory
- the use of dispositional or situational attributions to understand behaviours.

Why do we do the things we do? Why did she react the way she did? Why does he feel that way? To help navigate our social experiences, we feel an inexplicable need to explain or determine the reason for the behaviour.

attribution inferences we make about the causes of events or behaviours in order to understand social experiences

Attributions are inferences that we make about the causes of events, the behaviour of others or our own behaviour. They were first described in 1958 by researcher Fritz Heider. He posited that people tend to see the cause of a behaviour or action as being either located within the person (internal) or outside the person (external).

Julia invites Kim (a co-worker) and Liz (a long-time friend) to the movies. Liz arrives 30 minutes late. Kim thinks that there must have been a lot of traffic or that parking was scarce in the area, causing Liz to be delayed. Julia knows that Liz is rarely on time and thinks her friend is disorganised. Both of these responses are examples of attributions, but each is different.

Julia's attributions blame the delay on Liz's character: her poor planning and lack of time management skills. These are dispositional (personal) attributions and are internal factors. Kim blames the delay on situational attributions, where the cause of behaviour is attributed to a situation or event that is external to the person involved. Table 1 lists some of the reasons behind internal and external attributions that we use to explain behaviour.

FIGURE 1 We can attribute the behaviours of others or ourselves to internal or external factors. If your friend is late to the movies you might assume it's because she is always late, but someone else might blame it on traffic.

TABLE 1 Internal and external attributions

Dispositional (Internal)	Situational (External)
Traits	Environmental setting
Ability	Situation
Motivation	Luck
Attitude	Actions of another person
Mood	
Effort	

Attribution theory

attribution theory
the theory that humans need to understand why people behave in certain ways, and there are two ways to explain behaviour: dispositional factors and situational attributions

Attribution theory formed from the idea that people have an innate need to try and understand why things happen the way they do. When we observe another's actions we make decisions about the intention of the action and the responsibility. The attribution we use tends to be determined by whether we are performing an action, or if we are observing someone else. This is known as the **actor–observer bias**.

actor–observer bias
the tendency to explain our own actions by external factors, and explain the actions of others by internal factors

When we think about our own behaviour we tend to consider the environment and external factors. When we do this we are using **situational attribution**. Situational attribution is when we consider external factors to explain behaviour. For example, in the previous scenario where Julia and Kim are waiting for Liz, Kim is using situational attribution to explain Liz's behaviour.

situational attribution
the assumption that behaviour is due to environmental or external factors

When we think about the behaviour of others we tend to consider internal factors of their personality. This is called **dispositional attribution**. In the movie scenario, Julia attributes Liz's lateness as dispositional.

dispositional attribution
the assumption that behaviour is due to internal or personal factors

FIGURE 2 Situational and dispositional attribution

Fundamental attribution error

The premise of attribution theory is that we are more likely to explain someone else's behaviour by looking at dispositional factors rather than situational factors. This helps us to understand the question of 'why' things occur. When we underestimate the situational factors, and overestimate the dispositional factors in behaviour, we experience the **fundamental attribution error**.

fundamental attribution error
when people place too much emphasis on dispositional attribution, and too little emphasis on situational attribution

For example, you may see someone in your class act responsibly, conscientiously and with kindness in front of all teachers and people who hold positions of responsibility. This may cause your teachers to believe that this student is always responsible, conscientious and kind. They have assigned this to the behaviour they see, and have not considered how this student's behaviour changes during different circumstances. In Western society, such as Australia, people are held responsible for their actions; because of this there is a tendency to typically assign dispositional attribution to their behaviour.

Ross and colleagues (1977) conducted a study to see if people would make the fundamental attribution error when they had factual knowledge to contradict this. The study used student participants who were randomly assigned to one of three roles: a game-show host, contestants on the game show and the game-show audience. Participants were told that the game-show host could design their own questions. The audience then watched the game show.

When the show was over, observers were asked to determine the intelligence of the people in the show (host and participants). They consistently determined the host to be the most intelligent, despite being aware that the host had written the questions. They attributed the host's intelligence to dispositional factors, and were unable to attribute the 'intelligence' to situational factors (i.e. the host had written the questions, and therefore clearly already knew all the answers).

This study confirmed that the fundamental attribution error can happen despite people having knowledge that it is incorrect.

FIGURE 3 Participants determined the game-show host to be the most intelligent in the 1977 study.

CHECK YOUR LEARNING 16.4

Describe and explain

1 **Describe** the fundamental attribution error.

2 **Identify** if the following behaviours have been attributed to situational or dispositional factors.

- **a** Jenna and Kai are waiting to meet Mel for dinner. Jenna has been friends with Mel for a long time and assumes that Mel is running late because she underestimated how much time she needed to get ready. Kai has only known Mel for a few weeks and assumes that Mel got stuck in traffic.
- **b** Kamila and Finn are watching their friend Jamie teach students to ski. Finn assumes that Jamie is really smart because of what he is saying. Kamila knows that Jamie can check his phone whenever he forgets information, so she doesn't assume Jamie is that smart.
- **c** Elsa knows that she is running late because there is snow on the road, and the bus can't go as quickly. She knows that it is not her fault, but Tomas disagrees and thinks Elsa should have gotten an earlier bus.

Apply, analyse and interpret

3 **Compare** dispositional attributions and situational attributions.

4 Thea has been helping Lotte write and practise a speech all week. When Lotte is presenting the speech, Thea still assumes that Lotte is speaking naturally, and is very clever for thinking of it on the spot, despite knowing that she helped Lotte learn the speech. **Determine** if Thea is experiencing fundamental attribution error.

Investigate, evaluate and communicate

5 **Assess** the 1977 Ross study. Refer to ethics and potential issues with the study (think of sample, population, method etc.).

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 16.4
- **» Increase your knowledge**
  Exploring attributions
- **» Weblink**
  Attribution theory

16.5 Bias

KEY IDEAS

In this section, you will learn about:

- the use of bias to understand human behaviour
- self-serving bias as a means of maintaining self-esteem and confirmation bias as a tendency to be selective in our recall of information.

As discussed in attribution theory, people like to have an explanation for why something occurs. When it comes to human behaviour and action, people use short-cuts to make their daily lives easier. Unfortunately, one of these methods is prejudice. However, this can be taken further when people experience bias. A **bias** is an opinion of belief about an object, group or person.

bias
an opinion or belief held about a thing or person

In this section we will review two types of bias. A self-serving bias is a form of attribution error, whereas confirmation bias is involved in stereotyping.

Self-serving bias

self-serving bias
a tendency to view ourselves more favourably than others in the same position

A **self-serving bias** is a cognitive or perceptual process that is partial because of a need to maintain our self-esteem. Alternatively, it is a tendency to view ourselves more favourably than we may view others in the same position.

As people, we are more likely to attribute our success to internal factors and our failures to external factors. This is the self-serving bias. For example, if your netball team wins the game on the weekend, you are likely to decide that you (and the rest of your team) played really well. However, if your team were to lose on the weekend, you are more likely to blame the weather, the other team, the umpires or injuries. It is harder for people to acknowledge their flaws as this can risk damaging their self-esteem.

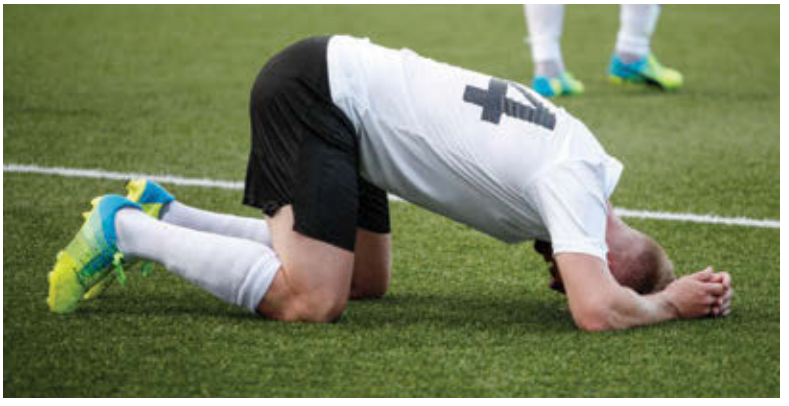


FIGURE 1 If your team loses the grand final you might be tempted to blame the umpires or the weather, instead of accepting that the other team played better.

In 1975, Miller and Ross posed another aspect of the self-serving bias: people expect to be successful. When an outcome is consistent with our expectations we are likely to attribute this to internal factors. When an outcome is inconsistent with our expectations we will make situational attributions to justify the result.

Confirmation bias

confirmation bias
tendency to search for, recall and interpret information to suit already held beliefs

Confirmation bias is the tendency that people have to search for, recall and interpret information to affirm our pre-existing beliefs. People often remember information selectively, or only seek out information that confirms their suspicions. Ambiguous information usually does not retain its ambiguity, as people interpret this information to support their existing position or thought. This is particularly obvious when it applies to an emotionally charged

stimulus. For example, your sports team lost but you think it was the umpire's fault, you will recall all the times an umpire has made the wrong call previously. You will also indulge in new information that proves your point.

Self-serving and confirmation biases help to explain how attitudes can be maintained. Confirmation bias is known to make stereotypes resistant to change. They both contribute to errors in understanding of behaviour.

Challenge 16.5

Are you responsible?

Imagine that you have spent the past month studying for an important mathematics test. You have revised every night by completing at least 10 practice questions. On the day of the test, you believe that you have done really well, but when you get your mark back, you have only scored a D+, when you thought you would get an A. Instantly, you decide the teacher is wrong and has marked your test incorrectly. Your teacher informs you that you actually studied the wrong material. Based on this you decide that your teacher didn't tell you the correct information to study. Your classmates support your decision and tell you that they have never got a good mark with that teacher.

Determine what type of bias you are using and propose how you could change this perception.

CHECK YOUR LEARNING 16.5

Describe and explain

1 **Explain** the self-serving bias.

2 **Describe** confirmation bias.

Apply, analyse and interpret

3 **Compare** the self-serving bias and confirmation bias.

4 **Determine** which bias may be used in the following situations:

- **a** James's football team won, the weather was wet and Drago's team had injuries and were playing at James's teams field.
- **b** Sian expected to get a high score on her exam. When she received her results, she hadn't achieved the score that she expected.
- **c** Shahil believes that dogs are superior to cats. When presented with information that cats may be more friendly and social, Shahil ignores this and focuses on the playful nature of dogs.

5 **Differentiate** between self-serving bias and confirmation bias with reference to attitudes.

Investigate, evaluate and communicate

6 **Design** a methodology to compare the self-serving bias and confirmation bias.

7 **Evaluate** the following claim: 'Confirmation bias is more prominent in everyday life than self-serving bias'.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 16.5
- **» Challenge**
  Worksheet: 16.5 Are you responsible?
- **» Weblink**
  The effects of bias

SCIENCE AS A HUMAN ENDEAVOUR

16.6 Implicit bias influences our behaviour

KEY IDEA

In this section, you will learn about:

+ understanding how implicit bias influences behaviour.

How can we unconsciously hold beliefs that we know on a conscious level to be morally, socially and politically unjust? Such were the questions asked by the owners of the American Starbucks coffee chain in 2018 when a store manager had two African-American men wrongfully arrested for 'refusing to make a purchase or leave' (Sukhera, 2018). These men were simply waiting for other people to arrive for a business meeting before ordering. Although the charges were later dropped, and an apology issued, Starbucks management chose to close a number of their stores and engage staff in 'anti-bias' training.

Why did the store manager appear to make a rash, uninformed and unconscious decision about the two men? This decision-making process is related to a phenomenon known as implicit (or unconscious) bias.

Implicit bias can be defined as a discriminatory bias that lies outside our conscious awareness or control (Greenwald & Krieger, 2006). In other words, we don't know that we hold these implicit biases. We form them from our early childhood experiences and from what we are taught and observe in our social environments (Golden, 2017). Harvard University researchers recently uncovered implicit gender bias in high-school students regarding female leadership roles. The researchers surveyed more than 19 000 high school students, assessing whether or not they agreed to give power to student councils based on the gender, race and ethnicity of the leaders (Harvard Graduate School of Education, 2015). The findings revealed that both male and female teenagers favoured male-led councils over female-led councils.

Sometimes, however, implicit bias can lead to reverse discriminatory behaviour. Such was the case with a recent Australian study assessing whether women and people from minority groups were discriminated against in the public service recruitment process

(Hiscox, 2017). They examined whether anonymity reduced discriminatory recruitment practices for senior positions. The researchers found that when the records were identifiable, female candidates were more likely to be shortlisted than male candidates. This trend was strongest for Indigenous female candidates. Hiscox concluded that screening candidates anonymously may hinder efforts to encourage diversity in the Australian workforce rather than reduce discrimination.

It is challenging for psychologists to measure something that is unconscious. A group of social psychologists responded to this challenge by developing an online test called the Implicit Association Test (IAT; Greenwald, McGhee & Schwartz, 1998). The IAT was designed to measure how strongly different concepts received automatic (or unconscious) evaluations. They asked people to categorise words or images as they are flashed onto a computer screen. Words such as 'Black', 'White', 'Japanese', 'Pleasant' and 'Unpleasant' were presented on the screen and participants were required to sort them into a series of tasks. The IAT has been widely used to examine implicit biases among police officers and employers in the legal system and other political settings. However, the test has received criticism due to its unreliable psychometric properties and the difficulty in interpreting the results (Oswald *et al* 2013; Sleek, 2018).

Harvard University's Project Implicit (2011) has captured over 20 years of data on unconscious thoughts and feelings. Project Implicit involved an international collaboration, including researchers from the University of Sydney, to provide new insights into attitudes, stereotypes and other hidden biases that influence how people perceive, judge and act. For example, the research data suggests a gradual cultural shift towards more positive evaluations of the lesbian and gay community (Westgate *et al*., 2015).

CHECK YOUR LEARNING 16.6

Describe and explain

1 **Describe** what implicit bias is.
2 **Explain** how implicit bias can affect our behaviours in relation to gender prejudice.

Apply, analyse and interpret

3 **Compare** the strengths and limitation of the Implicit Association Test.

Investigate, evaluate and communicate

4 **Discuss** how implicit bias in relation to sexual preference could develop during childhood.
5 **Investigate** other current examples of implicit bias that have occurred in politics.
6 **Create** a research question for this claim: Australian politics demonstrates a gender bias.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 16.6

» **Weblink**
Implicit bias

» **Weblink**
The relationship between bias and attitudes

CHAPTER 16

Review

Summary

16.1
- An attitude is a learnt, stable and relatively enduring evaluation of a person, object or idea that can influence behaviour.
- Attitudes can be expressed as an explicit attitude, an attitude that you are open about and matches your behaviour, or an implicit attitude that is unconscious and people may be unaware they have.
- Attitude specificity is when behaviours and attitudes are more likely to be congruent when the attitude is highly specific to the behaviour. This can be influenced by previous knowledge and experience or the situation.

16.2
- Cognitive dissonance is a theory that suggests that a person will feel uncomfortable and try to maintain an internal consistency and agreement between their beliefs and behaviours by altering their beliefs to match their behaviours.
- Effort justification occurs when inconsistencies experienced will make an individual go to large amounts of effort to justify the achievement of their goal.

16.3
- Social identity is an individual sense of self based on groups that we belong to.
- Henri Tajfel suggests that we determine in-groups and out-groups by three processes: social categorisation, social identification and social comparison.
- An in-group is a group of people with a shared interest, identity or beliefs; an out-group is a group of people that exist outside of someone's in-group.
- Social categorisation is when people assemble similar objects and people so that they are better able to understand them.
- Social identification is the process that people use to modify their behaviour, attitudes and beliefs to match the group that they belong to.
- Social comparison is how people maintain and confirm their identity by comparing their in-group with out-groups. This may involve decreasing the out-group's status to affirm the in-group's status.

16.4
- Attributions are inferences that people make about the causes of events or behaviours to understand social experiences.
- Situational attribution is the assumption that behaviour is the result of external factors.
- Dispositional attribution is the assumption that behaviour is due to personal or internal factors.
- Fundamental attribution error is where people place too much emphasis on dispositional factors.

16.5
- Bias is an opinion or belief held about an object or person.
- Self-serving bias is a tendency to view ourselves more favourably than others in the same position.
- Confirmation bias is the tendency to search for and interpret information that suits already held beliefs.

Key terms

- actor–observer bias
- attitude
- attitude specificity
- attribution
- attribution theory
- bias
- cognitive dissonance
- confirmation bias
- dispositional attribution
- effort justification
- explicit attitude
- fundamental attribution error
- implicit attitude
- in-group
- out-group
- self-serving bias
- situational attribution
- social categorisation
- social comparison
- social identification
- social identity
- social identity theory

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: * = low, ** = medium, *** = high.

Multiple choice

1 What is a relatively permanent, integrated system of beliefs, thoughts and behaviours?

A an opinion
B a value
C an attitude
D a theory

2 How do social psychologists view attitudes?

A not permanent
B learnt
C something we are born with
D all of the above

3 How is the fundamental attribution error best described?

A placing too much emphasis on dispositional factors and too little emphasis on situational factors
B the belief that a person doesn't always act the same way in different circumstances
C placing too much emphasis on situational factors and too little emphasis on dispositional factors.
D making unfair judgments about someone due to their race, age or gender

4 When people affirm their identities by comparing their in-group with other groups, what is this known as?

A social identity theory
B social comparison
C cognitive dissonance
D attribution theory

5 Which of the following statements best describes the difference between attitudes and attributions?

A Attributions are inferences, whereas attitudes are ideas.
B Attributions help us make sense of our social world, whereas attitudes help us evaluate our actions.
C There is no difference – both attributions and attitudes help us identify the cause of events in our social world.
D Attitudes are inferences, whereas attributions are ideas.

6 What are the three processes associated with social identity theory?

A in-groups, out-groups, social comparison
B attitudes, beliefs, behaviours
C implicit attitudes, explicit attitudes, prejudice
D categorisation, identification, comparison

7 Which of the following statements is *not* true of cognitive dissonance?

A There is no difference between the attitude a person holds and the behaviour they engage in.

B A person will change a behaviour or change their attitude to reduce tension.

C A person tells a white lie to cover for a friend even though they believe honesty is the best policy, then composes a cover story to justify the lie.

D A person alters beliefs or behaviours to maintain internal consistency between their beliefs and behaviours.

8 According to cognitive dissonance theory, how might people try to reduce dissonance?

A changing one or more of their inconsistent cognitions

B looking for additional support to bolster one side or the other

C being critical of the source of one of these cognitions

D all of the above

9 In their study, Festinger and Carlsmith had students complete a very boring task and offered them either $1 or $20 for telling other students that the task was 'interesting'. Later, the participants were asked to give their honest opinion about the task. What did the results of this study indicate?

A Both the $1 and $20 students rated the task as boring.

B The $1 students rated the task as interesting, whereas the $20 students rated it as boring.

C Both the $1 and $20 students rated the task as interesting.

D The $20 students rated the task as interesting, whereas the $1 students rated it as boring.

10 In Festinger and Carlsmith's 'boring task' experiment, the participants who were paid only $1 to lie were more likely to have:

A convinced themselves that the task was interesting.

B realised that it was all part of the experiment.

C insisted that they be paid $20.

D begged Festinger not to reveal their names.

11 Cognitive dissonance theory predicts that after people have behaved in a way that contradicts their attitude, they will:

A do nothing.

B change their attitude to make it more consistent with their behaviour.

C change their behaviour to make it less consistent with their attitude.

D not do any of the three answers above.

12 Claire recently tried out for a regional sporting team. She attributed her selection in the team to her dedication to training. However, she suggested the coach was playing favourites when she wasn't selected to play the first game of the season. What might Claire be using?

A social comparison

B internal attribution

C self-serving bias

D prejudice

13 Which of the following best explains bias?

A a positive or negative action against someone in a minority group

B a short-cut in decision-making based on prior knowledge of a concept

C an opinion of belief about an object, group or person that can be positive or negative in nature

D how attitudes form and can result in negative actions towards a group, object or person

14 What is social identification?

A when people modify their behaviour, attitudes and beliefs to match those of the out-group

B when people group similar objects and people to help identify and understand them

C when people modify their behaviour, attitudes and beliefs to match the group they belong to

D when people modify their behaviour, attitudes and beliefs to match those of the in-group

Short answer

Describe and explain

★ **15** **Identify** and **explain** three components of an attitude.

★ **16** **Identify** and **explain** the two approaches to explaining the way attitudes are formed.

★★ **17** **Explain** why people's behaviour is often not a true indication of their attitudes.

★★ **18** Briefly **describe** the three processes involved in social identity theory.

Apply, analyse and interpret

★ **19** **Compare** the processes of social identity theory.

★ **20** **Compare** implicit and explicit attitudes.

★★ **21** **Differentiate** between dispositional and situational attributions. **Provide** an example to support your answer.

★★ **22** Paulo decided to go on a gap year before starting university despite his belief that it is better to complete his degree before taking time off from study. He later felt uncomfortable and justified his decision by telling his parents he would get better grades if he took time off from studying. **Consider** this using cognitive dissonance theory.

★★★ **23** **Distinguish** between self-serving and confirmation bias. **Explain** how each might contribute to an incorrect understanding of behaviour.

Investigate, evaluate and communicate

★★ **24** Using social identity theory and a specific example, **discuss** how people tend to maintain self-esteem and pride.

★★★ **25** **Assess** attribution theory, including an explanation of actor–observer bias, situational attribution and dispositional attribution.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 16 Review
- **» Revision notes**
  Revision notes for Chapter 16
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz
- **» Flashcard glossary**
  Key terms in Chapter 16

CHAPTER 17

Stereotypes, prejudice & discrimination

What do you think when you hear the word 'lawyer'? Do you imagine someone who is well educated, dressed in a suit and wealthy? The collection of ideas that we form about individuals who belong to a particular group are referred to as stereotypes.

We often use these ideas to make quick, and sometimes very inaccurate, decisions about a person simply because they belong to a certain group.

Prejudice involves people expressing preconceived and irrational attitudes and beliefs about members of another group, while discrimination involves behaviours directed against another group. Prejudice and discrimination have led to the mistreatment of many groups of people worldwide, including atrocities such as the persecution of Jews by the Nazis in the Second World War. Closer to home, European colonisation, cultural displacement and discrimination have at times disadvantaged Australia's Aboriginal and Torres Strait Islander peoples, with many Indigenous peoples continuing to experience discrimination and social disadvantage today.

In this chapter, we will discuss how stereotypes are formed and how they function. We will investigate different forms of prejudice and discrimination and explore how they influence our interactions with others based on such characteristics as age, gender, race and sexual orientation.

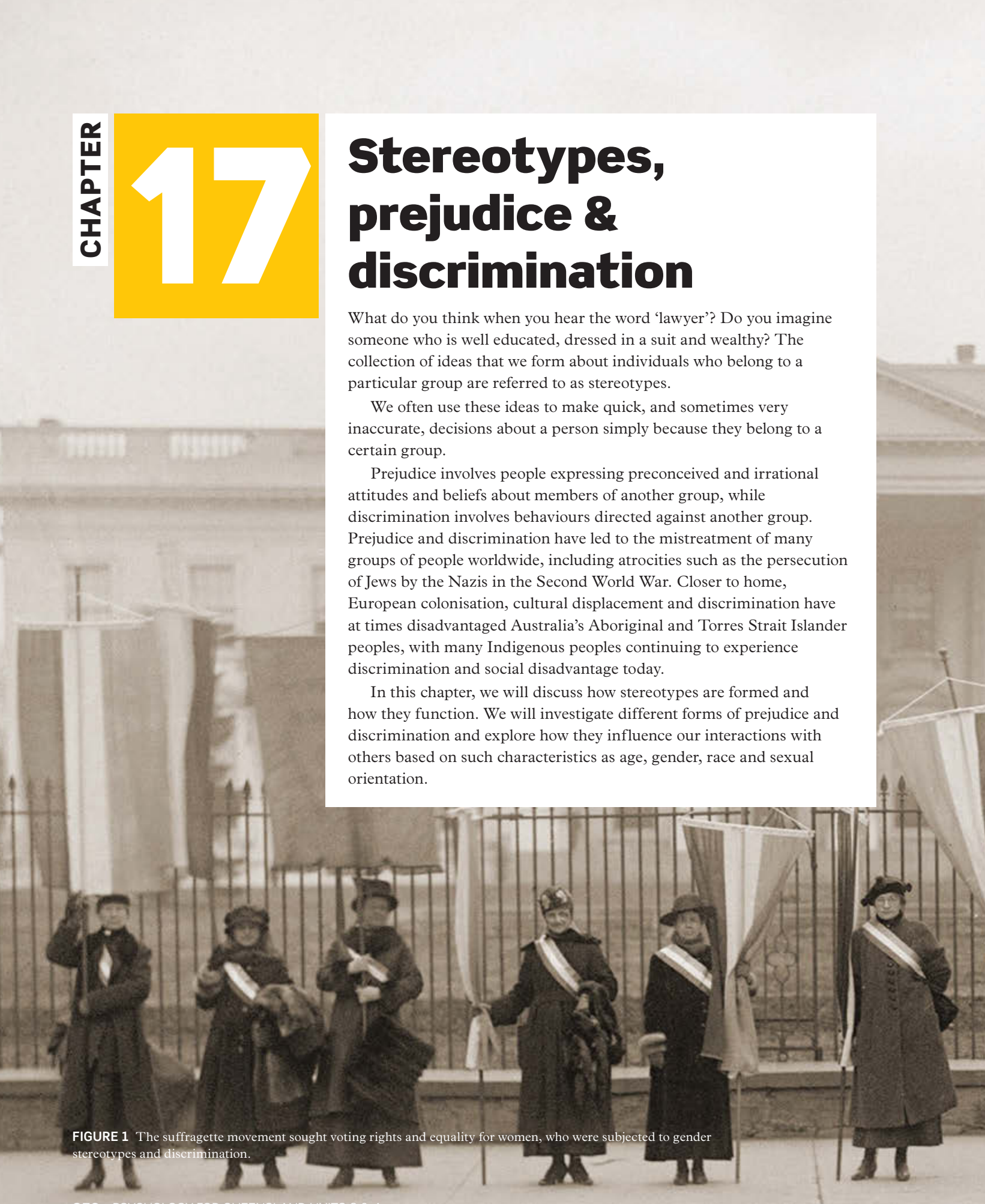


FIGURE 1 The suffragette movement sought voting rights and equality for women, who were subjected to gender stereotypes and discrimination.

OBJECTIVES

→ Describe stereotypes using the tri-component model of attitudes.
→ Distinguish between prejudice and discrimination.
→ Describe scapegoating, direct experience, personal and group prejudice and the prejudiced personality.
→ Prejudice can be on the basis of social differences; describe prejudice expressed as sexism and ageism.

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

MANDATORY PRACTICAL AND SUGGESTED RESEARCH

MANDATORY PRACTICAL	**17.1** The relationship between stereotypes and behaviour
SUGGESTED RESEARCH	**17.2** Social identity theory in discrimination (e.g. 'A Class Divided' 1968 experiment by Jane Elliot in *A Class Divided: Introduction* 2003)
SUGGESTED RESEARCH	**17.3** Social identity theory in group prejudice (e.g. 'The Robbers Cave' 1964, 1958 and 1961 experiments by Muzafer Sherif)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

17.1 Stereotypes and attitudes

KEY IDEAS

In this section, you will learn about:

- stereotypes – what they are and how they form
- the tri-component model of attitudes.

Chapter 16 discussed attitudes and how they relate to identity and behaviours. This section will look at how our attitudes relate to the stereotypes we use on a daily basis.

stereotype generalised and simplified belief about a group of people or a person based on their membership to a group

Stereotypes

Social categorisation (as discussed in Chapter 16) is our natural human tendency to classify people into groups based on characteristics that we perceive them to have in common. Categorising people is a means of organising the information that we have about them through the use of labels, such as hipster, bogan, hoon, bimbo, nerd and snob.

FIGURE 1 *Crocodile Dundee* influenced the Australian stereotype, but how much does this reflect the majority of Australians? The hippie movement was associated with stereotypes such as loving peace, taking drug taking, and being free-spirited and promiscuous – but were these accurate?

Some people are under the impression that certain groups have particular characteristics that are typical of them: these are **stereotypes**. The most common stereotypes are based on age, gender, ethnicity and occupation. Stereotyping is a normal human thought process that is usually automatic and efficient because it saves time and effort when forming an opinion of someone. Put simply, stereotypes are a convenient way of simplifying our social world. However, there is a problem with this simplification, because it leads to inaccurate generalisations. It causes us to prejudge people according to the categories we put them into based on our past experiences and the influence of others, including social and traditional media outlets. Table 1 shows common stereotypes in Western cultures.

Stereotyping includes:

- categorising people into groups – this is usually based on appearance; for example, gender, ethnicity, race, physical ability or disability and age, but can also be based on culture, sexuality, social class, occupation, intelligence and so on
- assuming that all members of the group are the same; for example, Homer Simpson is a stereotypical stupid, white, middle-aged American father; Crocodile Dundee is a stereotypical Aussie.

Function of stereotypes

Stereotypes help us to organise our knowledge of people quickly, especially when we meet new people. Unfortunately, stereotypes tend to be incorrect or over-generalisations about group members. Any individual will not usually possess all of the characteristics that we have assumed, and therefore individual differences are overlooked.

Stereotypes play a large role in prejudice. They can be both positive and negative. Research suggests that prejudicial stereotypes are very accessible and tend to operate automatically without conscious thought.

TABLE 1 Common stereotypes associated with population groups in Western cultures

Gender	
Women	Emotional, submissive, irrational, physically weak
Men	Unemotional, dominant, logical, physically strong
Age	
Young adults and teenagers	Risk-takers, impulsive, promiscuous, binge-drinkers, irresponsible
Elderly people	Feeble, forgetful, slow, intolerant, deaf

Stereotypes may be difficult to change and they persist for several reasons. They are highly subjective – the stereotype a person believes means that the person will be likely to see only what they expect to see in other people. This can cause societal issues, especially regarding minority groups.

Biases may help perpetuate stereotypes where positive aspects of group members are explained for reasons other than the good qualities of the minority group; for example, when a female employee succeeds in a male-dominated industry, a sexist male might attribute her performance to the support she has received from her male colleagues rather than to her own aptitude.

Unfortunately, most people – regardless of education, socioeconomic background or religion – hold some form of prejudice. There are certain groups that have been victims of prejudice because they have lacked power in society or because of certain characteristics.

The tri-component model of attitudes

We discussed what an attitude is in Chapter 16. There are several models to describe the structure of an attitude. The most commonly used is the **tri-component model of attitudes** (Rosenberg & Hovland, 1960).

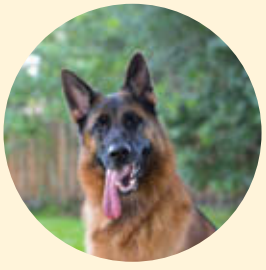
According to the tri-component model, an attitude is made up of a cluster of beliefs (thoughts and ideas), feelings (likes and dislikes) and behaviours (actions and intentions). These elements fit within three components of an attitude: **affective**, **behavioural** and **cognitive** (the ABC of attitudes).

tri-component model of attitudes
the theory that an attitude consists of cognitive, affective and behavioural components

affective component of the tri-component model
how an individual feels about an attitude object

behavioural component of the tri-component model
how a person behaves towards the attitude object

cognitive component of the tri-component model
how a person thinks about the attitude object



Affective component

This is a person's feelings and emotional response to an attitude object. This component is mostly learnt during the course of our daily lives. It is the emotional reaction we have, or the way we feel about the attitude object. This involves a physiological response to the attitude object. For example, you may love dogs.

Behavioural component

This is a person's behaviour towards an attitude object. This is what we say and how we act towards the object. For example, you get a dog as a pet and spend time with it.

Cognitive component

This is a person's thoughts, ideas and understanding about an attitude object. It is what we know, or think we know, about an attitude object. For example, dogs can be good guard dogs and good companions.

FIGURE 2 The three possible components of an attitude according to the tri-component model of attitudes

Some attitudes do not contain all three components; psychologists prefer to say that attitudes can have up to three components. For example, it is possible to have an attitude that is mostly cognitive-based (such as rational thinking). This might be the case during elections, where a voter evaluates the policies of each political candidate (cognitive component) and votes (behavioural component) for whichever candidate has the appropriate policies. In this example, there is very little of the emotional component (affect) in the voter's attitude.

In addition, any one of these components can be more dominant than another for a particular attitude object. For example, an attitude can be cognitive-based rather than affective-based. Your attitude towards smoking could be cognitive-based because you have studied and learnt about the health issues associated with smoking; whereas your attitude towards your favourite songs could be affective-based because the rhythm of the music makes you feel good.

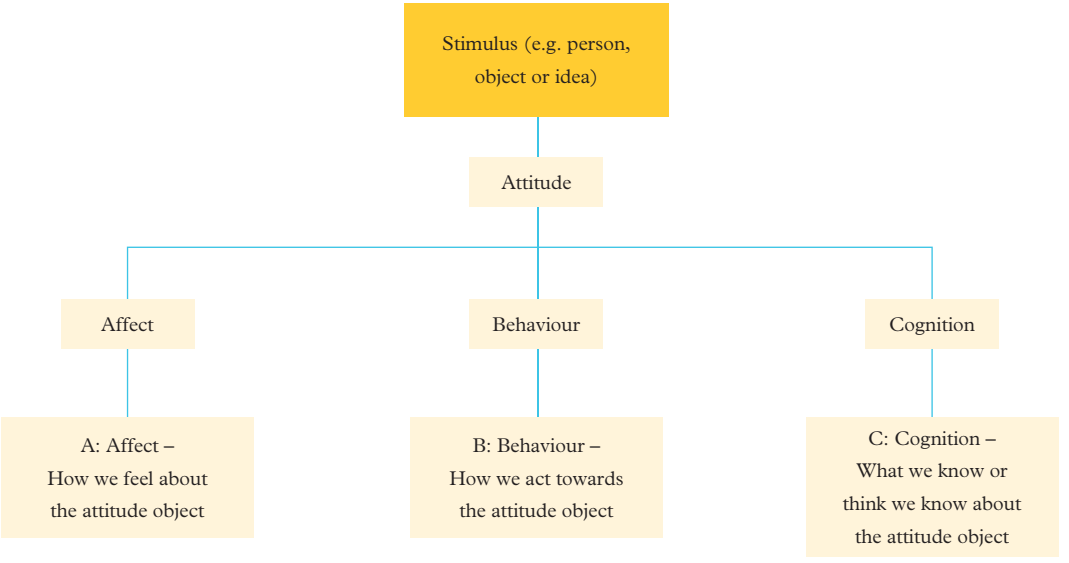


FIGURE 3 The tri-component model of attitudes

Stereotypes and the tri-component model

The tri-component model has also been applied to stereotypes. When people hold stereotypes about other groups of people, there is usually consistency between how they think (cognitions), feel (affect) and act (behaviours) towards people in these groups. For example, 'Irish' people are often thought to be funny, friendly, easygoing people, who love a good chat. If we meet an Irish person, we would likely behave in a friendly manner towards them and be motivated to engage in conversation.

When the stereotype is negative, however, the tri-component model can explain how affect, behaviour and cognition can be linked to lead to prejudicial and discriminatory behaviour. For example, perhaps a young leader in a senior management position sees older employees as inferior. They view older people as not being 'up with the latest technologies' (negative cognition), they generally dislike older staff members (negative affect) and choose not promote them as often as younger people (negative behaviour).

Nevertheless, our thoughts, feelings and behaviours are not always consistently played out this way. For example, Laiere's (1934) study showed how negative thoughts or beliefs held by restaurant owners about Chinese people did not prevent them from serving Chinese guests in their restaurants. This is discussed further in Section 17.2.

MANDATORY PRACTICAL
17.1 The relationship between stereotypes and behaviour
Go to page 432 »

FIGURE 4 A young employee might think that the older employee isn't proficient with new technology (cognitive) and feel that they shouldn't be working in the same role (affective). This might make them act rudely towards the older employee (behaviour).

TABLE 2 The tri-component model of attitudes applied to stereotypes

Stereotype	
Cognitive	Assumptions are made about a group of people or person.
Affective	Feelings are either friendly or hostile towards a group of people based on the assumption.
Behavioural	Behaviour towards a group of people is influenced by the assumption.

CHECK YOUR LEARNING 17.1

Describe and explain

1 **Define** stereotypes and **describe** their function.
2 **Explain** the tri-component model of attitudes.
3 **Use** an example to **summarise** the tri-component model of attitudes and stereotypes.

Apply, analyse and interpret

4 **Compare** the ABCs of attitudes (affect, behaviour, cognition).

Investigate, evaluate and communicate

5 **Investigate** a common stereotype (e.g., stereotypical Australian, student). Using the tri-component model of attitudes, **evaluate** the stereotype you have chosen.
6 **Evaluate** this statement: Attitudes can be based entirely on affect and cognition, behaviour is not important.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 17.1
- **» Mandatory practical**
  17.1 The relationship between stereotypes and behaviour
- **» Increase your knowledge**
  Stereotyping in society
- **» Weblink**
  The tri-component model of attitudes

17.2 Prejudice and discrimination

KEY IDEAS

In this section, you will learn about:

- prejudice and discrimination
- how prejudice and discrimination interact.

prejudice
an unfavourable attitude towards a group of people

discrimination
prejudice expressed through behaviour

Prejudice (literally pre-judgment) is an unfavourable or negative attitude towards a group of people, based on insufficient or incorrect information about the group to whom it is directed – it often arises from stereotyping. Note that prejudice is directed towards an identifiable group or identifiable member of a group, not towards an isolated individual. **Discrimination** is the action that expresses the attitude of prejudice and it is often an individual who is the victim.

Prejudice is a form of antisocial behaviour, and it is a cause for concern in all communities. It is present in most cultures, and has been evident throughout history. It causes stress and tension between groups, and harm to the victims.

Study tip

Prejudice can result in acts of discrimination. Prejudice is a feeling/thought, whereas discrimination is an action.

A negative attitude towards a group is not always necessarily prejudice, however. For example, it is common for members of a society to have a negative attitude towards a group of people who have been found guilty in a court of law for committing criminal activity, such as murder.

To be able to moderate and prevent the effects of prejudice, it is important to understand why people are prejudiced, and how prejudice may be formed.

The interrelationship between attitudes, prejudice and discrimination

Section 17.1 covered the tri-component model of attitudes. Prejudice is another example of an attitude.

For example, prejudice against elderly people (ageism) includes negative beliefs about elderly people (cognitive component), a strong feeling of dislike towards the elderly (affective component) and the action of discriminating against them (behavioural component).

TABLE 1 The tri-component model of attitudes applied to prejudice and discrimination

Prejudice	
Cognitive	Assumptions are made about a group of people or a person.
Affective	Feelings are either friendly or hostile towards a group of people based on the assumption.
Discrimination	
Behavioural	Behaviour towards a group of people is influenced by the assumption.

TABLE 2 Examples of prejudice

Prejudice type	Example
Sexism	Only men can lift heavy objects.
Ageism	Old people can't learn new skills.
Disability	People with a mental illness are unreliable.

FIGURE 1 A bilingual sign from the apartheid era of South Africa designates a beach 'for whites only'.

Examples of prejudice and discrimination

The most obvious examples of prejudice and discrimination are based on gender, race, ethnicity, age, sexual preference, physical or intellectual disability or mental illness. Table 2 contains examples of prejudice.

In most Western nations, much has been done to try to reduce these prejudices through education and legislation. There is still much work to do, however, because prejudice can be difficult to prevent and difficult to eradicate once it has been established.

Although laws in Australia prevent discrimination, some prejudice can be difficult to detect. It is also subtly embedded in our everyday language, culture and social dialogue. Table 3 presents some types of discrimination.

TABLE 3 Examples of discrimination

Discrimination	Description	Example
Reluctance to help	Reluctance to help other groups improve their position in society by passively or actively declining to assist their efforts	Inadequate facilities for physically disabled employees in a workplace
Tokenism	Publicly giving trivial assistance to a minority group in order to avoid accusations of prejudice and discrimination	Employing one woman in a predominantly male organisation
Reverse discrimination	Publicly being prejudiced in favour of a minority group in order to deflect social accusation of prejudice and discrimination	Deliberately favouring a minority group by making it company policy to employ a percentage of minority group members – but this sometimes turns out to be discriminatory because the members of the minority group are singled out and treated differently once employed by the company.

Victims of prejudice may suffer a range of effects that include physical, psychological and social disadvantage, low self-esteem, limited ambition, and physical and verbal abuse. Some examples are set out in Table 4 (page 364).

TABLE 4 Examples of the effects of prejudice and discrimination

Effect	Example
Low self-esteem	Crude acts of prejudice on a regular basis can damage self-esteem (e.g., insults, denial of equality, violence).
Disadvantage/failure	Being denied access to resources in society that are necessary for success is more likely to lead to failure (e.g., education, health, housing, employment).
Self-fulfilling prophecies	Expectations and assumptions about group members will influence interaction with members of that group and eventually change their behaviour so that it is in keeping with the original expectations and assumptions.
Violence and genocide	Overt acts of prejudice can include physical harm (e.g., apartheid in South Africa, segregation in the United States and, in some cases, deliberate acts of extermination such as the Holocaust in the Second World War).

CASE STUDY 17.2

Prejudice but not discrimination

During the 1930s in the United States, racism towards ethnic minorities was common. Richard LaPiere (1934) travelled throughout the nation with two Chinese friends. The trio dined at 184 restaurants and were not refused service at any. Six months later, LaPiere surveyed the same restaurants, asking whether they would serve Chinese patrons. The results of this survey found that approximately 50 per cent of the restaurateurs returned the survey and, of these, 90 per cent said they would not serve Chinese patrons. LaPiere had found that people who *expressed* prejudice had not actually *behaved* in a prejudicial way.

One fault with LaPiere's study is that the people who served the Chinese customers might not have been the same people who completed the survey later. Yet, since LaPiere's study, there have been numerous studies that have found that people express attitudes that contradict their behaviour.

CHECK YOUR LEARNING 17.2

Describe and explain

1 **Define** prejudice.

2 Using an example, **explain** discrimination.

Apply, analyse and interpret

3 **Compare** prejudice with discrimination.

4 Complete the following table to **differentiate** between prejudice and discrimination.

	Expressed as	Attitude
Prejudice		
Discrimination		

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 17.2

» **Suggested research**
17.2 Social identity theory in discrimination

» **Increase your knowledge**
Are Australians prejudiced?

17.3 Forming prejudice

KEY IDEAS

In this section, you will learn about:

- influences that contribute to prejudice
- scapegoating, direct experience and personal and group prejudice.

A range of influences contribute to the formation and maintenance of prejudice. This section will focus on scapegoating, direct experience, personal and group prejudice and the prejudiced personality.

Scapegoating

scapegoating blaming a person or group for a negative action, event or result

Scapegoating is sometimes referred to as the 'frustration-aggression theory' (Dollard *et al.*, 1939). The theory contends that any aggressive behaviour is the result of the release of frustration. It suggests that when people feel frustrated, they engage in behaviours to relieve the frustration, and that any form of aggressive behaviour is always preceded by frustration (Berkowitz, 1989; Burton, Westen & Kowalski, 2019). People often use scapegoating to explain failures, misfortunes or poor behaviour, blaming it on another person or another group. Scapegoating can involve socially frustrating conditions, such as economic depression and unemployment. An example of this is the increase in lynching against Black Africans that occurred in the United States during the Depression years. It also involves the need for frustration to be released, which results in blame being directed towards a 'scapegoat' – usually a minority out-group – leading people to discriminate against and perpetrate verbal and physical abuse towards that group.

Study tip

Try to familiarise yourself with 'real' examples of prejudice – this will make remembering the concept easier.

Direct experience

Direct encounters with a person, object or idea can influence the formation of an attitude (Fishbein & Ajzen, 1975). Direct experiences that are negative or unpleasant can result in strong attitudes. For example, if a person has a wound and the doctor stitching it causes a lot of pain, this may result in a negative attitude to all doctors in future.

FIGURE 1 You might have blamed your brother or sister for something that you were getting in trouble for – this is a form of scapegoating.

Personal and group prejudice

Prejudices can be held by individuals towards other people or groups, or by groups towards other people or groups. Personal prejudice results from an individual's direct experiences, or through early childhood interactions with parents, friends and social groups.

CASE STUDY 17.3

The Robbers Cave experiment

A study by Sherif and colleagues (1961), set in a school holiday camp in the Robbers Cave Park in Oklahoma in the United States, involved 'campers' who were mostly 11- and 12-year-old boys. The study investigated the cases of, and possible solutions to, intergroup conflict. The experiment was conducted in three stages.

Stage 1: Setting up camp

The boys were divided randomly into two groups. Each group was initially unaware of the other group, but gradually became aware.

Stage 2: Setting up rivalry between groups

A series of contests was set up to create rivalry between the two groups, who had named themselves the Rattlers and the Eagles. There was hostility once each group became aware of the other's existence; insults were hurled, and they accused each other of 'using our campground' and 'our baseball diamond'.

For the first two days of the contests, there was good sportsmanship, but this did not last: there were food fights; the Eagles stole the Rattler's flag and burned it; the Rattlers raided the Eagles' cabin, stole the group leader's jeans and used them as a flag; and the Eagles raided the Rattler's cabin, spreading dirt and upending beds.

When the Eagles won the final of the contest, the Rattlers raided their cabin and stole the prizes. A fist fight developed and the staff had to intervene to prevent injury.

Each group had developed negative stereotypes of the other group, and a contrasting positive stereotype of themselves.

Stage 3: Setting up cooperation between groups

Researchers tried to reduce friction between the groups by having them socialise at pleasant events such as Fourth of July fireworks, but this was not successful. However, when told that there might be a water shortage due to damage to the water tank, the groups discussed the problem together, and worked collaboratively towards a solution. Once the tank had been repaired, the Rattlers, who had water bottles, did not object to the Eagles taking the first turn at drinking water from the taps.

Next morning there was another food fight, but the researchers again provided a cooperation task. This time, a truck carrying the next week's supplies had become bogged. It needed all of the boys working together to push it out of the mud. After this the rivalry between the groups diminished.

The cooperative activities forced the groups to work together peacefully. The prejudices of the members of each group were reduced. The Rattlers even used the money that they had won in the contest to buy treats for all the boys in both groups.

This study demonstrated that prejudice and hostility arising from competition can be overcome by simply getting groups to know each other by working together towards a *superordinate goal* (a goal that neither of group could achieve alone). This meant the boys began to think of themselves as a combined group.

FIGURE 2 Robbers Cave State Park is where the experiment took place.

On the other hand, group prejudices develop when members of a majority group (in-group) hold negative attitudes towards members of a minority group (or out-group).

According to American psychologist Herbert Blumer (1961), there are four basic characteristics that can be observed in prejudiced groups:

1 They tend to believe that they are superior to the minority group to whom the prejudice is directed.
2 The majority group see the minority group as different and that they 'do not belong'.
3 The majority group see themselves as more powerful and important than the minority group.
4 A majority group displaying prejudiced attitudes tends to be insecure and fearful of the minority group becoming more important and powerful than they are themselves.

The prejudiced personality

Some social psychologists suggest people with certain personality types and characteristics are likely to hold prejudiced attitudes. Gordon Allport argued that prejudice involves a general cognitive style (way of thinking) and that prejudice is more about how a person thinks rather than an evaluation of a specific group of people (Roets & Van Hiel, 2011).

Other researchers use 'authoritarian personality' to explain why some people are attracted to racist-type thinking (Burton *et al.*, 2019; Roets & Van Hiel, 2011). It was first used by researchers who had escaped from the Nazis during the Second World War and describes how people have tendencies to project hate and blame on people from different social groups. People described as having an authoritarian personality tend to hold very conventional beliefs, have high regard for obedience and authority, and are very resistant to change.

There are some criticisms of this approach; for example, it doesn't explain why people can hold prejudices against some groups but not others (McLeod, 2017).

CHECK YOUR LEARNING 17.3

Describe and explain

1 **Define** scapegoating.
2 **Explain** what is meant by a prejudiced personality.

Apply, analyse and interpret

3 **Compare** personal prejudices and group prejudices providing an example of each.

Investigate, evaluate and communicate

4 **Investigate** how authoritarian personality was used to explain the atrocities the Nazis committed against the Jews in the Second World War. **Comment** on the role of prejudice and discrimination that was present during the Second World War.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 17.3
- **» Suggested research**
  17.3 Social identity theory in group prejudice
- **» Weblink**
  Scapegoating in history
- **» Weblink**
  The Robber's Cave Experiment

17.4 Ageism and sexism

KEY IDEA

In this section, you will learn about:

+ sexism and ageism as forms of prejudice.

sexism
prejudice and discrimination on the basis of an individual's sex

ageism
prejudice and discrimination on the basis of age (typically youth or elderly)

As discussed earlier in this chapter, prejudice can be targeted at specific social groups. Many groups of people experience prejudice on a daily basis and in many different roles. In this section we will consider two different kinds of prejudice: sexism and ageism.

Sexism is prejudice towards someone on the basis of their sex. Typically, women will report experiencing prejudice more consistently than men. **Ageism** is prejudice on the basis of someone's age. Ageism can be reported by both young and old; however, the elderly may experience greater discrimination. Many prejudices seek to legitimise inequalities within society.

Sexism

Sexism is one of the most recognised forms of prejudice in the world. It exists across all cultures, age groups, societal classes and countries. While sexism is experienced by both sexes, women typically report experiencing sexual prejudices more than men. Sexism involves an individual making an assumption, often of a prejudicial or discriminatory nature, about another individual on the basis of their sex. Sexism limits what males and females believe they can or should do. Over time, sexist attitudes have been brought to attention in many Western countries to correct unfair attitudes held by portions of society, with women's rights movements occurring predominantly in the past century.

It is important to remember that sexism is not acknowledging the differences that exist between men and women. It is the assumption that, because of these differences, an individual should and will behave in a specific manner. Table 1 provides some examples of sexism.

FIGURE 1 The notions that men aren't good carers for children or that women aren't good at science are stereotypes.

TABLE 1 Types of sexism

	Sex	Example
Occupational	Female	• Women are less likely to be employed. • Women are more likely to experience a 'wage gap' and be paid less than men in the same role.
Domestic	Male	• Men may be thought of as not being as good as females at caring for children.
Emotional	Male and female	• Men may be expected to control their emotions more and be 'strong' all the time. • Women may be expected to display their emotions and be 'softer'.

FIGURE 2 *The Fearless Girl* was erected in 2017 in New York's Wall Street on International Women's Day, which seeks to promote awareness of the sexism women experience. The plaque below the statue states 'Know the power of women in leadership. SHE makes a difference'.

Study tip

As you explore stereotypes, prejudice and discrimination be mindful of any research you are using, as well as your own background and your classes.

CASE STUDY 17.4A

Women's education

Women have been denied an education throughout history, and in parts of the world this still occurs. From a young age, Malala Yousafzai advocated for girls' education while growing up in Pakistan. After the Taliban started to attack girls' schools, Malala presented a speech titled 'How dare the Taliban take away my basic right to education?' At the age of 15, Malala was on a bus travelling home from school, when the Taliban attempted to assassinate her for her advocacy. After surviving the assassination attempt, Malala has continued to advocate for women's education around the world. She now attends Oxford University, and has received the Nobel Peace Prize for her work in women's rights.

FIGURE 3 Malala Yousafzai advocates for women's right to an education.

Malala's advocacy demonstrates the lack of equality in the treatment of women around the world. Much of this comes from prejudice about the role of women in society and culture. Many cultures hold onto gender roles that have existed for centuries that are not applicable in today's society. Thanks to people such as Malala, many countries are acknowledging a need for girls' education.

CHALLENGE 17.4

What's your experience?

Without knowing it, or doing it intentionally, your parents, teachers, family, friends and possibly your sports team or employer may be behaving in a certain way towards you because of your age or gender. Consider your daily experiences. If you have personally felt ageism or sexism directed towards you, write a brief paragraph about the event, how it made you feel, and why you think you were treated this way.
If you don't think you have experienced ageism or sexism, write about common stereotypes and prejudices related to your age or sex and consider how these could be prevented.

Ageism

Ageism is not restricted to one age group. People can experience prejudice based on age throughout their lives, though it is more likely to affect the elderly. Adolescents can experience ageism; for example, being thought of as reckless.

Many of the prejudices against age affect the elderly. The World Health Organization (WHO) estimates that by 2050, two billion people will be above the age of 60. In an increasingly ageing society, ageism is not a prejudice that is likely to go away as more pressure is placed on government systems and aged care. WHO suggests that ageism is the most normalised of any prejudice, and that of all the prejudices, little is done to counter ageist beliefs.

FIGURE 4 Some young people think that older people should retire to make way for the next generation.

There are many beliefs about the elderly. Some people will picture a sweet old lady baking biscuits for her grandchildren; other people will picture an ageing man in the office who they believe should retire. There are different types of ageism, such as digital ageism and visual ageism. Digital ageism is the belief that older members of society will not be digitally savvy, and visual ageism is that the elderly are underrepresented in society. These beliefs form the basis of ageism and stem from prejudices such as the following:

- The elderly have poor memories.
- Elderly people lack skills in modern technology.
- The elderly are a burden on society (i.e. economics).
- Older people have declining health and fitness and are more likely to experience physical weakness and illness.

Like all prejudice, ageism stems from the belief that everyone in a particular group is the same. Ageism can affect the elderly in the following ways:

- They may be overlooked for employment in favour of someone younger.
- They may be restricted from certain services.
- They may be stereotyped in the media as 'losing their marbles'.
- They may be blamed for the problems of future generations.

Australia has laws that prevent age discrimination. These laws seek to prevent people from being subjected to age discrimination in employment, provision of services, housing and education. While these laws mean that it is illegal to discriminate against someone because of age, it does not prevent people from holding these prejudices.

CASE STUDY 17.4B

Ageism at 45

When people think of ageism, the image that comes to mind is usually an elderly retiree, not a middle-aged person, but the reality is that people as young as 45 are experiencing ageism in the workplace.

A national survey of people aged 45 and above found that Australians felt discriminated against based on assumptions about their learning ability, skills and cognitive ability. It was also found that there were limited options for promotion or training so that they could upskill themselves. There was a general feeling that people perceived older Australians as less able to learn new things, and an assumption that the skills they possessed lacked relevance to the current workforce. The survey also found that older employees felt that younger people wanted them to stop working to make way for a new generation.

CHECK YOUR LEARNING 17.4

Describe and explain

1 **Explain** what sexism is.
2 Using two examples, **describe** ageism.

Apply, analyse and interpret

3 **Compare** ageism and sexism.

Investigate, evaluate and communicate

4 **Assess** how sexism or ageism affects daily life in Australia.
5 Read Case study 17.4A, and **investigate** Malala Yousafzai's life and the *He for She* movement. As a class, **discuss** the influence of these movements and consider how they are trying to change sexist prejudice and discrimination.
6 **Evaluate** the claim: 'Ageism only effects the elderly'.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 17.4

» **Challenge**
Worksheet: 17.4 What's your experience?

» **Weblink**
Sexism and ageism in society

CHAPTER 17

Review

Summary

17.1
- Stereotypes are generalised and simplified beliefs about a group of people that can be either positive or negative in nature, and can often be inaccurate.
- Stereotyping involves categorising people into groups based on common characteristics such as age, sex, ethnicity and occupation.
- Stereotypes are generally resistant to change and persist over time.

17.2
- The tri-component model of attitudes includes three components: affect, behaviour and cognition (ABC). Some attitudes do not contain all three components.
- The tri-component model can be applied to stereotypes. However, links between the affective, behavioural and cognitive components are not always consistent.

17.3
- Prejudice is an unfavourable attitude towards a group of people, based on insufficient or incorrect information.
- Discrimination is prejudice expressed through behaviour, often directed at individuals from a particular group.
- Common effects of prejudice and discrimination include low self-esteem, disadvantage or failure, self-fulfilling prophecies and violence.
- LaPiere's study showed that people can express prejudiced ideas but not behave in prejudicial ways. Prejudice can exist without discrimination.
- Scapegoating refers to the idea that people will express prejudice by blaming others for socially frustrating conditions. Scapegoating often leads to aggressive verbal and physical acts against minority groups.
- Direct experience with people, objects or ideas can contribute to the formation and maintenance of prejudice.
- Prejudice can be formed and maintained on a personal level or on a group level.
- Personality characteristics can explain why some people are more prone to holding prejudiced ideas.
- The Robbers Cave experiment demonstrated that prejudice can be reduced by having groups get to know each other by working together on a shared goal.

17.4
- Sexism is prejudice towards someone based on their sex.
- Ageism is prejudice towards someone based on their age.

Key terms

- affective component of the tri-component model
- ageism
- behavioural component of the tri-component model
- cognitive component of the tri-component model
- discrimination
- prejudice
- scapegoating
- sexism
- stereotype
- tri-component model of attitude

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: * = low, ** = medium, *** = high.

Multiple choice

1 What is a stereotype?
- **A** a generalised and simplified set of beliefs about a group of people
- **B** a flexible set of ideas and attitudes towards a group of people
- **C** favourable attitudes held towards a group of people
- **D** an idea to help us understand the characteristics of a group of people

2 Which of the following statements best describes discrimination?
- **A** negative attitudes directed towards those in minority groups
- **B** stereotyping people as part of a group rather than as an individual
- **C** negative actions directed towards people in another group
- **D** affective component of stereotypical attitudes

3 Jacinta applies for a job promotion after being with a firm for two years. She is told that her application is rejected as she needs to have worked for the company for at least three years to be considered. Jacinta knows male staff members whose applications have been accepted after only being employed for a year. What is this is an example of?
- **A** discrimination
- **B** stereotyping
- **C** unfair treatment
- **D** prejudice

4 Which one of the following is *not* a component of the tri-component model of attitudes?
- **A** cognitive component
- **B** social component
- **C** affective component
- **D** behavioural component

5 Only women are good at multi-tasking. What is this statement an example of?
- **A** gender prejudice
- **B** discrimination
- **C** tokenism
- **D** gender bias

6 People tend to blame other people or groups for their hardships. What is this an example of?
- **A** discrimination
- **B** scapegoating
- **C** personal prejudice
- **D** blaming

7 Masie believes that all dentists are cruel because of the many painful visits she had with her childhood dentist. This is an example of _____. Masie believes that brown-eyed people are smarter than blue-eyed people. Maisie has brown eyes. This is an example of _____ prejudice.
- **A** systematic; group
- **B** personal; group
- **C** group; personal
- **D** individual; group

FIGURE 1 Do you remember your first visit to the dentist?

8 Andrei is opposed to poker machines in sporting clubs and gets agitated when reading about poker-machine addiction. Andrei will sometimes play a poker machine when out with friends at their local sporting club. How does this fit with the tri-component model of attitudes?

A There is consistency between thoughts, feelings and behaviour.

B There is consistency between thoughts and behaviours, but not feelings.

C Andrei's behaviour is inconsistent with cognition and affect.

D There is inconsistency between beliefs and actual behaviour.

9 The Robbers Cave experiment demonstrated that prejudice can be overcome by:

A forcing groups to spend time together to complete a task.

B having a goal that both groups can work towards.

C having groups get to know each other by working towards a common goal.

D having groups socialise together.

10 What did LaPiere's study show?

A Discrimination can exist without prejudice.

B People who have prejudiced attitudes generally engage in discriminative behaviour.

C People who express prejudice attitudes do not always behave in prejudicial ways.

D Prejudiced ideas and discriminatory behaviours always exist together.

Short answer

Describe and explain

★ 11 **Define** stereotypes and provide an example.

★ 12 **Describe** some of the effects of prejudice and discrimination, using examples to explain your answer.

★ 13 **Identify** and **describe** two influences that contribute to prejudice formation.

★ 14 **Describe** the key finding of LaPiere's (1934) study about the relationship between attitudes and behaviour.

★★ 15 **Identify** and **explain** the components of the tri-component model of attitudes.

★★ 16 **Identify** and **describe** a form of discrimination. Use an example from Australian culture to show how this form of discrimination can be embedded in everyday society.

Apply, analyse and interpret

★ 17 **Consider** the function of stereotypes.

★ 18 Chanin doesn't like peanuts. He doesn't like the taste and thinks that they are a useless nut. Chanin discourages everyone at work from eating peanuts. **Determine** if Chanin has a prejudiced attitude towards peanuts, or if he just doesn't like them.

★★ 19 Toni dislikes rabbits and tells everyone that they are silly creatures that hop and bite and some of them have red eyes. She refuses to have a pet rabbit. **Apply** the tri-component model of attitudes to Toni's feelings towards rabbits.

FIGURE 2 A rabbit

★★ 20 Use an example to **differentiate** between prejudice and discrimination.

Investigate, evaluate and communicate

★ 21 **Create** a research question for the following statement: 'Ageism has greater effects for those older than 65, rather than teenagers.'

★★ 22 **Discuss** the role of ageism and sexism in society, and determine if you think they have any benefits. You might want to consider survival and the role of nature-versus-nurture.

★★ **23** **Investigate** one of the following historical cases of prejudice and discrimination and **evaluate** the influence of stereotypes, prejudice and discrimination in these movements. Make sure to **evaluate** how attitudes were involved:

a the US Civil Rights movement

b Nazi Germany

c South African apartheid

★★★ **24** **Design** a method to measure how prevalent daily sexism is in your high school.

★★★ **25** Biological perspectives in psychology suggest that human behaviours and attitudes are a result of survival needs. **Propose** a reason for prejudice and discrimination from a biological perspective. In your response, **identify** two potential benefits for prejudice and discrimination.

Check your obook assess for these additional resources and more:

» Student book questions
Chapter 17 Review

» Revision notes
Revision notes for Chapter 17

» assess quiz
Test your understanding with this self-correcting multiple-choice quiz.

» Flashcard glossary
Key terms in Chapter 17

CHAPTER 18

Community & culture

There are many factors that influence the unitedness of a particular group of people. These factors determine the sense of community that individuals can feel within a group, including how accepted they feel within a culture.

'Culture' is a difficult term to define as it can incorporate a variety of elements within a geographical, religious and social environment. However, key aspects of defining a culture include values, ideals, customs and rituals. It can be difficult to become part of another culture if values and ideals are so different that they are in opposition to each other.

Multiculturalism and pluralism describe ways in which individuals from one culture can integrate into a community of a different culture. All cultures have positive and negative attributes. In this chapter, concepts of membership, culture and multiculturalism versus pluralism will be discussed and evaluated to further your understanding of cultural psychology.

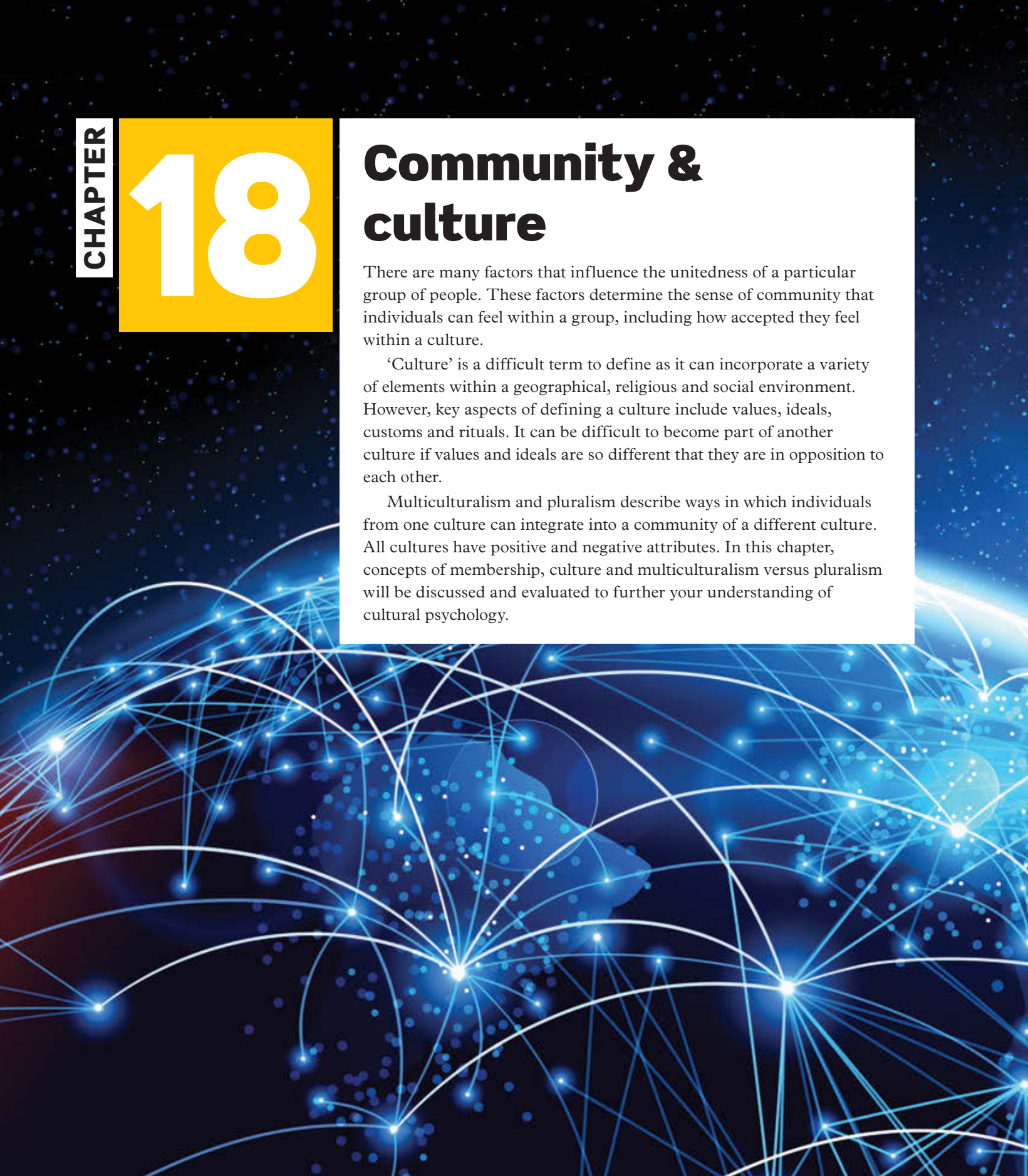


FIGURE 1 The world is increasingly connected. This connection highlights different cultural attitudes, beliefs and behaviours, and also highlights the importance of acknowledging cultural differences in psychology.

OBJECTIVES

→ Describe how membership, influence, integration and the fulfilment of needs, and shared emotional connection lead to a sense of community (David McMillan and David Chavis 1986).

→ Consider what is meant by culture.

→ Distinguish between multiculturalism and pluralism.

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

SUGGESTED PRACTICAL

SUGGESTED PRACTICAL

18.2 Conversational distance and culture

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

18.1 Sense of community

KEY IDEAS

In this section, you will learn about:

+ the importance of membership, influence and integration for individuals
+ how fulfilment of needs and shared emotions can create a sense of community.

community
a group of people with common characteristics

A definition for **community** describes not only the geographical locations in which people live but it must also include an explanation of the relationships that exist within that particular group of people (McMillan & Chavis, 1986).

McMillan and Chavis investigated this idea of community and their research suggests four factors that add up to make a community: membership, influence, integration and fulfilment of needs, and shared emotional connection.

Membership

membership
inclusion in a group or society of people and a sense of belonging

Membership can be defined as feeling a sense of belonging to a group or a society. Membership usually also requires an individual to invest a part of themselves within the group so that they feel a right to belong to that group. An individual gives something to the group and the group gives back (McMillan & Chavis, 1986).

A vital part of determining group membership is perceived benefits in joining the group. For example, membership in groups usually comes with some set boundaries, meaning that there are people who can be part of the group and people who cannot be part of the group. This gives the members of the group a feeling of security that only those who have similar characteristics or investment in the group can benefit, and those who do not are thought of as outsiders. The role of boundaries in forming a group is especially relevant when we consider a neighbourhood, as there is also a physical boundary.

For example, consider the Amish communities in the United States. Due to their religious beliefs, the Amish choose to live in communities where there is no electricity, and where farming and selling goods from their labours are their sole means of survival.

FIGURE 1 A community is formed by common characteristics or interests.

FIGURE 2 Being part of a team or sports club can give you a feeling of belonging or membership as well as benefits such as exercise, friends and having a team.

This unique environment often isolates the Amish from more technologically developed communities, which creates a safe environment to live as they wish. This provides the Amish community with emotional safety, as outsiders who may shun the way that they think generally refrain from engaging with the Amish, which protects the groups' values and traditions. By sharing a way of dressing, religion, language and rituals, the Amish share a sense of belonging, deriving their identity from those shared values of the group.

In addition, each member of the Amish community contributes to the system, whether that be churning butter, milking cows or tending to the fields, which increases the personal investment each member has within the group, and therefore strengthens the group as a whole. The Amish also use their own language system with a different set of symbols for communication, which increases their feeling of belonging and membership within the group.

Membership includes five key attributes, which provide a sense of community among people:

- boundaries, which can lead to emotional safety
- a sense of belonging
- a sense of identity
- personal investment
- a common communication system.

Influence

The second factor that contributes to the creation of a sense of community is the idea of **influence**. Influence can be defined as individuals exerting an impact on the decisions made for the group as a whole. However, there is a fine line between having an effective leader who can influence others, and maintaining group cohesion so that the group can function well. For example, if the group has conflicting ideals, then it would be difficult for the group to present a united front and convince other members to join or to follow them in their pursuits. Therefore, it is important that there is some **conformity** (being influenced by others to perform the same action) in the group to enhance a sense of community within the group.

influence
convincing individuals to do something that you want them to do

conformity
behaving in a similar way to those around you that is socially acceptable within the social group

FIGURE 3 The mutual shunning of technology in Amish communities has enabled their sense of membership as a group, and their shared values promote emotional safety so that they are free to live out their beliefs and behaviours.

Research has found that influence can be a factor that predicts community formation in the following ways:

- Individuals are most attracted to a community if they feel they can exert some sort of influence over the group, even if it is just to share an opinion or to share their ideas.
- There is a positive correlation between influence leading to conformity by group members and the level of cohesion within a group. Both conformity and influence affect the strength of social bonds within a community.
- The need for conformity is determined by the group as a whole and leads to increased cohesion. Thus, the pressure to present a united front works to enhance closeness within the group rather than reflect a struggle for power.
- The influence of one member of the group and the influence of the community as a whole are closely connected. The more individuals within a group who present as a united front, the more connected and influential the community is perceived to be.

These ideals suggest that influence from an individual is high when their own goals match the goals of the group. In turn, group cohesion amplifies the membership and the investment of the group towards a common goal. Group cohesion and shared goals of individual members increase the sense of community, as group members are functioning as a whole rather than as separate parts.

Shared emotional connection

Shared emotional connection is defined as the individual members of a group feeling a sense of connectedness to the community's history or emotional past. Individuals need not have lived the history of the community to share the emotional connection. However, in order to strengthen a community, its members should have shared experiences that can then generate a shared understanding and emotional response to specific events and thereby increase investment in the group.

There are seven features that can be used to assess shared emotional connection:

- **Contact hypothesis:** This is similar to the mere exposure effect discussed in Chapter 15. The more people are physically exposed to each other, or close to each other, the higher the likelihood they will experience shared events and share emotional connectedness.
- **Quality of interactions:** Positive experiences will lead to stronger bonds between individuals.
- **Closure to events**: If the experience between members is neither positive nor negative and the community's goal is not reached, it can hinder group cohesion.
- **Shared valent event hypothesis:** The more vital or important an event is, the more likely it will increase the bond between members. For example, the 2011 floods brought a lot of Queenslanders closer together as they shared an emotional loss and connection through the event itself and the rebuilding phase.
- **Investment:** This signifies emotional risk as individuals trust others in the group by sharing a part of themselves, or by contributing financial, physical or emotional investment towards its members. Increased investment can again allow members to feel a greater sense of community.
- **Effect of honour and humiliation on community members:** If individuals are humiliated in front of other community members, this will decrease the likelihood that they will join the group or feel close group cohesion. However, if reward or honour

is shared with community members, group cohesion increases as does the sense of community within a group.

- **Spiritual bond:** This bond can be experienced in a community through shared religious practices or beliefs. Shared spiritual beliefs increase the sense of group membership and belonging.

These seven features, combined with the three other factors already discussed, can determine if a group will feel a sense of community or if a community will fail to form.

CASE STUDY 18.1

The People's Temple: 'Jonestown'

Rev. Jim Jones, an ordinary and unexceptional man, rose to prominence as the leader of a cult by the name of 'The People's Temple'. This man, however, will now forever be notorious not for his religious doctrine, but for the largest mass suicide in cult history. Jones was able to convince more than 900 of his followers to drink cyanide-laced cordial, which caused death in less than 5 minutes.

Now, 40 years later, many researchers and journalists are still trying to find reasons for how one man could have convinced so many to form a community around his beliefs and, most of all, to commit suicide at his request (it is disputed whether many followers voluntarily committed suicide or were coerced).

FIGURE 4 In 1978, Jim Jones urged more than 900 followers to drink cyanide-laced cordial.

Jones convinced his followers that if they did not follow him, or were not part of the group, they were the enemy. He instilled in them an 'us against them' mentality, thus increasing the sense of membership in the group. Jones also censored what his members saw from the outside world, which in turn increased his influence over them. He would limit access the members had with their families, and also removed media influence from their lives. Interestingly Jones also aligned himself with powerful politicians so that he could increase his power among the group.

The farm that he had created for his members served as a means for survival with food production and the promise to give to the poor, a noble goal that attracted many of his followers. This created the fulfilment of needs and also a shared emotional connection as all members worked together towards a common goal.

By using these concepts, he was able to create a sense of community. This particular case is one of the most notorious in history for demonstrating an example of cult behaviour.

Integration and fulfilment of needs

The role of integration and fulfilment of needs in a community can also be thought of as the role of reinforcement (see Chapter 10) or in other words, keeping group members happy and content within the community by solidifying their mission or rewarding certain behaviours. Reinforcement in this case represents methods or ways to motivate individuals within a community to behave in a particular way.

Empirical research has suggested that reinforcement and needs fulfilment is a large part of a successful community, and in order to increase group success, rewards must be available to the members of the group to encourage and to motivate them to behave in particular ways. Some of the most common rewards that are available within a community include status within a group (e.g., being given a leadership role within a community), overall success of the community (e.g., gaining a national title for softball) and benefiting from the competence of other members.

Competence as a motivator is demonstrated by the research of Zander and Havelin (1960), who established that individuals are attracted to others who have skills that can benefit them in some way. This is especially the case if the other members of the group have competencies that the individual lacks. This attraction is due to an increased chance of success for the group because of the increased and diversified skills of the members. There is a sense of community between them because the members need each other to fulfil their needs.

CHECK YOUR LEARNING 18.1

Describe and explain

1 **Define** the concept of community.
2 **Describe** the feature of membership and suggest how this can increase the sense of community.
3 **Explain** how a spiritual bond can increase the likelihood of cult communities forming. Use The People's Temple as an example (Case study 18.1).

Apply, analyse and interpret

4 **Apply** the McMillan and Chavis model to a group or community that you belong to (e.g., school, sport or other). **Select** the components of the model that apply to make your group feel like a community.
5 Punk-rock fans in the 1970s and 1980s (and today) were known for their distinctly recognisable dress and symbols. Some notable features included studded belts, black leather and Mohawk hairstyles. Using your knowledge of the McMillan and Chavis model, **consider** which feature explains this particular trait of community.

Investigate, evaluate and communicate

6 **Evaluate** the model by McMillan and Chavis and suggest some of its strengths and limitations.
7 **Create** a claim to test the accuracy of the model and **devise** some possible research questions for that claim.

obook assess

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 18.1

» **Increase your knowledge**
Describe your community

» **Weblink**
The People's Temple: 'Jonestown'

18.2 Culture

KEY IDEA

In this section, you will learn about:

+ what is meant by culture.

culture
the standard or norms that a particular group of people have for the way they live; can include beliefs, values and even rituals

cultural perspective
psychological investigation that considers the culture from which an individual came in order to explain behaviour

Culture is a word that is difficult to define because it is a complex interplay of many factors and ideas. **Culture** includes beliefs, behaviours, surroundings, belongings and other characteristics that are the same for all members of a particular group. It is a dynamic system that is fluid, changing with each generation, and it also encompasses many aspects such as subcultures and cultural dimensions.

In psychology, a **cultural perspective** evaluates an individual's behaviour by considering the culture they are from. Scientists using this perspective will often look at a person's interactions, ideals, morals and values that originate from their cultural background.

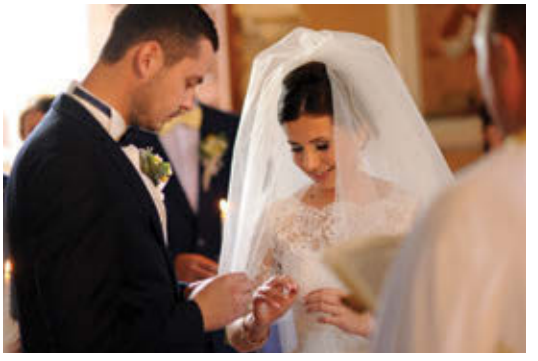


FIGURE 1 Indian cultural norms include bright, colourful weddings, whereas many Western cultures have traditional white dresses and neutral coloured suits.

FIGURE 2 Different cultures can have very different ideals and values and for this reason, it can be difficult to define culture and what is considered the 'norm'.

In Unit 1, you learnt that Lev Vygotsky suggested that cognitive development is affected by the beliefs one holds and these are, in turn, shaped by the person's surroundings. Therefore, an interpretation of culture is needed to understand a person's behaviour, because actions stem from cognitive processes or thoughts about particular concepts. Culture plays a key role in society because it can influence how people display their cultural beliefs and values in everyday life. Language, customs, rules and technologies that come from our culture can influence how we exist within society. Culture can determine how we mix with people of different cultural backgrounds and also how well we might integrate into a different culture. For example, it is traditional practice in some parts of Burma for women to wear rings around their necks (Figure 2). It is considered beautiful in that culture; however, if we saw women wearing these same neck rings in the central business district of Brisbane or on the streets of Roma in South West Queensland, we might do a double take and think the behaviour strange. Thus, understanding culture is vital to understanding human behaviour.

Defining culture

Culture can be defined as an ever-changing and living system of rules that is established by a social group. It includes elements within society such as music, clothing and food, which are considered the surface culture or observable part of the culture. Culture also comprises elements such as emotions, beliefs, values and expressions as part of the deep culture, which is invisible to an observer. As there are elements that can be seen and some that are hidden, it is very difficult to define culture; however, we can identify common elements of culture. For example, Lonner (1995) defined culture as a set of guidelines that dictate the way a group interacts or behaves with one another. Similarly, Hofstede (1980) determined that culture was like a piece of programming that exists in our minds, which allows us to feel part of the society or a community by knowing the rules and regulations within a particular group of people.

Both definitions suggest a community that has collective or common rules so that the members of the community know the rules of their environment and can live by them. There are also certain elements that are common to all cultures though differently expressed, which define them and set them apart from social groups.

First, culture is all-encompassing; it is comprehensive and people within a culture all have their place and fit together in a logical fashion. For example, the practice of taking off your shoes when you enter someone's house is the physical manifestation of the importance of respecting others in a particular culture. Second, culture is not innate; it is something that is taught and learnt by each person. Third, culture determines the limits of acceptable and unacceptable behaviour, and any violations of the rules may result in punishment. This can be punishment in terms of embarrassment or using the legal system to sanction those who have

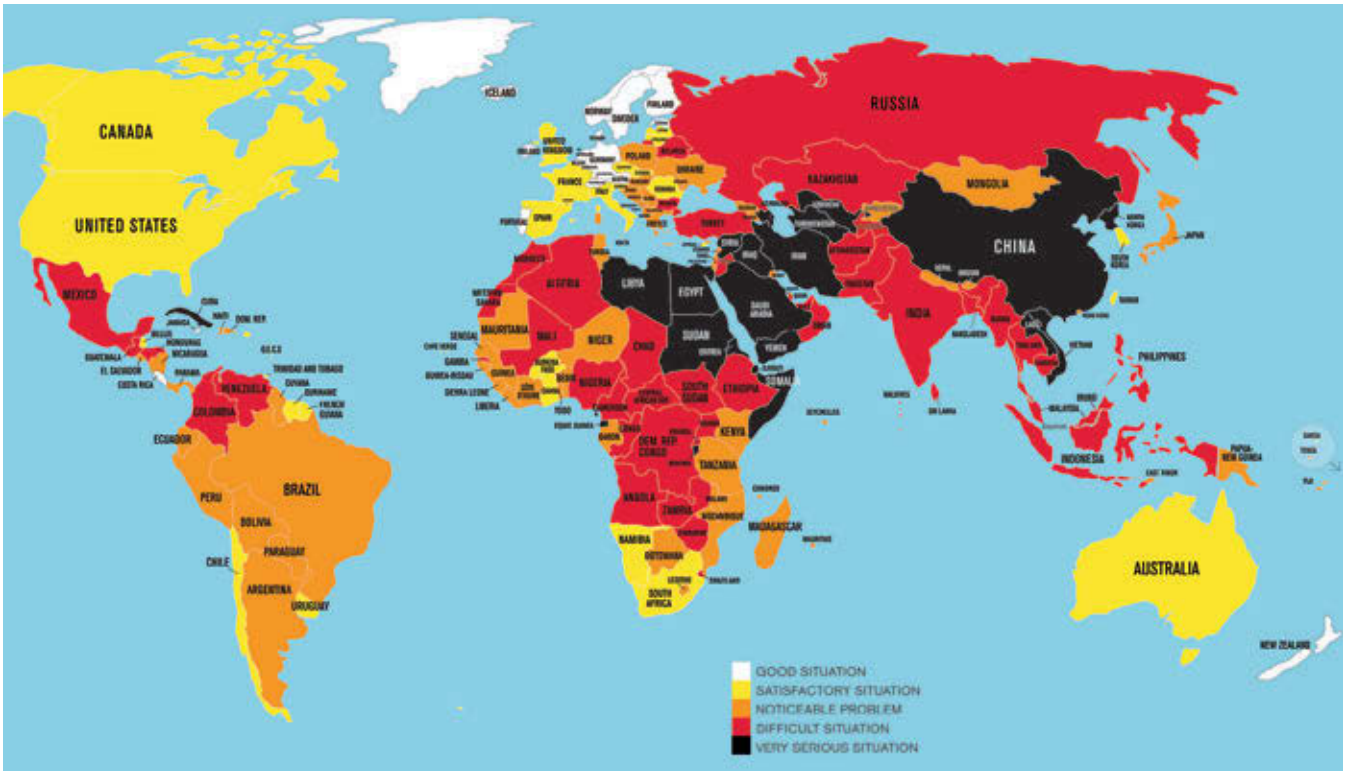


FIGURE 3 Freedom of the press around the world. The media that you are exposed to can shape your culture.

violated the rules. Fourth, cultures hold many invisible standards and rules; for example, there is a story of an American spy during the Second World War who spoke perfect German, but was caught because he held his fork differently from the cultural expectations of the Germans at the time. Fifth, cultures are dynamic; they are ever-changing, although it might take years for a change to become evident.

For example, modern Australian culture is largely influenced by similar changes in other Western societies; however, the culture of Egypt has changed much more slowly over history.

Given the universal aspects of culture, it is important that if you are visiting a culture or shifting to live within a different culture, you know the rules and regulations that are acceptable in that culture. These are called 'cultural norms'.

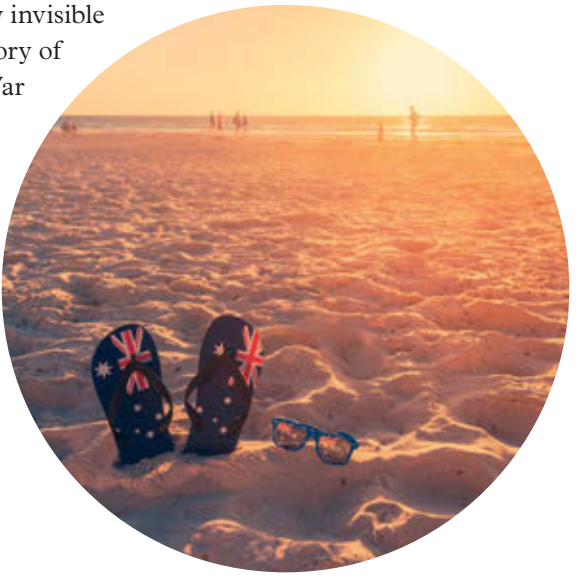


FIGURE 4 Australia's dominant culture includes enjoying the beach and a 'fair go' attitude.

Cultural norms are the set of rules that a specific group ascribes to in order to decide if behaviours are appropriate or inappropriate. These cultural norms are derived from the culture we live in and can include values, beliefs and attitudes towards each other and the outside world. These rules are put in place in order to create order and control for each individual within the group. The norms can dictate communication style, marriage rules, child-rearing techniques and even where to stand or sit during a meal. Cultural norms can also be visible to everyone, such as legal policies, or they can be internal to the culture, such as ritual practices. Cultural norms can also act as gatekeepers to keep norms in place. For example, in North Korea, the media is censored so that cultural norms within the country are maintained and free from corruption from external news sources around the world. Figure 3 shows the differences in freedom of the press worldwide.

cultural norms shared rules set by a specific group to guide behaviour

Cultural dimensions

Cultural dimensions are dichotomous extremes that exist in cultures seen across the world. For example, Asian cultures tend to have values that promote the whole community (i.e. collectivist cultures) whereas Western cultures tend to be more focused on the self (i.e. individualist cultures).

cultural dimensions used to group cultures into categories based on values and overall beliefs

Cultural dimensions were developed by Geert Hofstede when he conducted a study on 60 000 IBM employees from more than 50 countries so that he could use their self-reported data to classify their behaviours according to their cultures. He asked all of his participants to complete surveys and tallied the results. Hofstede (1980) found that cultural differences can generally be categorised into four key dimensions:

- individualism versus collectivism
- power distance
- masculinity versus femininity
- uncertainty avoidance.

He concluded from this research that there are cultural differences in overall behaviours and, therefore, these dimensions are important to consider when working with and understanding people from differing cultures. The individualism versus collectivism and the masculinity versus femininity dimensions will be explored further so that cultural differences in behaviour can be examined.

Individualism versus collectivism

individualism prioritises the individual over the whole community

collectivism prioritises the whole community as a collective over the individual

This dimension is a measure of whether people within a particular culture are more likely to work alone or in groups. **Individualism** refers to the belief that certain cultures, or at least most individuals within that culture, act in a way to benefit primarily themselves rather than the collective whole. **Collectivism** refers to individuals within a culture acting in a way that benefits the group as a whole.

The characteristics that are common within the extremes of the cultural dimensions are generalisations; however, these differences are supported by research. Bond and Smith (1996) utilised Solomon Asch's paradigm (see Chapter 12) to test the cultural differences in conformity between collectivist and individualist countries. He performed a meta-analysis of 133 studies using the Asch protocol and covered results from 17 different countries around the world.

The researchers found that individualistic societies such as the United States, the UK and France had lower rates of conformity compared to collectivist countries such as China, Fiji and Brazil. The study concluded that the cultural dimension of individualism versus collectivism affected results from a well-known experiment (Asch's conformity test), confirming the differences in behaviour due to culture.

TABLE 1 Comparing individualist and collectivist societies

Individualist societies	Collectivist societies
Decisions aim to benefit the individual	Decisions aim to benefit the most people within the group
Relationships between individuals not very strong	Relationships between individuals very strong
People care about those who are immediate to them (i.e. family members within their home)	People live geographically closer together
Lower birth rate	Higher birth rate
Less likely to conform	More likely to conform for the sake of harmony
More likely to comply with requests (especially from those in positions of authority)	Low compliance
More expression of emotion	Less expression of emotion
Strong self-identity	Low self-identity but high social identity
Less tendency for groupthink	Greater tendency for groupthink
Easier to persuade as they are not committed to their group's opinions	Harder to persuade as they are only interested in the opinions of their group
Tend to be wealthier (as individuals and as a society)	Tend to be less wealthy (as individuals and as a community)
Research suggests they exist in colder climates	Research suggests they tend to exist in warmer climates

CASE STUDY 18.2

Vampire subculture

A **subculture** is a cultural group that exists within a larger culture, with alternative lifestyles, rules and expectations. One such example is vampire subculture, which has evolved into a large underground movement around the world. This is not the same as the vampires you read about in *Twilight* or the *Vampire Diaries*. Instead, these are regular people who choose to live an alternative lifestyle inspired by gothic ideals.

subculture
small alternative cultures or norms that exist within a larger community

This subculture has its own set of beliefs and morals. People who commit to this type of lifestyle often participate in rituals as a means of increasing their social currency within the group. The unique lifestyle draws from ideas in gothic novels (e.g., *Dracula*, *Interview with the Vampire*, etc.) and horror films, and much of the subculture is inspired by Victorian England and earlier eighteenth-century gothic traditions. It is very much a Western-based subculture.

There are many types of vampires within the large vampire subculture, including those who believe they need to drink blood to survive. There are pseudo-religions based on vampirism, and there is also a type of vampire called 'transcendental vampires', who believe they are immortal. Although some members may become involved in crime, this controversial subculture is not necessarily only about violence or blood. It is sometimes about finding like-minded people to feel a sense of community, and it is sometimes used to find a belief system that is more in tune with a person's needs and demands. Many also find a sense of unity through their appreciation of gothic art, architecture and literature.

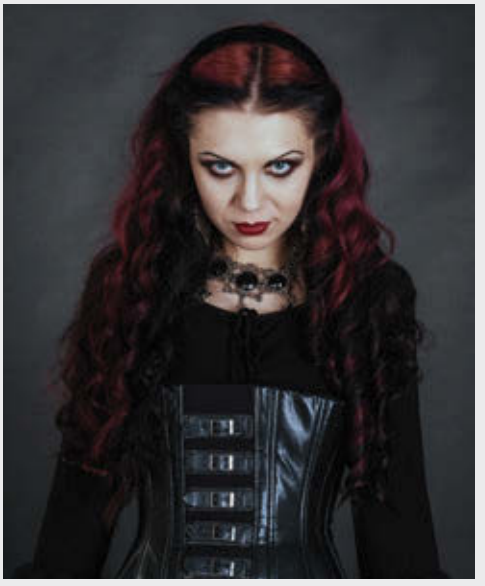


FIGURE 5 Vampire subculture is a Western-based subculture.

Masculinity versus femininity

This cultural dimension looks at how members within a certain culture behave in negotiations, and also in their treatment of women. Predominantly masculine cultures, as categorised by Hofstede, include an emphasis on authority, assertiveness and success (e.g., Japan). The behaviours displayed within these cultures will also usually be more aggressive and assertive, and individuals value material success more than in cultures that are predominantly feminine. On the other hand, in cultures that are predominantly feminine (e.g., the Netherlands), there is higher value placed on interpersonal relationships and harmony, and more of an emphasis on working together and having multiple people performing roles so that roles can be shared. The values also sway towards social wellbeing rather than individual quality of life.

CHALLENGE 18.2

Language and culture

Language is a key communication tool within a culture. Depending on the region, sometimes even within the same country, there can be marked differences in the way language is used. For example, even though Brazil and Argentina are very close geographically, one speaks Portuguese and one speaks Spanish.

There are also subtle non-verbal means of communication that are specific to different cultures. For example, some cultures use a head nod to indicate yes, whereas in other cultures that same action can mean no.

There can be very large variations within regions in the same country as well. For example, there are some regions of China where the people speak Cantonese, whereas in most of the cities people speak exclusively Mandarin. There can be large differences in word usage from one culture to the next. For example, the game that Australians call soccer is known as football in Britain and many other parts of the world. There are also differences in slang and writing patterns.

1 Find two cultures that have similar but different communication styles and compare the languages within these two cultures.
2 Explain how and why the development of language illustrates the importance of culture and provide evidence for the sociocultural perspective of psychology.

CHECK YOUR LEARNING 18.2

Describe and explain

1 **Define** culture.
2 **Explain** the cultural dimension of individualism versus collectivism.
3 **Identify** three elements that form observable culture and give an example of each.

Apply, analyse and interpret

4 **Compare** the concept of a masculine society and a feminine society. **Identify** key characteristics of each.

Investigate, evaluate and communicate

5 Some people say that Australia is too individualistic and competitive, while other people say these values are part of what makes Australia great. Write a brief essay to **assess** this statement and **argue** for one side.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 18.2

» **Challenge**
Worksheet: 18.2 Language and culture

» **Weblink**
Defining culture

18.3 Multiculturalism versus pluralism

KEY IDEA

In this section, you will learn about:

+ distinguishing between multiculturalism and pluralism.

multiculturalism where individuals from many cultures coexist and live by one set of rules for all

pluralism where two or more cultures coexist, each holding on to their own set of rules, traditions and rituals but both in the same geographical location

Consider the active migration of people into Australia today. Asylum seekers and migrants arrive from various parts of the world, and this can lead to a variety of cultures living within the same geographical area. The ideas of **multiculturalism** and **pluralism** are two almost opposing concepts to describe how cultures can be integrated within a particular society. These two concepts are contradictory to each other and affect society in different ways. Multiculturalism and pluralism may even divide communities and cause political change, especially in immigration policies. Figure 1 explains the difference between the two concepts and the way they are able to integrate cultures into an existing, often larger, culture.

Multiculturalism

Multiculturalism can be defined as the preservation of cultural identities within a society that is united and unified. By assimilating a culture into an already existing society, the members within the society accept the cultural traditions and ideals of the incoming nation, coexisting peacefully within the same space. Sometimes the policies and regulations within the country will change to reflect parts of the incoming culture in order to accommodate and show acceptance for the new people who have arrived. The incoming cultural group eventually plays an important role in the society and has equal respect and rights to those originally in the society. Multiculturalism however, does have a downside: the individual coming from a different culture must let go of aspects of their culture that may not fit within the society that they are joining.

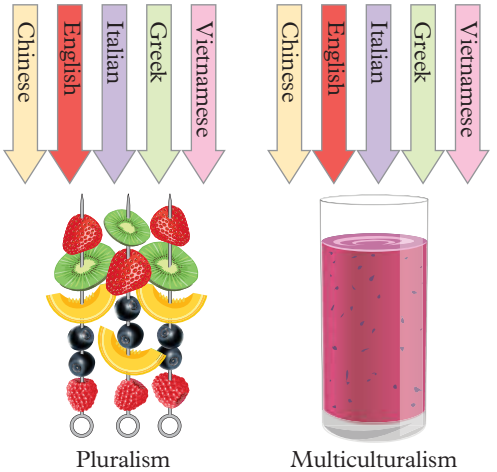


FIGURE 1 The left shows an example of pluralism, where the cultures maintain their core values within the existing framework of a host country. The right is an example of multiculturalism, which can be described as a melting pot where cultural norms and values are lost to a government that accepts all cultures, although some aspects of culture can still be retained.

Australia is an example of multiculturalism at work. The multiculturalism policy in Australia states that all Australians have a right to express their cultural ideals and heritage. It also states that they have equal rights in terms of their treatment and employment opportunities. However, for migrants to take advantage of these opportunities in Australia, they are encouraged to adopt values and behaviours that accord with Australia's cultural framework and forego any customs that are problematic within Australian society.

There are some advantages and disadvantages to multiculturalism in a society, as outlined in Table 1 (page 390).

Pluralism

Pluralism can be seen when smaller groups migrate to a larger community, and retain the ideals and values of their original culture, which are accepted by the larger community provided the ideals and values fit within the laws and values of the larger community.

For example, the United States is a pluralistic society where many minority groups exist within the larger American society, with people of different cultural backgrounds able to keep their own traditions. Some advantages and disadvantages of pluralism are outlined in Table 2.

TABLE 1 Advantages and disadvantages of multiculturalism in society

	Advantages	Disadvantages
Education	• Syllabi in schools have changed to include broader cultural representation, enabling a more comprehensive history to be presented and exposing students to various views and cultural practices. • Opportunities for cultural exchanges increase understanding of other cultures.	• Students from non-English-speaking backgrounds may struggle at school because of language.
Professional	• Can increase the kinds of experience that a work team can draw from. • Multinational companies are more likely to have branches in multicultural countries. • A diverse population of employees allows them to capture the global market, increase their customer base and have greater understanding of clients around the world, thereby growing their business.	• Managing people from a variety of backgrounds can be difficult, as expectations can be different. • People may express opposition to the acceptable cultural norms of the other, which can lead to antisocial behaviour.
Social	• Studies have found that if policy changes have shown integrative and cooperative stances for multiculturalism, then the chances of social conflict are much reduced. • Migrant workers are often very highly skilled and very well educated and, therefore, their skills benefit society as a whole. • Learning about other points of view can lead to an enriching experience.	• People may fear losing their identity (or their country's identity) and their lifestyle if new cultural norms are adopted as diversity increases. • People may fear unfamiliar cultures or belief systems, leading to possible conflict and racism. • Differences in religion, values, rituals and lifestyles can cause friction or rifts between groups in society.

TABLE 2 Advantages and disadvantages of pluralism in society

	Advantages	Disadvantages
Government	• Challenges politicians to find the most democratic solution for issues that arise within the society. Instead of having just the majority in mind, politicians need to appeal to all interest groups to create a healthy democracy.	• Does not lead to better government because there are too many conflicting ideas and politicians will only create policies and solutions for the majority. • The creation of interest groups to include the cultural minorities, historically, has ignored the needs of the poor.
Preserving traditions and culture	• New migrants who settle in a particular society will be able to hold onto their traditions and ideals for longer. • Preserves traditions and cultures by allowing individuals to continue to practise their culture without having to give up their traditions.	• Can increase the risk of stereotyping of the minority group, which can increase prejudice, especially if their traditions and rituals are very different. • Can lead to racism and violence between the different groups.
Social	• Exposure to other cultures and traditions can increase acceptance and understanding and alleviate fear or misunderstanding towards a particular culture. • Increase cultural diversity and decrease racism.	• In limited cases, it can lead to violence.

Differences between multiculturalism and pluralism

As you have seen, pluralism and multiculturalism are not the same thing. The key differences between the two terms are summarised below:

- Pluralism allows individuals to hold onto their own values rather than having values that are suitable to all of the cultures, as is the case for multiculturalism.
- Many people assume multiculturalism just means being kind to other cultures and people from other faiths, but this is not true. Multiculturalism actually states that each minority individual has the same rights as those in the majority, without exception. In pluralistic cultures, minorities can be treated differently and with different rules and regulations, which can cause conflict.
- Pluralism allows for more individuality because it allows groups to maintain different traditions, expectations and values from the majority culture, and therefore allows for each culture to be preserved; multiculturalism decreases individualism and increases unity within a society.
- Multiculturalism values tolerance more than pluralism does.

These key differences are neither positive nor negative. Each society must decide what works for them and ensure the disadvantages are accounted for and addressed to ensure the smooth transition of peoples to new societies.

CHECK YOUR LEARNING 18.3

Describe and explain

1 **Define** multiculturalism and give an example of this type of culture.

2 **Explain** what pluralism is.

Apply, analyse and interpret

3 **Analyse** multiculturalism and pluralism and apply your understanding of these two terms to a real-life society.

Investigate, evaluate and communicate

4 **Investigate** a culture that has vastly different values from your own. Using the evaluations above, **identify** what possible advantages and disadvantages must be accounted for if you live within a pluralistic environment. Write a short paragraph to present the advantages and disadvantages.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 18.3

» **Increase your knowledge**
Worksheet: 18.3 Finish your plate!

» **Weblink**
Australia as a multicultural society

SCIENCE AS A HUMAN ENDEAVOUR

18.4 Why psychological research needs to consider other cultures

KEY IDEA

In this section, you will learn about:

+ the international collaboration required when investigating cross-cultural phenomena.

International communication is vital for successful cross-cultural research. It is vital because differing cultures have vastly different values, and without open and transparent communication, misperceptions and misunderstanding can hinder accurate research across different cultures. For example, in collectivist cultures, the values of the community are valued over those of an individual, and violation of such values may hinder cooperation from that culture or even lead to inaccurate interpretation of research findings. One such example includes a multicultural assessment of the Asch conformity paradigm, which was covered in Chapter 12.

One of the key limitations of Asch's conformity study was that the findings of the study lacked cross-cultural relevance. A study performed by Berry (1967) aimed to rectify this limitation by using the same test as Asch to establish if the same results in conformity are found in different cultures. The same test was used to test conformity (Figure 1) where participants were deceived and asked to judge the length of the test line compared with the reference lines in the presence of confederates who gave the incorrect answer each time. If the participant agreed with the confederates, this suggested conformity, but if they did not agree with the confederates and chose the correct line instead, this indicated a lack of conformity from the participants.

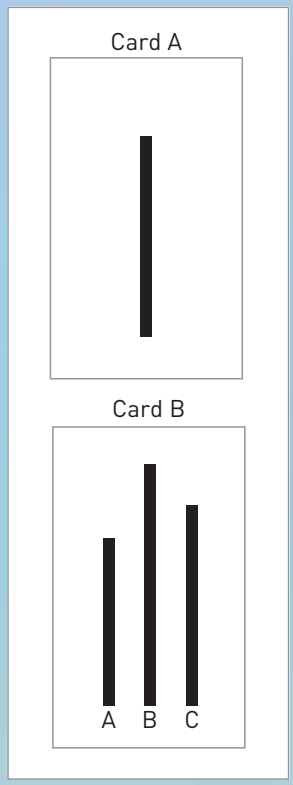


FIGURE 1 This is an example of Asch's line test for conformity.

Instead of testing Americans (like in the original study), Berry chose participants from the Temne tribe in Sierra Leone in Africa and Inuits of Baffin Island in Canada. The Temne people are an agricultural people who are a collectivist society; they need cooperation from the community in their farming practices. In contrast, the Inuits of Baffin Island are solitary hunters who come from an individualist culture.

The results of this variation of the Asch test found that the Temne people were more likely to conform when compared to the Inuit peoples. It is suggested that because of the need to work with others in the community, the Temne people trusted the judgments of the confederates or the 'community' consensus, and thus increased their conforming behaviour. The Inuits, however, depend on their own skill for survival and, therefore, value their individual judgment over those of the group, thus showing a decrease in conformity.

This cross-cultural difference in the social behaviour of conformity highlights the importance of understanding cultural differences and cultural values in conducting research in psychology and the need for international collaboration. Without such collaborations, research findings may not be able to be generalised to other cultures and may be misinterpreted, which can affect the understanding that is fundamental to psychology, the understanding of human behaviour.

CHECK YOUR LEARNING 18.4

Describe and explain

1 **Identify** the results found in Berry's 1967 study and **explain** why the results may have differed from Asch's original study.

Investigate, evaluate and communicate

2 **Interpret** the results found in Berry's 1967 study and apply the results to a group of Australian participants. **Predict** the results of Asch's study being applied to Australian culture by writing a discussion.

3 **Evaluate** the reliability and validity of Berry's 1967 study and prepare a short presentation to show your evaluation.

4 **Investigate** another phenomenon learnt so far in the QCAA Psychology syllabus and **assess** whether it can be generalised in cross-cultural investigations.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 18.4
- **Weblink**
  Cultural variance in research
- **Weblink**
  Cross-cultural differences

CHAPTER 18

Review

Summary

18.1
- Sense of community can be determined by aspects such as membership, influence, integration and the fulfilment of needs, and shared emotional connection. Having these elements can increase the sense of ownership and compliance within a group and can dictate the longevity of a group.

18.2
- Culture can include elements such as language, values, beliefs, religion and rituals.
- Cultural norms define the rules by which members of a culture must live. This can include food preparation and daily behaviour.
- Cultural dimensions is a measure of the core values in a group and how these core values can help you to predict the behaviour of the members within the dimension. For example, people from individualistic societies are more likely to conform compared with people from collectivist cultures.

18.3
- Multiculturalism and pluralism are distinctly different ways to incorporate incoming cultures within an already existing one.
- There are many benefits and disadvantages to multiculturalism and pluralism within a society. However, integrating cultures into an already existing cultural framework can cause conflict and fear in the already existing and dominant culture, because it can mean a change to the status quo.

Key terms

- collectivism
- community
- conformity
- cultural dimensions
- cultural norms
- cultural perspective
- culture
- individualism
- influence
- membership
- multiculturalism
- pluralism
- reinforcement
- subculture

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: * = low, ** = medium, *** = high.

Multiple choice

1 Identify two factors that can influence sense of community (note: you may select more than one answer).
- **A** fulfilment of needs
- **B** influence
- **C** social identity theory
- **D** sense of community

2 State an example of membership, according to McMillan and Chavis.
- **A** a membership card to a store you rarely go to
- **B** being a part of a group with people who have the same goals and values as you
- **C** feeling like your voice is being drowned out by a much larger group
- **D** a sense of conformity because everyone else is doing one thing even though you want to do the opposite

3 Which one of the following is *not* a factor for shared emotional connection?
- **A** contact hypothesis
- **B** investment
- **C** quality of the connection
- **D** status of the group

4 What does the term reinforcement in fulfilment of needs suggest?
- **A** Members need to be punished for inaction towards the group goals.
- **B** Members of a group need to be praised for actions that are against the group goals.
- **C** Members of a group are praised for actions that help the community to achieve a group goal.
- **D** Members of a group avoid punishment when they perform actions that satisfy the needs of the group.

5 Influence can predict formation of a group by:
- **A** having individuals feeling like they can exert some sort of influence over the group.
- **B** having the rules for conformity determined by the group so that there is increased cohesion.
- **C** having a leader who wants one goal while members of the group may prefer another goal.
- **D** having trust for other members of a group.

6 Identify a possible definition of culture.
- **A** a static environment where rules and regulations stay the same
- **B** a set of rules that dictate daily lives for a group of people
- **C** a set of values and ideals for a particular group of people that is passed to offspring
- **D** social groups interacting with each other

7 State an example of a cultural norm.
- **A** avoiding eating pork on a daily basis
- **B** a yearly ritual related with fertility for the tribe
- **C** following the laws of the country that you are a part of
- **D** the values your family holds about religion

8 State a definition for individualism.
- **A** acting based on the collective goals of a society
- **B** acting for your own goals and taking credit for your own efforts in a project
- **C** relying on your community to help you find a profession
- **D** refusing to conform to others as it is against the values of your group

9 Identify an example of masculinity in cultural dimensions.
- **A** authoritarian and strong communities
- **B** communication-based cultures where ideas are shared
- **C** emphasis on working together on a common goal
- **D** emphasis on harmony rather than aggression

10 The cultural perspective in psychology investigates phenomena using:

- **A** genetic testing to determine behaviour.
- **B** memory tests and tests that rely on attention in order to test thinking processes.
- **C** research methods, especially experiments, to find results.
- **D** researchers who are immersed in different cultures in order to understand the background and reason for behaviours based on specific cultures.

11 Identify a benefit of multiculturalism.

- **A** A healthy conflict can arise at work when individuals from the host culture fear that their job may be taken over my immigrants.
- **B** Fear of change in the host culture can lead to changes in attitudes and stereotypes.
- **C** An increase in skilled migrant labour helps the economy.
- **D** Students may struggle to understand school assessments, which can build resilience.

12 Give an example of multiculturalism.

- **A** a particular culture living within their own community and keeping to themselves
- **B** a group of refugees living alongside locals and adopting the local rules and regulations
- **C** many cultures coming together and holding onto their own values within one larger society
- **D** society encouraging new rules from visiting cultures

13 Select an advantage of pluralism.

- **A** attracting more multinational companies
- **B** creating a divide in the society
- **C** increasing opportunities to learn another language
- **D** preserving individual cultures

Short answer

Describe and explain

★ **14** **Define** culture and give an example of a culture in your response.

★ **15** **Identify** the five key attributes of membership according to McMillan and Chavis.

★ **16** **Identify** two strengths and two limitations of multiculturalism.

★★ **17** **Explain** the difference between individualism and collectivism.

★★ **18** **Describe** the concept of cultural dimensions and, using masculinity versus femininity as an example, **describe** the differences between those two concepts.

★★★ **19** **Identify** a cultural norm in your culture and use this example to **explain** the value it is based on as part of your culture.

Apply, analyse and interpret

★ **20** **Analyse** Berry's 1967 study and summarise the study, explaining how culture changes conformity behaviour.

★ **21** **Analyse** an example in your own life where your sense of community applies to your group membership.

★ **22** **Distinguish** between how a person from an individualist country versus a person from a collectivist country may attribute a reason for a student coming to class late.

★★ **23** **Apply** your understanding of culture to **compare** behavioural differences between people from two cultures and suggest a reason for these differences.

★★ **24** **Apply** your knowledge of sense of community to the Jim Jones cult and **explain** how such a cult could have existed.

★★★ **25** **Interpret** the following results:

A study found that African children could not remember a list of words like American children of the same age could. However, when the list of objects was presented as a visual diorama around their tribe lands, they were able to remember as many as the

American children. This particular African tribe hunts for food around their land.

Apply your knowledge of cultures to explain the results.

Investigate, evaluate and communicate

★**26** The United States is often described as a melting pot of cultures. **Justify** this statement using your knowledge of culture.

★**27** **Evaluate** pluralism and whether it could work as a cultural system in Australia.

★**28** **Discuss** the factors that can increase a sense of community.

★★**29** **Investigate** the following claim: 'Behaviour depends on culture'. Suggest a possible research question that can be used to assess this claim.

★★**30** **Discuss** culture and how culture can lead to changes of behaviour. You may use Berry or other research to support your perspective.

★★★**31** Japan's culture lies between individualist and collectivist (not solely collectivist, as is often claimed). **Evaluate** this point using your knowledge of cultural dimensions.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 18 Review
- **» Revision notes**
  Revision notes for Chapter 18
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz.
- **» Flashcard glossary**
  Key terms in Chapter 18

CHAPTER 19

Cultural diversity

To achieve a holistic understanding of human behaviour, we need to consider both the variability and invariance of human behaviour and mental processes under diverse cultural conditions. This can include examining the cultural ideals within a society, including the challenges faced by individuals entering a different culture. Cultural diversity can also be a source of conflict and we will examine how conflicts can arise due to members of different cultures living together in society.

Recent immigrants, whether they have entered the country based on humanitarian needs or by choice, typically face a range of psychological challenges that can affect their integration into their new country. The psychological challenges of immigration include culture shock, acculturation and assimilation.

People who were born and live in their home country may express fear that the society is changing due to immigration. This can lead to prejudice towards the new arrivals. Sometimes, this prejudice can show itself as discrimination in the form of racism, which can be detrimental to the mental health and wellbeing of immigrants, refugees and asylum seekers.

Psychologists have explored ways to decrease prejudice, based on the contact hypothesis as well as cognitive approaches. This chapter will explore these ideas and outline different approaches for minimising prejudice and hate.

FIGURE 1 Cultures can be diverse because of beliefs.

OBJECTIVES

→ Examine the psychological challenges of immigration, including culture shock, acculturation and assimilation.

→ Consider how cultural diversity can sometimes be a source of conflict, with reference to prejudice expressed as racism (implicit and explicit).

→ Describe ways to reduce prejudice, with reference to intergroup contact, sustained contact, superordinate goals, mutual interdependence and equality (equal-status contact).

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

SUGGESTED RESEARCH

SUGGESTED RESEARCH	**19.2** Prejudice displayed as racism (e.g. racism in Australia in Dunn 2004)
SUGGESTED RESEARCH	**19.3** Prejudice reduction through intergroup contact (e.g. racial bias in neural response to other's pain in Cao, Contreras-Huerta, McFadyen & Cunnington 2015)
SUGGESTED RESEARCH	**19.3** Cultural diversity and implicit instructions (e.g. emotional display rules in Matsumoto 2007)

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

19.1 Psychological challenges of immigration

KEY IDEA

In this section, you will learn about:

+ the psychological challenges of immigration (culture shock, assimilation and acculturation).

In Chapter 18, we looked at how countries can adapt their policies and governance to include people coming from other cultures, through our exploration of pluralism and multiculturalism, but what about how people feel when they move from their home to a new country through the process of immigration?

immigration the act of moving to a new country to find a new home

Immigration is the movement of people from their native homeland to a new country or place where they do not possess citizenship (and at times may not have rights to work or to even stay permanently). There are many reasons for immigration, including reuniting with family members who have already moved there, searching for work or for humanitarian protection (e.g., from war, political persecution or due to natural disaster).

Moving to a new place, whether it be by choice or by necessity, can be daunting and challenging, both physically and mentally. Imagine you are a refugee spending the last night in your home country, your family huddled listening in fear as bombs are being dropped overhead and you hope against all odds that you will survive the night. Then imagine the stark difference from a night in Australia, where you may be watching Netflix, or playing on your phone, and the biggest worry you have in the world is what you will have for dinner or working on an assignment that is due tomorrow.

You may think as a refugee, being taken away from war or famine or both and being placed in Australia is a blessing; however, it is important to acknowledge that refugees are displaced from their homes. They left everything behind, including their families, their friends and even their work, to escape. In so doing, they may experience various psychological challenges in their new country, not to mention they often need to learn to speak and write in a new language.

These psychological challenges include culture shock, acculturation and assimilation. How well new arrivals navigate these challenges can determine how well they transition to their new place of residence, and is often a focus for cross-cultural research.

FIGURE 1 People migrate to countries for a variety of reasons, and may then hope to gain citizenship when they are there.

FIGURE 2 Escaping Syria may have been a relief for this family, but it may have also meant leaving behind family, friends and cultural customs.

Culture shock

Culture shock is not a medical diagnosis but rather a description of how someone might feel when they first migrate to a new country. It is a way to describe the confusion and nervousness a person may have when they arrive in a country that they have never even visited before and it is the place they must call home. The cultural disparity between their homeland and their new home may be so large that they feel overwhelmed.

culture shock being placed in a new country that has a very different set of ideals or values from your own, and feeling overwhelmed by the differences between the cultures

People who experience culture shock experience it in different ways with varying emotions, but some common emotions include feelings of frustration, feeling isolated from their new cultural environment, loneliness, sadness and feeling homesick. People experiencing culture shock may also have difficulty paying attention or concentrating at school or work.

Although culture shock is one of the challenges of immigration, it is a very normal response. In fact, many people travelling abroad even for a short amount of time sometimes feel this same sense of confusion that immigrants feel when they move permanently. For example, in some South-East Asian countries, you will see street stalls selling scorpions, grasshoppers and even spiders as food (often fried and on a stick; see Figure 4) which is very different from food in Australia. The foreignness of the new cuisine may scare some travellers, which can then lead to feelings of homesickness or perhaps feeling sad or unsettled.

Culture shock involves difficulty in dealing with, or adjusting to, an unfamiliar culture. You may have experienced this yourself, or seen it with international students at your school. The way other people have grown up may be quite different from your experience – the flip side is that they feel the same way about your culture being unfamiliar. Although culture shock can be upsetting and difficult to adjust to, it is also temporary. Culture shock can be overcome with time. As a person gets used to their new country and the culture, they feel happier and less homesick at the prospect of living in the new country.

FIGURE 3 These creepy crawlies are a local delicacy in Thailand.

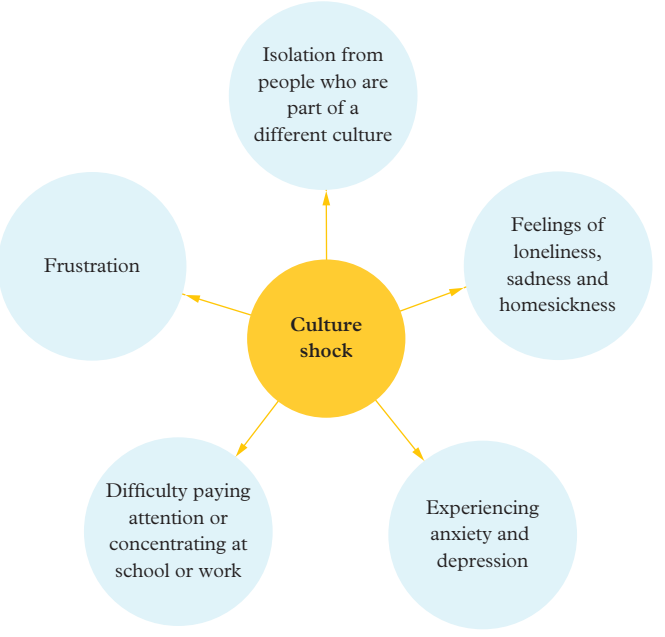


FIGURE 4 Culture shock can have many emotional effects.

Assimilation

Once culture shock has passed, a new immigrant to Australia may then adopt parts of the culture. For example, a new immigrant to Australia may choose a cricket or rugby team to support, enjoy the local cuisine and may even adopt some of the local customs.

These changes in immigrant populations, where they adopt local cultural ideals, is called **assimilation**. This means that the migrants slowly lose aspects such as language, food and rituals that separate their culture from the dominant Australian culture, and eventually the minority and majority culture have little difference.

assimilation adapting or fitting into a culture completely

Assimilation is not an all or nothing event. It can happen in degrees, so even though there are some majority cultures that may totally assimilate a minority culture, it is not often that cultures are completely absorbed into the majority. In fact, most cases of assimilation are a two-way process, meaning that even though there are drastic changes to the minority culture, there are also changes in the majority culture during this process.

Australia has been referred to as a 'melting pot' of cultures; in some ways this is correct. Think of assimilation like a stew. When salt is added to the stew, it is absorbed, and the taste remains in the final meal. With assimilation, the minority culture has added elements to the majority culture over time.

Multiculturalism holds that minority culture groups should be able to preserve some of their original cultural norms, values and practices, within the majority culture's framework. A minority culture may need to embrace the majority culture, but is able to retain some of their original cultural norms.

FIGURE 5 A picture taken from the Canadian Mountain Rangers. This is an example of a multicultural society accepting the traditions of the man's culture and it also displays assimilation as the man is living and contributing to the rules of the majority (Canadian) culture.

If assimilation is the seasoning in a stew, multiculturalism is like a salad bowl. Multiculturalism holds that minority culture groups should be able to save some of their original cultural norms, values and practices within the majority culture's framework. When you think of multiculturalism as a salad bowl, a minority culture may need to embrace a new culture (the salad), but is able to retain some of its original cultural norms (the seasoning/dressing for the salad).

Multiculturalism is thought to decrease prejudice and increase migrants' self-esteem as it preserves some of their traditions, while respecting the laws and traditions of the culture they have migrated into. An example is shown in Figure 5 where a Canadian Mountain Ranger (Mountie) is dressed in his traditional turban as part of his cultural traditions – but with the official uniform and responsibilities of the Canadian Mounties – showing assimilation with the majority laws and rules, but keeping part of his culture as part of Canada's multicultural 'melting pot'.

Acculturation

If cultural markers such as language, traditions, food and rituals of an immigrant culture are sustained after they have moved to a new majority culture, this is called **acculturation**. Members of the minority culture will retain most of their cultural norms, however, they may still adopt some small aspects of the majority culture. Individuals who acculturate can be said to be bicultural because they have customs and aspects of both cultures, even though their original culture is the one that dominates. These cultural aspects include:

acculturation keeping the core values and ideas from the original culture while abiding by the rules of the adopted culture

- language
- cultural identity
- values
- food
- social interactions
- customs.

As with assimilation, acculturation is not a one-sided act. Both the minority and majority cultures may mix or adapt with each other, meaning acculturation is also a two-way process. Acculturation indicates an individual adapting to both cultures (their original and the new). If you live in a neighbourhood that is predominantly one culture, but go to school or work where there are many different cultures, you are likely to retain your traditions at home, but adjust to the majority culture during the school or work day, and therefore show an example of acculturation. A key benefit of acculturation is that the individual gains access to resources that they may otherwise not have had. For example, if someone is feeling anxious, they can get social support from their neighbourhood and people from their culture who understand their pride and rituals. However, if their anxiety stems from school work, they can access school-based assistance, which is provided by the majority culture.

Acculturation can be limited by a phenomenon known as a family **acculturation gap**. This occurs when there is a difference in acculturation between parents and their children. Migrant parents may be consistently surrounded by their community and therefore be less exposed to the majority culture of their new country. Their children, though, may attend school with the majority culture, and so may find it easier to embrace. This can make it difficult for parents to understand their children, and also can make it difficult for children to live with two sets of expectations: one at home and one at school. Children may choose to assimilate with the majority culture, rather than maintain their parents' culture, which can put pressure on family relationships.

acculturation gap the difference that can arise between the level of assimilation of migrants compared to their children

Helping with culture shock

Given the challenges that immigrants face when they start to live within an unfamiliar culture, research has aimed to find ways to make the transition easier. There are many ways in which to improve the ease of transition, some of which are offered below.

- **Education within the majority culture:** In order to prevent an anti-immigrant climate, or **xenophobia** (which can be defined as a fear of strangers or a fear of other cultures), government policies and education could include cultural understanding and diversity in order to minimise discrimination from the majority culture.
- **Creation of new neighbourhoods and communities:** Often when individuals migrate, they leave behind their social support network including family and friends. Not having social support in a new place can be very disorienting and often scary. Therefore, introducing migrants to small communities where others of their culture live can prevent cultural isolation, which can then increase psychological adjustment to immigration and increase the chances of acculturation or even assimilation, and decrease culture shock.

xenophobia fear of, or strong animosity towards, people of different races or cultural backgrounds

resilience
the ability to cope with a difficult situation using mental strategies

- **Resilience skills: Resilience** is the ability of individuals to cope with a potential trauma or startling situation by controlling their reactions and finding means to manage their fear or using strategies to continue to function. This can increase their ability to cope with culture shock and therefore decrease the impact culture shock may have upon them.
- **Learning the language:** Culture shock and also resistance to assimilation or acculturation can be reduced if programs are in place for arriving individuals to learn the local language. This can reduce the disparity between the original culture and the new culture which can, in turn, decrease the distress at leaving their original home.
- **Knowing what to expect:** If an immigrant knows what it may feel like to live in their new culture from friends who may have moved, or even through television and movies, this can often help to reduce the fear of immigration and therefore decrease culture shock.
- **Having friends and family move together:** If a social network can move together to the new place, it will increase resilience and the social support, as the group can understand each other and empathise with the changes they are all experiencing.
- **Maintaining culture:** By holding onto their cultural ideals and customs, migrants' fear of losing their cultural identity will decrease, which makes adapting to a new environment and culture easier.

These strategies may help those migrating to Australia to adapt to the majority culture.

CASE STUDY 19.1

Refugee immigrant to Australia

FIGURE 6 Najeeba Wazefadost

Najeeba Wazefadost was only 12 years old when she was smuggled out of Afghanistan to avoid an active war zone in 2000. Her family flew to Indonesia using fake passports with the intention of later reaching Australia by boat. Their journey was not without danger or risk, and before they could reach Australia, the Australian Navy intercepted their vessel and Najeeba was detained as a humanitarian refugee.

'I had to leave my country Afghanistan in 2000 because of the war and persecution that happens there. I am from an ethnic minority called Hazara. Hazaras have been persecuted ever since around 1891, and there is no single cause or reason as to Hazaras not only being persecuted by the Taliban but by other ethnic minorities. Hazaras still face massacres by officials and warlords in Afghanistan. That is the reason that I and my family escaped. There was no other choice for us than escaping the country and going to somewhere safe – we would not have survived there.

'We left Afghanistan without knowing that we were coming to Australia. When we left Afghanistan we didn't have any means of transport. Sometimes we had to walk barefoot, sometimes we had to get into a truck and hide within a truck, sometimes we were walking in the night. But then we did make our way, it was very difficult to get out

of Afghanistan, but we finally got to Pakistan. From Pakistan we went to Indonesia and then to Australia by boat.

'It was a horrifying journey to come to Australia by boat, or I should actually call it a piece of wood. We had to sit in the boat for more than a week, just hoping to survive. We risked being drowned in the Pacific Ocean.

'I am a refugee, but that no longer defines who I am. And I thank the education that I've had for that.'

Najeeba has since been granted humanitarian refugee status in Australia and today lives in Western Sydney where she is an ambassador for Amnesty International and Welcome to Australia.

Najeeba experienced culture shock and racism when she initially settled in her new community. Over time, she assimilated into Australian society and began helping fellow refugees from her home town as a means of retaining her cultural identity through her connection with those with similar backgrounds. However, she has also integrated herself into Australian culture and earnt her medical science degree – she was even a finalist in the 2010 Australian Human Rights Person of the year!

Najeeba is just one of many to have faced challenges adapting to a new culture. She was able to overcome these challenges with social support and many kind Australians who helped her adjust to her new environment.

CHECK YOUR LEARNING 19.1

Describe and explain

1 **Define** culture shock and give an example of how someone might feel if they had culture shock.
2 **Describe** assimilation.
3 **Identify** a difference between acculturation and assimilation.

Apply, analyse and interpret

4 **Analyse** the cultural policy of the United States and suggest if it is more likely to favour assimilation or acculturation.
5 **Apply** your knowledge of discrimination and prejudice as well as the strategies given to aid migrants and come up with an activity at school that can potentially help migrants at your school.

Investigate, evaluate and communicate

6 **Compare** multiculturalism and assimilation.
7 **Evaluate** the following statement: 'Australians who dislike acculturation are racist'.
8 **Investigate** the following claim: 'Immigration is always bad for individuals'. **Devise** a possible research question that could be used to assess the claim.

Check your obook assess for these additional resources and more:

» **Student book questions**
Check your learning 19.1

» **Increase your knowledge**
Australian immigration

» **Weblink**
Acculturation in Australia

19.2 The challenges of cultural diversity

KEY IDEA

In this section, you will learn about:

+ the relationship between cultural diversity, prejudice and racism.

Cultures around the world are unique, and often have historical significance. With cultures differing so markedly from each other, it is not surprising that there can be aspects of one culture that may be the polar opposite to the core values of another culture. Therefore, if these conflicting cultural beliefs cannot be assimilated or negotiated, it can lead to the formation of stereotypes, which can increase the occurrence of prejudice and racism.

cultural diversity the many cultural, racial and ethnic groups in a society

Cultural diversity is the range of cultural norms or cultural traditions that exist within a society. This cultural diversity can be a very beneficial aspect of a society; however, it can also be detrimental if conflicts arise due to the differences between cultures, and this can lead to stereotypes, prejudice and discrimination.

Formation of stereotypes and prejudice

In previous chapters, we have explored how attitudes are formed and how they are experienced. We explained attitudes by exploring three components: the cognitive (how we think), the affective (how we feel) and the behavioural (our actions and behaviours). These interact and help us to assess our perspectives and attitudes about a given situation.

The formation of prejudice includes all three components of the ABC model of attitudes because prejudice is defined as having negative thoughts, feelings and actions towards another group, and these thoughts, feelings and actions are not based on logical reasoning (Allport, Clark & Pettigrew, 1954). Prejudice can also lead to discrimination, which is the action or behaviour that stems from these negative thoughts and feelings; for example, someone shouting a racial slur at someone from a different race is racism, an example of discrimination. Discrimination is based on the behavioural aspect of the ABC model of attitudes. Stereotypes, on the other hand, are based on the cognitive aspects of attitudes. A stereotype is a long-lasting belief that all members of a particular group have a particular characteristic in common (Bartlett, 1932). Sometimes these stereotypes are true or partly true, but most of the time it is an over-generalisation and this can lead to prejudice and discrimination due to the lack of understanding of a particular culture or group of people. For example, the stereotype that all teenagers are lazy is not true for all teenagers, but it could lead to adults treating teenagers differently or even discriminating against teenagers when they apply for jobs.

FIGURE 1 Culturally diverse groups can discourage discrimination, but they can also increase chances of prejudice and racism.

Historically, having stereotypes allowed us to respond quickly to situations by allowing our brains to use previous experiences to assess a situation quickly in order to potentially increase our chances of survival. Even though they can lead to discrimination and prejudice, stereotypes can also be helpful in certain situations. Depending on our previous experiences, we may develop **schemas** (social categorisation or having a set of characteristics that are common for a specific group of people) for a certain cultural group, which can lead to the formation of stereotypes. Therefore the role of culture in prejudice and the subsequent actions that result in discrimination must be considered to fully understand the role of culture in behaviour.

schemas
mental representations of categories

Role of culture in prejudice

Prejudice can be defined as an opinion about a person or group of people that is negative and not based on logical reasoning (cognition aspect of attitudes). There are many factors that can cause cultural misunderstanding, which can lead to prejudice towards a particular group of people. Some of the key factors are discussed below:

- **Cultural insensitivity and lack of awareness:** Educators, health-care professionals and other workers may lack cross-cultural experience or understanding, and may offend people from a different culture with certain advice or methods of interaction. This includes cultural practices such as dietary requirements, as well as lifestyle factors, such as not being able to work on certain days for cultural reasons. If an employer or individual misunderstands these cultural differences as a person not wanting to eat their food, or perceiving their inability to work on a certain day as lazy, this can then increase the chance of conflict.

FIGURE 2 Different religions avoid certain meats; Catholics typically eat fish only on Fridays, Jewish people typically don't eat pork and Hindus typically don't eat beef. If this were to be misinterpreted as simply being a fussy eater, it could cause offence or create frustration.

- **Different verbal and non-verbal communication styles:** The use of words may actually vary greatly between one culture and another. For example, in Australia a person saying 'Yes' to performing a task is accepted as a verbal agreement, but in another culture, it may actually mean that the person is not resistant to the idea and will think it over, or the person may have only said yes because it would be considered rude not to. Therefore, this could lead to misunderstanding and the development of prejudice towards another culture as unreliable. In addition, differences in non-verbal communication can be a source of conflict. For example, in Aboriginal culture, it is impolite to look directly into someone's eyes when you are speaking with them; however, in the dominant Australian culture, a lack of visual contact is often perceived as rude or untruthful, leading to misunderstanding and potential conflict.

- **Work ethic and approaches to completing tasks:** There are generally two types of people when it comes to task completion: those who are task-oriented and those who are relationship-orientated. Depending on which one a particular culture may ascribe to, this may cause frustration if individuals from a culture that values one type of task completion are working with people who favour the other type of task completion. For example, have you ever heard of 'Fiji Time'? This means the task you are waiting on will take a while, as Fijians tend to be relaxed when it comes to time and value making strong relationships with their customers rather than completing the task quickly. Therefore, if you are not used to waiting or forming relationships, it can cause conflict because you think the task is not being performed quickly enough.
- **Decision-making styles:** Different cultures have different ways of making decisions. For example, in Indigenous Australian culture, people achieve a majority in their clan, especially with the support of their elders, before making a decision. The time needed for a consensus to be reached may delay decisions, and become frustrating for someone who does not understand this cultural norm, especially someone from a more individualistic culture where a person can make a decision on their own. This may then lead to conflict between the cultures.

FIGURE 3 Fijian culture focuses more on building relationships rather than completing work quickly.

The factors discussed suggest that culture can affect the amount of tolerance and frustration individuals may feel due to misunderstandings related to cultural differences. This frustration may lead to formation of stereotypes for a particular cultural group and in turn may develop into prejudice. This prejudice can be expressed as xenophobia, ethnocentrism and racism. From a psychological standpoint, there are three main perspectives that can explain this formation of prejudice: the biological, cognitive and sociocultural.

Formation of prejudice

Biological perspective

According to this perspective, it is possible that prejudice is an inherited trait. The evolutionary causes of prejudice suggest that because groups want to preserve their own way of life and keep their gene pool consistent, they are likely to exclude individuals who are not part of their own group (Reynolds, Falger & Vine, 1987). By excluding 'strangers' there may be an evolutionary advantage, as it can protect the members of a community from potential trouble and aid in their survival. Therefore, anything that can be deemed as 'natural' to a specific group will be accepted by members of the group, but anything that is unknown or foreign will be assumed to cause danger and therefore should be avoided, which can then lead to the formation of prejudice.

There are criticisms for this explanation of prejudice formation, however, especially because in society today, most nations are multicultural and we have much more ability to

experience and learn about other cultures. It also overly simplifies the formation of prejudice, as the reasons behind the prejudice are not explored. Therefore, even though the evolutionary theory may be a possible explanation for prejudice, it is not absolute.

Cognitive perspective

The cognitive perspective looks at the formation of prejudice in two ways: the first is the psychodynamic, and the second concerns perception or cognition.

The psychodynamic theory suggests that prejudice can help satisfy the psychological needs of individuals. For example, people use prejudice to divert attention from other stressors, such as political or economic issues. If someone is feeling stressed about their chances of getting into the local university and there is an influx of international students to their school, it is possible that the person may channel their fear into prejudice. This need to place blame diverts their attention from what is really worrying them, which is getting into university.

The second perspective focuses upon perception or cognition. This approach explains the formation of prejudice based on selective attention and selective memory. Focusing on the negative behaviours of out-groups creates a greater distinction between out-group members and in-group members. By increasing the perceived differences in characteristics between an in-group and out-group, it increases the members of the in-group's self-esteem so that their behaviours are reinforced (Bartlett, 1932). This will form stereotypes, which can increase prejudice because of the way people think.

Sociocultural perspective

Instead of looking at the cognitive and biological perspectives, the sociocultural perspective can also help us to explain the formation of prejudice. Stereotypes provide us with mental shortcuts for predicting or assuming the characteristics of an individual we have never met before. Individualising people can actually cost us cognitively; categorising people can actually be beneficial for saving mental space. By interacting with individuals from different cultures within your community and hearing about experiences from those who are in your in-group about individuals from other cultures, it can influence the formation of a negative attitude towards those you do not personally know but have stereotyped based on information available in the social environment (Tajfel, 1970).

In addition, real-life events that can cause conflict, such as an oil crisis, economic difficulties and immigration increase, and historical reasons, can all feed into prejudice. These reasons can cause many different versions of prejudice, which will be considered in more detail in the remainder of this chapter.

Expressions of prejudice

Xenophobia

Prejudice in the form of xenophobia is derived from a fear of unfamiliar situations or strangers. This fear is often attributed to individuals perceived as a part of an out-group or those who are physically different or have different values. This type of prejudice can lead to conflicts. New immigrants may be from a land that is culturally very different from the host country. For discriminatory people in the host country, this can lead to distrust and discrimination due to the fear that the foreign cultural ideals will affect the status quo in the majority culture.

Ethnocentrism

ethnocentrism
valuing one's own ethnicity or culture more than others, and acting with prejudice towards other groups or people

Ethnocentrism is prejudice or negative feelings towards a whole culture. This type of prejudice stems from the feeling that one's own culture is superior to that of another. People who display this type of prejudice may protest the inclusion of any other culture into their current society; they may also highlight concerns about national security as a prime reason for stopping people from other countries migrating into their country.

Racism

racism
negative emotions or actions towards someone based on their race

race
the grouping of people based on common descent

Racism is prejudice towards someone based on race or religion. It is similar to ethnocentrism because this prejudice towards race comes from the belief that one's own race is superior to another race. **Race** suggests grouping humans according to their common descent. By displaying acts of racism, an individual is judging another person by their race or their physical attributes, and having negative attitudes towards a person based solely on what can be seen rather than anything known about the individual.

There are two types of racism: implicit and explicit. They each display their negative acts upon individuals differently.

CASE STUDY 19.2A

Prejudice expressed as racism in Australia

In 2004, Kevin Dunn investigated 5056 Queenslanders and residents from New South Wales through the use of telephone surveys to obtain data on 'racist attitudes' and 'experiences of racism', including asking if the respondents had ever experienced discrimination due to their race or ethnicity. This question about discrimination reflected experiences of racism across a variety of settings such as the workplace, educational institution, when renting or buying real estate, when approached by police, as well as everyday situations such as at the shops, restaurants and going to a football game or other public event.

The results showed that the overall experiences of racism were higher for Aboriginal and Torres Strait Islander peoples (twice as often as non-Indigenous Australians). Those who were born overseas or speak a language other than English experience racism almost four times more than native-English-speaking Australians. In addition, more than 15 per cent of Australians had experienced racism in the workplace, in an education setting or both, and 25 per cent had experienced racism in shops, restaurants or public events where they were targeted either implicitly or explicitly by other individuals.

Interestingly there was also an age effect in the results, where younger Australians were more aware of the racism that goes on around them and were less likely to experience incidents of racism from same-aged peers. This is likely due to awareness-raising programs and other strategies that have been put in place in Australia in recent years.

However, even given the decreased incidents, Dunn has clearly identified that racism is very much still alive as a form of prejudice in Australia. It therefore needs to be further explored in order to educate and put strategies in place to decrease racism.

Implicit racism

Implicit racism is an almost unconscious form of racism. It occurs when individuals use unconscious biases when making their decisions and judgments about people from different cultures or ethnic groups. Examples of this type of racism are:

- people fearing or mistrusting people who do not look the same as themselves
- police pulling someone over due to the colour of the person's skin or the way they look
- juries being more likely to bring in a guilty verdict for suspects who have a particular colour of skin
- dismissing job applicants based on a foreign-sounding name
- media presenting people of particular ethnicity in a negative way.

FIGURE 4 Trayvon Martin was shot after an individual allegedly became suspicious of Martin on the basis of his skin colour.

All of these acts are considered to be implicit in nature. They can often be due to xenophobia, especially when seen in children, and can be learnt from the media, family members or the local community. This type of racism is very difficult to correct as often the person is unaware of the bias they have towards a particular ethnicity, and therefore will deny having such racist thoughts or ideals. However, implicit racism is common. Case study 19.2b highlights an example of implicit racism.

implicit racism negative actions towards members of a different cultural group that are covert and often unconscious or concealed

CASE STUDY 19.2B

Implicit racism

When two African-American men asked to use the bathroom at a Starbucks in the United States, the manager refused them access by stating that only customers were permitted to use the facilities. The two men then sat at a table without having purchased anything. When the manager enquired about their intentions they claimed they were waiting for a friend to arrive to join them. Instead of allowing these men to remain in the store, the manager called the police and the men were arrested, but were not charged with anything.

Actions of the manager demonstrates implicit racism. The manager assumed the worst when the two men remained in the store without purchasing anything, likely discriminating against the two men based on the colour of their skin rather than their actions.Starbucks has since apologised and is now offering training in implicit bias to prevent similar incidents occurring again in their stores.

Explicit racism

Explicit racism exhibits in a different way from implicit racism. This type of racism is overt and very intentional in nature. It is blatant racial discrimination of a group of people. Examples of explicit racism are:

- actions of hate groups such as neo Nazis, the Ku Klux Klan and white nationalists
- political parties that support racist policies and openly attack certain cultures

explicit racism negative actions towards members of a particular cultural group that are overt, such as a racial slur

- racial slurs, slang or derogatory terms to refer to a particular race
- supporting racism openly by talking negatively about particular cultural groups.

This type of racism is still very present in the world today. Even though it would be nice to think that this type of explicit and overt racism no longer has a place in Australia or anywhere around the world, further education and political changes are needed in order to reduce this type of prejudice.

CHALLENGE 19.2

Racism in Australia

Research online to investigate an incident of racism in Australia. Determine if the incident was caused by xenophobia, implicit racism, explicit racism or several of the options. As a class, discuss how racism can be reduced.

Changing attitudes and decreasing prejudice

Smith and colleagues (2002) suggested that the best way to be open to cultural diversity and to decrease prejudice is to increase contact with other cultures, be aware of different cultures and keep an open mind. Working together to better understand and communicate with those who come from other cultures is vital to educating individuals, increasing trust and decreasing the mystery of unfamiliar cultures.

In order to form new relationships, it can be useful to find commonalities between two cultures. Having said this, understanding the differences between the cultures can mean avoiding misunderstandings or frustrations that can build up due to lapses in communication between individuals. In Section 19.3, other factors that can decrease prejudice will be discussed to demonstrate ways in which individuals can act in order to overcome prejudices.

CHECK YOUR LEARNING 19.2

Describe and explain

1 **Describe** the two types of racism, using examples, and the key differences between them.

Apply, analyse and interpret

2 **Apply** your knowledge of the factors that can cause prejudice to analyse Case study 19.2b. Give a possible explanation of what factors may have led to this event.

3 **Compare** implicit racism with xenophobia.

4 **Contrast** ethnocentrism with explicit racism.

obook assess

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Check your learning 19.2
- **» Challenge**
  Worksheet: 19.2 Racism in Australia
- **» Suggested research**
  19.2 Prejudice displayed as racism
- **» Weblink**
  Xenophobia in Australia

19.3 Reducing prejudice

KEY IDEA

In this section, you will learn about:

+ ways to reduce prejudice, including intergroup contact, sustained contact, superordinate goals, mutual interdependence and equality.

The first step to reducing prejudice is to be open-minded and aware of the different factors that can decrease prejudice. Factors such as intergroup contact, sustained contact, superordinate goals, mutual interdependence and equality are all ways to decrease prejudice in its many forms, including racism. These factors allow differing cultures to increase their exposure to one another and therefore understand the basis of their respective cultures in more depth.

contact hypothesis prediction that increasing contact can reduce prejudice

Allport (1950) postulated the **contact hypothesis**, which states that increasing the interaction between groups that are in conflict can reduce prejudice. The reason for this is that by spending more time together, stereotypes and misconceptions can be broken down as individuals from different groups get to know each other. The factors mentioned not only suggest an increase in contact between groups that may be in conflict, but also key ways in which to improve cooperation and working towards similar goals in order to decrease prejudice.

sustained contact long-term interaction between individuals of different cultural backgrounds, which can reduce prejudice

Sustained contact

In addition to increasing contact with other races or with individuals, long-term contact can be more effective than many shorter bursts of contact in combating stereotyping. This increased duration of contact between those who hold the stereotype and those who have been stereotyped is called **sustained contact**. This can be achieved, for example, by having individuals from different cultures working together on a project or sharing a goal in a sustained fashion over a longer period of time.

FIGURE 1 Sustained contact with people you have stereotyped can decrease prejudice.

This extended contact will allow for individuals who hold a particular stereotype to get to know the other individuals better, and potentially dispel the held stereotype about the person or group of people, much like in the case of intergroup contact; however, sustained contact increases the chance of individuals finding out more about each other and, therefore, is able to decrease prejudice more effectively.

Intergroup contact

intergroup contact
increasing contact or exposure to a particular group of people can decrease prejudice

One way of decreasing the prejudice towards a particular group of people is to increase contact with that group. This is called **intergroup contact**.

Increasing contact with those we deem to be different from ourselves can reduce prejudice because it can increase the sharing between the two groups or two individuals, which in turn can increase the individuals' awareness of shared ideals, values and goals. By finding similarities between the two groups, the frustration or fear that one may feel about an unfamiliar culture may be reduced.

CASE STUDY 19.3

Reducing prejudice through intergroup contact

Cao, a researcher from the Queensland Brain Institute, reviewed research that suggests that when an individual observes someone in pain, there is greater activation in the sensory and emotion areas of the brain. Interestingly earlier research suggests that observing someone in pain who is the same race as you results in higher activation of the brain areas compared with observing someone from another race. Given these findings, Cao aimed to investigate if newly arrived immigrants to Australia would display this same racial bias when observing an individual in pain. Cao also wanted to see if this bias changed over time, as immigrants got to know the local people better as they spent more time in Australia.

Cao and colleagues (2015) chose 30 participants who had recently arrived from China to participate in their study at the University of Queensland. Participants were only recruited to the study if they completed their primary and secondary education in China and they had resided in Australia for less than five years.

The method utilised an fMRI to measure the brain activity of the participants while they observed videos of people from their own race or from another race receiving painful and non-painful stimuli. Additionally, rating scales and the level of contact participants had with those from different cultures from their own were recorded prior to the study commencing.

The results found were similar to those of previous research. Participants' brain activity increased when they observed individuals from their own race in pain. Another interesting finding was that the activity within an area of the brain called the anterior cingulate (an area in the brain that is thought to be associated with feelings of empathy) positively correlated with the level of contact participants reported having with individuals from other races. In other words, the more contact a participant had with people from other races, the higher their feelings of empathy towards those individuals. It is also interesting to note that the closeness or quality of the personal relationship did not affect the increase in empathy; simply being in contact with other races more often increased the strength of the correlation between brain activity and observations of pain. Therefore, Cao and colleagues concluded that racial bias can be decreased by increasing levels of intergroup contact, even if the contact is not particularly meaningful. It is simply the regularity of contact that can reduce prejudice, in this case in the form of neural activity.

SUGGESTED RESEARCH
19.3 Prejudice reduction through intergroup contact
Go to your obook assess »

SUGGESTED RESEARCH
19.3 Cultural diversity and implicit instructions
Go to your obook assess »

Superordinate goals

Superordinate goals are shared goals that are so big that no individual or single group could achieve success on their own. It requires cooperation from both groups of people in order to achieve the goal. These goals must be more important than lesser goals so that both groups find value in achieving the goal, which will mean that they are more likely to work together for mutual benefit.

superordinate goals
shared goals whereby members within one group cannot achieve the overall result without the help of the other group

In working together as members of a collaborative group, conflicts between the two groups may be reduced because it allows individuals to feel like they are part of the unified community rather than individual members of two separate groups. This sense of membership within a united group can mean that individuals who were initially part of the out-group can now be considered as part of the in-group; working together can also remove stereotypes as individuals get to know personal aspects of the individuals from the other group, which can decrease prejudice (Sherif, 1961). An example of superordinate goals and how these can decrease prejudice is seen in the 'Robbers Cave' case study (see Chapter 17). In terms of cross-cultural psychology, superordinate goals are often seen in terms of world politics.

FIGURE 2 During the Robber's Cave study, researchers used superordinate goals to reduce group prejudice and discrimination.

Study tip

Cross-cultural psychology builds on many ideas that were covered in chapters 11–17. Refer back if you need to.

Mutual interdependence

Sherif's (1961) 'Robbers Cave' study highlights another factor that can reduce prejudice, **mutual interdependence**, is where people depend on another person or group to meet their goals. In other words, if all the people involved in a project or activity have a shared vision and a shared goal, then it is likely that they will cooperate with each other in order to achieve those goals. For example, in a rugby league team there are people from many different races and age groups, but one thing they have in common is that they all want the premiership; they are all striving towards the same goal. In fact, they depend on each other to reach that goal. Therefore, by having a mutual dependence on the members of your group, this can increase the ability to work well and peacefully within the group.

mutual interdependence
when two groups must rely on each other to successfully complete a task

FIGURE 3 These soccer players have mutual interdependence on each other. They have to work together every game they play to increase their chance of winning.

Equality

equality (equal-status contact) contact between members of two different groups on the same level and with the same amount of power

Equality is also known as **equal-status contact**. This term suggests that social interactions need to occur where there is no power difference, and communication and actions are performed on the same level. In other words, if those who have prejudice against a particular group have more regular contact with that group, the interactions that exist must be on the same level, where one group cannot exert more power or dominance over the other.

Grack and Richman (1996) researched whether having equality in interactions between different groups would decrease previously held prejudices. Mix-race groups were formed in the work and home environments and as long as their interactions were on the same level (i.e. student to student or colleague to colleague rather than principal and student or manager and colleague), it increased an individual's understanding of the other group and decreased prejudice.

Cognitive approaches to reduce prejudice

cognitive approach changing thinking patterns to decrease prejudice

In addition to the contact hypothesis, another way to decrease prejudice is through cognitive approaches. **Cognitive approaches** are strategies to change the way people think rather than changing social interactions. These methods aim to decrease undesirable attitudes by asking a person to accept their prejudices but to reframe or to rethink their stereotypical notions, and question what they think. It can be done by using reconditioning, norms and accountability.

- Reconditioning involves educating individuals about the misconceptions in their biases or stereotypical ideas. Psychologists can use classical conditioning to reward behaviour from individuals who show an increased understanding of behaviour and reactions.
- Norms can educate an individual by letting them know that their prejudiced attitudes are not normal. This can decrease prejudice, especially if a person's friends don't agree with their prejudiced attitudes.
- Accountability suggests individuals who hold prejudice or act in a discriminatory way should be told they are doing so. Holding someone accountable for their behaviour and attitudes can actually decrease prejudicial thoughts and behaviours.

Therefore, apart from social aspects such as the contact hypothesis, cognitive strategies can also be used to decrease prejudice in some individuals.

CHALLENGE 19.3

Emotional display

Professor David Matsumoto works for the San Francisco University psychology department in the United States. His speciality is facial and emotional expressions and how these differ cross-culturally.

His recent research is based upon previous findings that there are differences across cultures in the perception of emotional expression. Matsumoto (2007) decided to extend upon this previous research by conducting three experiments. The aim of all three experiments was to test how well people can judge emotions from the faces of people from different cultures from their own. They were shown facial emotional expressions from Japanese and Caucasian photographs as part of the JACFEE set (Japanese and Caucasian Facial Expressions of Emotion). The participants were asked to match the photograph with a list of emotions and predict what the person in the photograph was about to do next. In the second and third experiment, the participants were told the nationality of the people in the pictures before they were asked to assess the emotions.

The results showed that, regardless of a person's nationality, all participants were able to accurately assess basic emotions on both the Japanese and Caucasian faces. They were able to do this whether or not they were told of the photographed person's nationality first.

Justify a possible implication of this finding on improving conflicts between cultures, and evaluate the study giving at least two strengths and two limitations.

CHECK YOUR LEARNING 19.3

Describe and explain

1 **Explain** the contact hypothesis and outline three factors that can reduce prejudice.

Apply, analyse and interpret

2 **Apply** the contact hypothesis to a real-life situation where you did not really like a person in your class, or perhaps in your sporting club, but one of the factors allowed you to get to know them better and decrease your prejudice towards the new person. **Describe** what factors were involved to change your relationship with that person.

Investigate, evaluate and communicate

3 **Evaluate** the Cao and colleagues (2015) study and suggest a possible improvement to their research method.

4 **Evaluate** the study of Matsumoto (2007) (Challenge 19.3) and establish its relevance to culture, cultural diversity and racism. Present your answer in an essay.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 19.3
- **Suggested research**
  Prejudice reduction through intergroup contact
- **Suggested research**
  Cultural diversity and implicit instructions
- Challenge
  Worksheet: 19.3 Emotional display

SCIENCE AS A HUMAN ENDEAVOUR

19.4 Changing history by increasing intercultural understanding

KEY IDEA

In this section, you will learn about:

+ The role of intercultural understanding n reducing conflict

Rosa Parks is often referred to as the mother of the civil rights movement in the United States. What she did may seem like such a small gesture, but back in 1955, it was possibly the most extreme and brave action anyone could have taken.

During the height of the segregation of 'Whites' and 'Blacks' in the United States, there was hostility between the African-American people, who were still often viewed as slaves, compared to the Caucasian settlers in the United States. The racism was so extreme that there were specialised white and black schools, black people had to move seats or stand on a bus if asked by a white person, and marrying someone from another race was frowned upon and in some states even illegal. Conflict was common between the blacks and the whites and the measures to keep the races apart did nothing to decrease conflict. In fact, the separation of the races increased the hostility.

On 1 December 1955, Rosa Parks boarded her normal bus in Montgomery, Alabama. She sat on a seat in the city bus, and when a white man asked her to surrender her seat, she refused.

Four days later, after she was arrested for her action (it was law to abide by segregation rules), waves of protesters ran through the street asking for equality for the races in the United States. Not once did Rosa raise her voice, not once did she raise her fist, she only silently protested the inequality she saw her people facing. After her arrest, black people, and many white people who were sympathetic to her cause, boycotted the city bus line for over a year.

The media and the government took notice after the protests, broadcasting more about individuals from African-American backgrounds on national television. This began to change the way white people viewed black people.

Martin Luther King Jr acted as the spokesperson for the bus boycott and he stressed that the protests were nonviolent. They conducted sit-ins, eat-ins and protests that were silent but showed a united goal. Thousands of people, both black and white, marched together in the protests with the aim of changing the racist laws of the United States and changing the perspectives of those in government so that equality could be garnered for the African-American people.

Rosa Parks exposed the characteristics of the African American people. In doing so, she increased the intercultural understanding in the United States and became a leader and a spokesperson for decreasing conflict between whites and blacks, and for achieving equality between the races. She is an example of how one person can make a big difference by increasing intercultural understanding. She made such a big difference that she was voted by *Time* magazine as one of the 100 most influential people of the twentieth century. Monuments such as the Rosa Parks Museum and the Rosa Parks Library are named in her honour.

FIGURE 1 Rosa Parks sitting at the 'wrong end' of the city bus in 1955 and refusing to move for a white man when requested by the bus driver

CHECK YOUR LEARNING 19.4

Describe and explain

1 **Describe** how increasing intercultural understanding can decrease prejudice and conflict, using the Rosa Parks example as evidence.

Apply, analyse and interpret

2 **Analyse** the following case study and **explain** why this solution may have decreased conflicts between the colleagues:

Mary and Steven work together in a big law firm in Australia. Mary is a native of Australia while Steven is originally from Egypt. They were tasked to work on a project together, but within two days, Mary had asked to be transferred because Steven kept trying to take over and would not listen to her perspective. The manager decided to invite the pair out for dinner with their families. Although Mary and Steven thought this was strange, they obliged and went out to share a meal together. Within a week of this informal gathering, the pair worked much better together and they seemed to be even catching up outside of home with their partners and children.

Investigate, evaluate and communicate

3 **Investigate** an example in Australia of how increased intercultural understanding with the Aboriginal and Torres Strait Islander peoples has led to changes in government policies and laws.

Check your obook assess for these additional resources and more:

- **Student book questions**
  Check your learning 19.4
- **Weblink**
  The civil rights movement
- **Weblink**
  Cultural understanding

CHAPTER 19

Review

Summary

19.1
- Culture shock can lead to a lack of integration by immigrants because it can overwhelm individuals due to the massive differences between cultures.
- Assimilation is the adaption of a new immigrant taking on all the aspects of the host culture and giving up their own.
- Acculturation is an immigrant living within a country and abiding by the laws and regulations, but holding onto their own cultural ideals at the same time.

19.2
- Cultural diversity can lead to an increase in exposure to unfamiliar cultures and to more diverse strategies and options for local residents at work, at home and with technology. It can also lead to conflict, especially if the ideas and values of the cultures are very different.
- Cultural diversity can give rise to xenophobia, racism and ethnocentrism and can increase hostility and lead to conflicts.
- Dunn (2004) showed racism in Australia and also how it can be decreased by increasing exposure to people coming from other cultures. His research established that the quality of the interactions doesn't matter; as long as there is increased contact, this will serve to decrease prejudice.

19.3
- Racism is negative actions geared towards those from a different group based on their race. This can include both implicit and explicit racism.
- Implicit racism includes unconscious or covert actions, whereas explicit racism is outward or overt racist action.
- The contact hypothesis is a prediction that outlines how prejudice can be minimised. It includes increasing the contact between groups of individuals, which in turn will increase understanding between the two groups of people.
- Prejudice can be decreased by increasing intergroup contact and ensuring sustained (long-lasting) contact, setting mutual goals that require cooperation from both groups (superordinate goals) that depend on them working with each other (mutual interdependence) and working at an equal power level (equality).
- Cao and colleagues' 2015 study is an example of contact hypothesis achieving its goal of decreasing prejudice in a real-life setting.
- Matsumoto (2007) used emotional displays that are universal for all cultures to show that reading others' emotional cues may be a useful way to understand people from other cultures and to decrease potential prejudice.

Key terms

- acculturation
- acculturation gap
- assimilation
- cognitive approach
- contact hypothesis
- cultural diversity
- culture shock
- discrimination
- equality (equal-status contact)
- ethnocentrism
- explicit racism
- immigration
- implicit racism
- intergroup contact
- mutual interdependence
- prejudice
- race
- racism
- resilience
- schemas
- stereotype
- superordinate goals
- sustained contact
- xenophobia

Revision questions

The relative difficulty of the short-answer questions is indicated by the number of stars beside each question number: * = low, ** = medium, *** = high.

Multiple choice

1 Superordinate goals:
- **A** are used to decrease prejudice between groups.
- **B** are shared goals that cannot be achieved without cooperation from both of the groups.
- **C** need a powerful leader to motivate both groups to achieve their goals.
- **D** will only be able to decrease prejudice if the groups already know each other.

2 Which is an example of explicit racism?
- **A** assuming someone with darker coloured skin may not be able to speak English
- **B** discriminating when choosing sports teams by excluding people who are from an Indian background
- **C** someone saying a racial slur under their breath as they pass an individual from a different nationality
- **D** seeing a Chinese name on a job application and putting that application in the rejection pile

3 Yingji and Peter work for the same place and have worked for the same amount of time doing the same job. Yingji earns $10 000 less per year than Peter. State what this example represents.
- **A** discrimination
- **B** judgment
- **C** prejudice
- **D** stereotype

4 Explain how multiculturalism can reduce racism.
- **A** by giving equal power and status to different cultural groups
- **B** by increasing exposure to different cultures
- **C** by increasing power to one cultural group and not the other
- **D** by recognising that some groups are better than others within the society

5 Identify a difference between assimilation and acculturation.
- **A** Acculturation involves a person losing their cultural ideals to a larger culture, whereas assimilation does not.
- **B** Assimilation involves completely integrating into a culture and losing original cultural ideals in order to live in the framework of the host culture, whereas acculturation does not.
- **C** Culture shock is only relevant to assimilation and not acculturation.
- **D** One is concerned with immigration and the other is only relevant to migration.

6 Jimmy and Saveen had large conflicts at school due to prejudice that had formed between the two of them as their cultural values are very different. The teacher decided to create a superordinate goal for the pair and assigned Jimmy as the leader and Saveen as the worker. Predict if this will decrease the current prejudice between the pair.
- **A** No, because superordinate goals only require one person to achieve the set goal.
- **B** No, because there is no equality in the role assignments for the goal.
- **C** Yes, because superordinate goals always decrease prejudice.
- **D** Yes, because Jimmy will be able to lead, and as a leader he must get to know Saveen better, which will decrease prejudice.

7 When Kelly doesn't get the job she applied for, she blames her lack of success on all of the 'immigrants that are taking over my country' for her lack of job opportunity. State what type of example this is (select all that apply):
- **A** inter-group conflict
- **B** cognitive approaches
- **C** racism
- **D** scapegoating

8 Which of the following may increase culture shock for an immigrant (choose all that apply)?
   A choosing to move to a new country for better job opportunities
   B not speaking the language of the host country
   C being forced to move from their home to a new country due to war or famine
   D being reunited with their family in the new destination

9 Rosa Parks can be identified as an example of:
   A feminism.
   B intergroup contact.
   C increasing exposure.
   D the mother of the civil rights movement.

10 Cultural diversity can cause conflict due to which of the stated reasons below (choose all that apply)?
   A increase in job opportunities for all
   B lack of understanding due to language differences
   C immigrants may be being employed due to their skill set, and locals are missing out on work
   D ideals or morals such as how to treat family members may be very different

11 What is cross-cultural research?
   A research that investigates the food aspects of a culture to better understand how this forms part of daily practice
   B research that deeply investigates one culture from the inside out
   C research that investigates more than one culture and compares them based on their similarities and differences
   D research that investigates more than one culture and what makes them cross

12 Identify the scenario that would be most useful in decreasing prejudice, based on the contact hypothesis.
   A asking individuals from different cultures to work together in a group once
   B asking individuals from different cultures to work together on a long-term project
   C asking individuals from different cultures to work in the same environment but on different goals
   D asking one individual to lead another individual from a different culture as they work together

13 Which of these is an example of the biological perspective for the formation of stereotypes?
   A Someone creates schemas about a group of people based on the behaviour of one person within this group.
   B Being exposed to the social environment where the individuals come from aids in the development of a stereotype.
   C Stereotyping against those who are unknown is an evolutionary advantage because it helps to protect those from the same race as you.
   D Time with another person from another race can increase the chances of stereotyping.

14 Which of the following can decrease prejudice (select all that apply)?
   A intergroup contact
   B mutual interdependence
   C separation and isolation
   D scapegoating

Short answer

Describe and explain

★ **15** **Explain** the difference between prejudice, stereotypes and discrimination.

★ **16** **Define** implicit racism and explicit racism, and **identify** one difference between the two terms.

★★ **17** **Describe** how a jigsaw activity in a school classroom can be used as an example of a superordinate goal.

★★ **18** **Identify** factors that can contribute to the formation of prejudice.

Apply, analyse and interpret

★ **19** **Analyse** the infographic in Figure 1 and identify the main reasons for immigration into Australia.

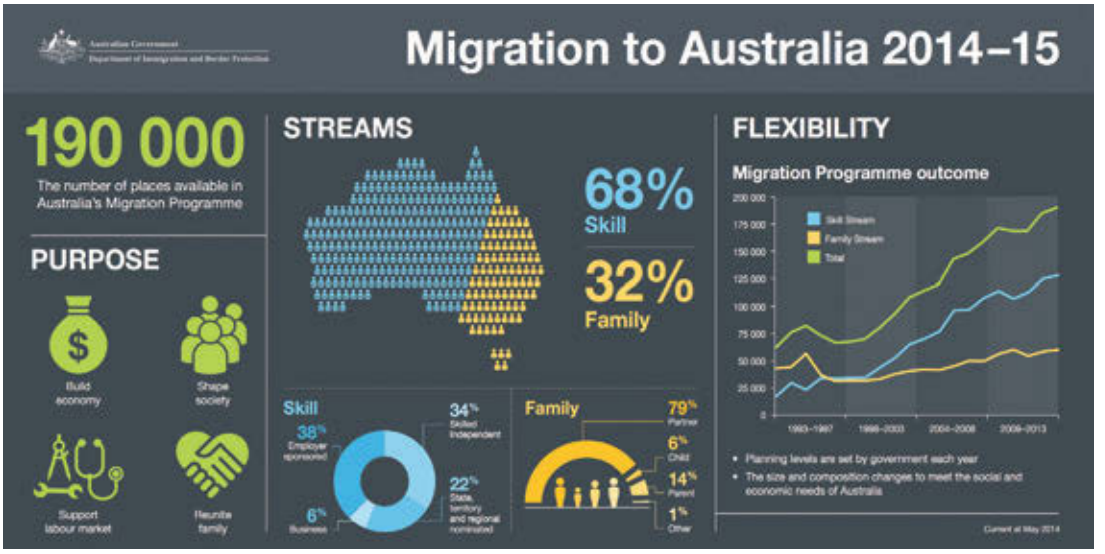


FIGURE 1 Australian migration statistics, 2014–15

★★ **20** Interview a member of your community from a different ethnic background from your own who was born overseas (this could be a student or a neighbour or teacher). **Identify** any challenges they faced when first moving to Australia.

★★★ **21** **Apply** your knowledge of factors that can be used to decrease prejudice, and write a proposal to your local government suggesting ways to decrease conflict in an area of the world (or your local community).

Investigate, evaluate and communicate

★ **22** **Investigate** the following question: 'Can members of a minority group be racist?' **Justify** your answer.

★ **23** **Investigate** racism in Australia today, and **identify** two to three government-initiated policies that aim to decrease discrimination and prejudice.

★ **24** **Discuss**, using evidence, the impact of offshore detention centres on the psychological adjustment of immigrants coming into Australia for humanitarian reasons.

★★ **25** **Evaluate** the study of Cao and colleagues (2015) and suggest one possible extension to their research.

★★ **26** **Evaluate** the study of Dunn (2004) and suggest a possible implication of this research on reducing prejudice in Australia.

★★★ **27** Research into social interactions and cross-cultural research generally rely on self-reported data. **Discuss** the use of questionnaires or surveys to obtain data, and **comment** on their reliability and validity.

★★★ **28** **Investigate** the following claim: 'Racism is inevitable in this day and age'. **Devise** a possible research question that could be used to investigate this claim.

Check your obook assess for these additional resources and more:

- **» Student book questions**
  Chapter 19 Review
- **» Revision notes**
  Revision notes for Chapter 19
- **» assess quiz**
  Test your understanding with this self-correcting multiple-choice quiz.
- **» Flashcard glossary**
  Key terms in Chapter 19

UNIT 4

Practice exam questions

Multiple choice

1 Dr. Smith has decided she is more interested in studying socialisation. She matches adults who are the same age, same gender and same socio-economic background to investigate the influence their parents had on them. Dr. Smith is using what type of design?

A matched participants
B repeated measures
C independent groups
D questionnaire

2 In a social psychology experiment, a psychology student deiced to drop a pile of books and papers in the middle of the school's cafeteria. They conducted two trials: one during a quiet time when few people were present, and then again during a busy lunchtime when many people were present. The student observed that during the busy lunchtime nobody came to her aid, whereas during the quiet condition someone quickly assisted her.

This is an example of:

A competence
B the bystander effect
C social norms
D altruism

3 The bystander effect is where the likelihood of someone helping is influenced by the number of bystanders present at the scene. Select the factors that can influence cause the bystander effect.

A diffusion of responsibility, audience inhibition, social influence, cost-benefit analysis
B acceptance of responsibility, audience inhibition, social influence, cost-loss analyis
C diffusion of responsibility, audience encouragement, social influence, cost-benefit analysis
D acceptance of responsibility, audience encouragement, social influence, cost-benefit analysis

4 An attitude is best defined as

A a positive or negative evaluation we make about others that changes over time
B a judgement we make on other people, objects, events or ideas that changes over time
C an evaluation of a person, object, event or idea that is learned and relatively consistent over time
D a positive or negative evaluation we make about others that is a result of genetics

5 According to the social and cognitive theories of attraction, people are more likely to be attracted to someone because of:

A facial symmetry, masculinity-femininity, genetics
B communication style, resurrection phase, grave-dressing
C closeness, shared interests, differences
D proximity, reciprocity, similarity.

6 Sherif's Robbers Cave experiment (1961) demonstrated that:

A boys tend to behave aggressively in competitive situations
B boys will follow an authoritative leader
C competition can reduce prejudice
D competition can create prejudice

7 Stephen is 55 years old, and has just been made redundant from his job as an electrician at Alcoa, which he has had for 35 years.

Although he has applied for many jobs since, he continues to be rejected. Stephen believes this is because of his age. If this is correct, the employers advertising for positions are showing:

A prejudice
B sexism
C an attitude
D ageism

8 Which of the following did Solomon Asch's experiments on conformity (1951) demonstrate?

A Individuals were more likely to conform when confederates were unanimous in their incorrect responses.
B Individuals are more likely to conform when in groups of people they know.
C Individuals were more likely to conform when one or more confederates gave the correct answers.
D Conformity decreased as the group size increase.

9 Georgia moved to the Gold Coast to attend university. Georgia is living on campus. Many people living on campus have also left behind their friends and family. This shared emotional connection is helping Georgia:

A develop membership
B fulfil her needs
C feel a sense of community
D assimilate

10 Shannon and his fiancé have moved to Sweden. They have found a group of 'ex pats' from Australia and England that they spend a lot of time with. This helps them to avoid culture shock as

A it educates them about Swedish culture
B it provides a community who have similar values and experiences
C aids in developing resilience
D they learn Swedish which makes assimilating easier.

Short answer

11 Jason enjoys eating healthy food because it helps him to perform as an elite athlete. Identify an example for each component of the tri-component model of attitudes to describe Jason's attitude towards food.

12 An exchange group from Mongolia has just started at your school. Many students at your school are unfamiliar with Mongolian culture, and so they have begun to show discrimination towards these new students. A year 10 student at your school, Serg, has found that the Mongolian students enjoy playing soccer. Serg has decided to organize a game of soccer, with mixed teams of Mongolian students and other students playing together. This involved training together over a period of three weeks before playing a game in front of other students.

Using your understanding of ways to prevent or reduce prejudice, explain why this idea of Josh's is likely to be effective at reducing discrimination towards the new Mongolian students. Use key psychological terms to justify your response.

13 Our decision to help in any situation can be dependent upon many factors, including cost-benefit analysis. Give an appropriate example of cost benefit analysis, and explain how this can influence someone's decision to help another person in an emergency situation.

14 **a** define social categorisation, social identification and social comparison
b compare how social categorisation, social identification and social comparison help an individual to form a social identity.

15 Charlie was raised in rural Queensland, and believes that everyone from Melbourne is snobbish and uncaring. Charlie has never been to Melbourne, but recently met someone from Melbourne and was reluctant to speak to the person and when he did have to speak with them, he said horrible things and refused to let them sit down.

a Differentiate between prejudice and discrimination with reference to Charlie's behaviour.
b There are several explanations for why prejudice occurs. Explain how the following two cultural influences impact prejudice.
- Lack of awareness
- Work ethic

CHAPTER 20

Research & practical manual

Part of studying psychology is researching previous studies as well as conducting your own experiments to investigate different phenomena and theories. This chapter provides examples of the mandatory practicals from Units 3 & 4 – any suggested practicals can be found via your obook assess.

Chapter 1 covered ethical considerations that you should be aware of when conducting psychological research and experiments. Understanding these considerations will help you evaluate the validity and reliability of research as well as ensure that you are being mindful of participants.

While these practicals act as a guide, it is the responsibility of teachers and schools to conduct their own ethical checks and risk assessments before conducting any of these practicals. No psychological research should be conducted without ethical consent. If you are under 16 years of age, you should consult with your teacher about gaining consent for the experiments.

Please note: before conducting an experiment that involves heart rate or food (or any other unusual activities), confirm that no participants have any pre-existing conditions that may pose a risk to them by their participation in the experiment.

FIGURE 1 Psychologists use research methods to understand the role of the brain.

UNIT 3 PRACTICALS

SUGGESTED PRACTICAL	**5.2** Expectation and perceptual set
SUGGESTED PRACTICAL	**7.6** Depth of processing and the retention of word in episodic memory
MANDATORY PRACTICAL	**9.1** The effect of learning environment on memory

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

UNIT 4 PRACTICALS

MANDATORY PRACTICAL	**17.1** The relationship between stereotypes and behaviour
SUGGESTED PRACTICAL	**18.2** Conversational distance and culture

Source: *Psychology 2019 v1.3 General Senior Syllabus* © Queensland Curriculum & Assessment Authority

9.1 MANDATORY PRACTICAL

The effect of learning environment on memory

CAUTION: Make sure you have considered ethical guidelines and have informed consent from all participants.

Unit 3, Topic 3: Use an experimental research design to investigate the effect of learning environment on memory, replicating aspects of the 1998 investigation by Grant *et al.*

Source: *Psychology 2019 v1.3 General Senior Syllabus*
© Queensland Curriculum & Assessment Authority

Context

The student of Grant and colleagues (1998) focused on context-dependent memory in order to test if learning environments affect memory. In particular, their aim was to identify the positive contributions context has on memory.

They used an experimental method and an independent measures design to test if having noisy or silent reading and testing conditions would affect several dependent variables, such as time it takes to read the text, performance on a multiple choice exam and performance in a short answer exam.

The sample consisted of individuals between the ages of 17 and 56 years (n = 39) with an average age of 23.4 years. Each participant was asked to bring in their own music device and headphones and the researchers provided the background noise (recording in a noisy university cafeteria at lunchtime) or silent soundtrack. The participants were then asked to read a two-page article on immunology before answering 10 short-answer questions and 16 multiple-choice questions. The short answers were asked first to ensure information from the article was being tested rather than recall of knowledge from the multiple choice test.

All participants were asked to wear headphones whether they were in the control (silent) or the experimental (background noise) conditions in order to control possible extraneous variables. As the participants read the article, researchers recorded the time it took for the participants to read the whole article from start to finish.

FIGURE 1 This study compares studying in silence with studying while listening to music and how this affects memory.

After a two-minute break, the participants were tested in either a silent or a noisy condition and given the short answer test followed by the multiple choice test. Some were asked to study in silent conditions and tested in noisy conditions and vice versa. Debriefing was given at the conclusion of the experiment.

The results showed that those who studied in silent conditions and were tested in silent conditions performed much better in both the short answer and multiple choice tests compared to when they were tested in a noisy environment. The same was true for those who studied in the noisy conditions: when tested in the same context (noisy) they studied the article in, they performed better in the tests.

The researchers concluded that context-dependent memory is supported, and studying and testing in the same environment can increase memory recall and performance on tests.

Aim

To determine if context-dependent learning can alter memory recall in students

Materials

- Informed consent form
- Music device (mobile phone, iPod, mp3 player)
- Head phones (or external speaker or noise cancelling headphones)
- Material for learning (see Appendix A)
- Test (see Appendix B)
- Standardised instructions
- Timing device
- Debriefing statement

Method

1. Recruit 10–20 participants from the same year level with an even mix of genders.
2. If participants are younger than 16 years old, ask their parents to sign an informed consent form; if they are older than 16, ensure participants complete the informed consent form prior to completing the experiment.
3. Present standardised instructions to all participants and hand out the test material for the students to learn.
4. Randomly allocate (by using names in a hat) half the participants to the testing in music group (Group 1) and the other half to the testing in silence group (Group 2).
5. Each individual in the experiment should choose their favourite song and put it on repeat for the duration of the experiment.
6. Participants are given 5 minutes to read the article while the music is playing on their individual devices. (If individuals do not have a device, an external speaker could be used to play music instead to all participants.)
7. Researchers remove the learning materials after 5 minutes.
8. The same test should be distributed to all participants (whether they are testing in silence or testing in music conditions). Depending on the random allocation in Step 4, instruct half of the students to turn off their music (Group 2) for the testing process and instruct the rest of the students to continue to listen to the same song on repeat as they complete the test (Group 1).
9. Ask each student to write their group number on the top of their answer sheets prior to commencing the test.
10. Each participant is given 5 minutes to complete the test. Researchers collect the test once the 5 minutes is completed.
11. Debrief participants and thank them for participating in the experiment.
12. Correct each test and collect the number of correct responses for each participant.

Analysis of results

1. Create a table like the following to collate the results:

Silent testing (___/10)	Noisy testing (___/10)
e.g., 8/10	

2. Using Excel, calculate the best central tendency (mean, median or mode) and dispersion (standard deviation, interquartile range or range).
3. Choose the appropriate inferential test for your data. (Keep in mind an independent measures design and the type of data collected.)
4. Calculate the inferential statistics using $p < .05$ and a one-tailed approach.
5. Create a graph of the means and measure of dispersion and write a sentence stating the inferential statistic.

Discussion

1 Suggest a possible rationale for why the current experiment was changed from the original experiment (Grant *et al*., 1998).
2 Explain the standard deviation for both groups and suggest which group showed more reliable results.
3 Decide if a conclusion can be drawn for this experiment.
4 Interpret your results and explain your results, using your knowledge of memory. (If they are opposite to what was expected, give reasons why this might be, in terms of experimental method errors).
5 Evaluate your study and suggest two ways it could be improved.
6 Evaluate the Grant and colleagues (1998) study, identifying two strengths and two limitations.

Appendix A

Learning material: Genes and attraction

Natural selection is an evolutionary process that aids in determining which genes are more likely to be passed on to offspring. The process suggests that individuals who have genes that are more beneficial to the survival of the species are more likely to mate, and therefore pass on those genes to the next generation (Wedekind, 1995). In terms of attraction, this means that stronger genes increase the likelihood of a mate selecting you and wanting to build a romantic relationship with you; this will increase the chances of those genes being passed down to the next generation.

Claus Wedekind (1995) investigated a specific set of genes that have been suggested as important in the process of attraction. The group of genes are collectively called the major histocompatibility complex (MHC) and are responsible for the formation and maintenance of the human immune system. These genes allow the immune system to detect pathogens readily and therefore decrease the chances of infection in humans. Genome research has found that the more diverse the genes are within the MHC, the higher the chances that an individual will have a stronger immune system (Wedekind, 1995). Therefore, according to biological theory of attraction, especially the evolutionary view, seeking a partner who has a set of genes within their MHC that is different from yours would be beneficial, as this would increase the diversity in the genes within the MHC of the offspring and thus give them the best chance of survival.

In order to support this hypothesis, Wedekind (1995) conducted the 'Sweaty T-Shirt Study' with the aim of seeing if women would be attracted to a man unconsciously based on just his natural scent, which can signal the uniqueness of his MHC. For the study, 93 students (49 females and 44 males) from the University of Bern, Switzerland were recruited and each participant was tested for the combination of genes present in their MHC. A wide variety of MHCs were included in the final sample, and women who were on oral contraceptives (which includes high levels of estrogen and sometimes progesterone) were recorded. The men in the experiment were asked to wear a T-shirt to bed for two nights and they were also given perfume-free washing detergent to clean their bodies, clothes and linens. They were asked not to use deodorants or after-shave, to avoid confounding variables in the experiment. In an attempt to control as many extraneous variables as possible, the men were asked to refrain from alcohol, tobacco and sexual activity, and also to avoid spicy or strongly flavoured foods. In the meantime, the women, where possible, were tested during the second week of their menstrual cycle, as their sense of smell would be the highest at this time, in efforts to control this variable to avoid it affecting the final results.

After the two days, the women were to smell seven T-shirts, each with a different combination of MHCs from the men. Out of the seven T-shirts, three of them came from men who had similar MHCs to the woman, three men with MHCs dissimilar to the woman and one of the T-shirts was unworn and acted as the control. Women were tested one at a time and every T-shirt and its associated odours was rated for intensity on a scale from 0 to

10, and T-shirts were also rated for pleasantness and sexiness (0 indicating unpleasant, 5 being neutral, and 10 being extremely pleasant).

The results of the experiment supported the evolutionary theory of attraction, with women consistently choosing MHCs that were dissimilar to their own. They scored male body odours as more pleasant when the MHC of the man was different from their own, and less pleasant when the MHC was more similar to their own. When asked, the women also suggested that the odours from the men who had dissimilar MHCs to themselves reminded them of their past relationships, which suggests that MHC genes may influence human attraction, or at least the action of choosing a mate.

The Sweaty T-Shirt Study supports the evolutionary view for attraction in humans, especially the notion that genes can influence the level of attraction felt for another person. This study was replicated in 2002 (Jacob *et al.*) and confirmed again in 2010 (Lie *et al.*).

Lie and colleagues (2010) extended the research of Wedekind by investigating MHC similarity and scores for facial attractiveness in females by males. Their study found that males who rated females with high facial attractiveness also had MHCs that were dissimilar to these women, again supporting the notion that mating with someone who has a different MHC increases the chances of the offspring having a stronger immune system and thus increases the chances of offspring survival. Furthermore, research from Beer and colleagues (1985), although outdated, does add further support for the evolutionary perspective to attraction. The research found that couples who suffer from repeated miscarriages were often sharing a high percentage of their MHC, which suggests that because of the decreased immunity due to the limited variation in the MHC genes, the offspring is less likely to survive.

In addition, this study has had somewhat of a cult following around the world. Recently at the 'Feast of Stenches' at the Secret Garden Party, Guerilla Science ran a version of the Sweaty T-Shirt Study, but with two males, a female and a primate. Interestingly, the same results were found, where those with the most different immune systems (as determined by DNA cheek swabs) were found to be the most attractive. Perhaps most interesting is that Hannah (the orang-utan) had the highest ratings for 'smelling good!' as her DNA was by far the most different from the other participants.

Appendix B

Test material

Group number: _____

1. What is the name of the process of evolution that can alter the number of organisms with certain variations?
2. Who created the Sweaty T-Shirt Study?
3. Complete the following sentence: Individuals preferred the smell of T-shirts that were _____ to their own smells more than T-shirts that smelled _____ to their own odour.
4. What are MHC genes responsible for?
5. In the Feast of Stenches, which smell was the most appealing to the most people?
6. Is having a different MHC from your partner a good or a bad thing?
7. How many males and females were tested in the original study in 1995?
   Males: _____
   Females: _____
8. Does this study support or reject the idea that genes are responsible for attraction?

17.1 MANDATORY PRACTICAL
The relationship between stereotypes and behaviour

CAUTION: Make sure you have considered ethical guidelines and have informed consent from all participants.

Unit 4, Topic 3: Use a correlational research design to investigate the relationship between stereotypes and behaviour by replicating the 1996 investigation by John Bargh, Mark Chen and Lara Burrows (Experiment 2).

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Context

Stereotypes are general categorisations of people who have similar characteristics in our environment. Often they are formed without conscious thought. They are generally a consequence of our experiences, but they can also be influenced by what we hear from others.

Bargh and colleagues (1996) decided to investigate the impact these stereotypes may have on the behaviour of participants who are exposed to the stereotypes. In their experiments, they utilised a stereotype of elderly individuals to see if they could influence university students' behaviours after being primed (or influenced) with stereotypes about the elderly.

Sixty psychology students were allocated to either the control or experimental groups. In the control group, the students were asked to complete a sentence scramble task, which included random words and phrases. In the experimental group, the participants were asked to complete a sentence scramble task that included words and phrases centred around slowness, which is a typical stereotype for older individuals as often the elderly move quite slowly. The dependent variable that the researchers were aiming to record was whether or not they could affect the speed at which they walk down the hallway after the experiment has 'concluded', by priming the students with an elderly stereotype. The researchers measured the number of seconds it took for the participants to walk down the corridor once they had been dismissed.

FIGURE 1 The elderly have many stereotypes directed towards them.

The results found that those who had been primed with elderly stereotypes walked significantly slower than those who were primed with just random words. This shows that social behaviour, in this case, the way people walk, can be affected by priming with stereotypes.

Aim

To replicate the second experiment by Bargh and colleagues (1996)

Materials

- Informed consent form
- Standardised instructions
- Timing device
- 30 scrambled sentences (priming condition – Appendix A)
- 30 scrambled sentences (no priming condition – Appendix B)

Method

1 Recruit 10–20 participants from the same year level with an even mix of genders.

2 If participants are younger than 16 years old, ask their parents to sign an informed consent form; if they are older than 16, ensure participants complete the informed consent form prior to completing the experiment.
3 Randomly allocate participants into either the control (no priming) or experimental (priming) group. Participants should be tested individually.
4 Ask the participant to unscramble the sentences for their group. Once they have completed it, debrief and thank them for their time.
5 A second researcher should be outside of the classroom, out of view, timing the participant walking down either a hallway or a pre-determined distance (in seconds).
6 Once the time has been recorded, catch up to the participant and debrief them properly with the true aim of the experiment.
7 Record all walking times for participants after completion of the sentence scramble task.

Analysis of results

1 Create a table for the collation of results.
2 Using Excel, calculate the best central tendency (mean, median or mode) and dispersion (standard deviation, interquartile range or range).
3 Choose the appropriate inferential test for your data. (Keep in mind an independent measures design and the type of data collected.)
4 Calculate the inferential statistics using $p < .05$ and a one-tailed approach.
5 Create a graph of the means and measure of dispersion and write a sentence stating the inferential statistic.

Discussion

1 Evaluate your methodology and come up with two improvements that could have increased the reliability or validity of your results.
2 Draw a conclusion for the experiment using the statistical analysis as a justification.
3 Explain if your results matched the original study and explain why or why not.
4 Apply the results of the study to your study habits. What could you change to improve your performance in the next exam?
5 Propose a research question related to the following claim given your understanding of context-dependent memory: 'Memory is infallible'.

Appendix A

Supporting material

Possible words that can be used for the priming condition (taken from Bargh *et al.*, 1996)

Prime words (Fr)	Prime words (Eng)	Neutral words (Fr)	Neutral words (Eng)
Inquiet	Worried	Présent	Present
Vieil	Old	Petit	Small
Solitaire	Lonely	Affamé	Starved
Gris	Grey	Blond	Blond
Egoïstement	Selfishly	Généreusement	Generously
Prudente	Careful	Rigoureux	Rigorous
Sentimental	Sentimental	Nerveux	Nervous
Sage	Wise	Bon	Good
Têtu	Stubborn	Chargé	Loaded
Courtois	Courteous	Ample	Ample
Isolé	Isolated	Brun	Brown
Oublieux	Forgetful	Déguisé	Disguised
Retraité	Retired	Différent	Different
Ridée	Wrinkled	Jaune	Yellow
Rigides	Ancient	Juriste	Jurist

Prime words (Fr)	Prime words (Eng)	Neutral words (Fr)	Neutral words (Eng)
Traditionnel	Powerless	Perplexe	Perplexed
Amère	Rigid	Connues	Known
Conservatrice	Traditional	Chaud	Warm
Tricot	Bitter	Verte	Green
Dépendant	Conservative	Empiriques	Empirical
Anciens	Old	Ricochet	Rebound
Impuissant	Relying	Grand	Tall
Crédule	Gullible	Occupé	Busy
Précaution	precaution	Arrivés	
Seuls	Alone	Statuette	Arrived
Canne	Cane	Skieurs	Statuette
Malade	Ill	Repas	Skiers
Repos	Rest	Rouge	Meal
Blanche	White	Bateau	Red
Home	Retirement house		Boat

Appendix B

List of no-prime sentences

Examples of scrambled sentences that can be adapted:

Scrambled sentences	Unscrambled sentences
. men office the in are Five working	Five men are working in the office.
? he yesterday did What say	What did he say yesterday?
? late are they Why today	Why are they late today?
they did the party When at arrive ?	When did they arrive at the party?
. The the in running girls park are	The girls are running in the park.
this teacher is ? your Who year	Who is your teacher this year?
. glass table a the on is There	There is a glass on the table.
. Three house dogs into ran the	Three dogs ran into the house.
fast running is How he ?	How fast is he running?
. drinks night coffee He at never	He never drinks coffee at night.
. on He bus is the travelling	He is travelling on the bus.
Is ? open big the window	Is the big window open?
your ? Are they brothers	Are they your brothers?
. tired feels today She	She feels tired today.
the are ? Where students other	Where are the other students?
do them like ? Why you	Why do you like them?
you Do day study? every	Do you study every day?
her she name remember ? Does	Does she remember her name?
. is expensive The very picture	The picture is very expensive.
. base The ran to from first player base second	The player ran from first base to second base.
. threw centre ball pitcher field the to from the Bob	Bob threw the ball to the pitcher from centre field.
game ! When batter the his hit a won team the homerun,	When the batter hit a homerun, his team won the game!
runs many score ? the did home team How	How many runs did the home team score?
. I the in inning last out struck of game the	I struck out in the last inning of the game.

Suggested research guide

Thinking critically about research is an important skill in Psychology. Please refer to Chapter 1, The psychology toolkit, for assistance in recognising valid and reliable research and interpreting statistical evidence. The table below provides a summary of all suggested research in the Senior Psychology syllabus. You will need to search for these articles yourself, using the skills suggested in the toolkit, such as referring to journals or university databases. Your obook assess features practical worksheets to help you with each suggested research.

When reading through research it is useful to consider the following:

- date of publication (i.e. is the research new or old?) and does the date affect the research (e.g. research on social media from 1980 would not be as relevant as research from 2010).
- location of research (i.e. was the research conducted in a specific country or area that might impact results?)
- the sample (i.e. does the sample reflect the whole population, or one part of the population? Can the results be generalised?)
- source of research (i.e. was this from a scientific journal?)

If you consider these as you read different studies and forms of research, you will find it easier to determine if it is credible research or not.

UNIT 3	
SUGGESTED RESEARCH	**3.3** Treatments for Parkinson's disease (e.g. clinical trials testing dopamine-precursor medications for Parkinson's disease in *The Lancet* 2014)
SUGGESTED RESEARCH	**3.3** Treatments for Alzheimer's disease (e.g. the significance of beta-amyloid deposits in Alzheimer's disease in Massachusetts General Hospital 2016)
SUGGESTED RESEARCH	**4.2** Feature detector theory (e.g. sensory processing in the primary visual cortex in Hubel & Wiesel 1979)
SUGGESTED RESEARCH	**5.3** The impact of culture on visual perception (e.g. cross-cultural pictorial depth perception in Hudson 1960)
SUGGESTED RESEARCH	**8.2** The role of the hippocampus in memory (e.g. the result of damage to the hippocampus in Corkin, Amaral, Gonzalez, Johnson & Hyman 1997)

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UNIT 4	
SUGGESTED RESEARCH	**11.6** The influence of social media in adolescent–peer relationships (e.g. identity formation, behaviours and relationships in Wood, Bukowski & Lis 2016)
SUGGESTED RESEARCH	**12.3** Obedience (e.g. the 'Shock the puppy' experiment in Sheridan & Kind 1972)
SUGGESTED RESEARCH	**12.3** Obedience and the authority gradient (e.g. the 'Hospital' experiment in Holfing *et al.* 1966)
SUGGESTED RESEARCH	**13.2** Cross-cultural altruism (e.g. kin selection in UK and South African students in Madsen, Tunney, Fieldman *et al.* 2007)
SUGGESTED RESEARCH	**13.3** Review the case study of Kitty Genovese (Gainsburg 1964) demonstrating Darley and Latane's (1968) model of bystander intervention.
SUGGESTED RESEARCH	**14.1** Temperature and aggression (e.g. hot temperatures, hostile affect, and hostile cognition, and arousal in Anderson, Deuser & DeNeve 1995)
SUGGESTED RESEARCH	**15.1** Biological attraction theories (e.g. partner selection based on genes expressed through body odour in Wedekind *et al.* 1995)
SUGGESTED RESEARCH	**15.2** Social and cognitive origins of attraction (e.g. the similarity–attraction hypothesis in Markey & Markey 2007)
SUGGESTED RESEARCH	**15.3** Relationship dissolution and media influence (e.g. navigating romantic relationships in social media in LeFebvre, Blackburn & Brody 2014)
SUGGESTED RESEARCH	**15.3** Attraction, relationship satisfaction and relationship dissolution (e.g. correlation between heterosexual and homosexual relationship satisfaction and stability in Gottman, Levenson, Gross, Fredrickson, McCoy, Rosenthal, Ruef & Yoshimoto 2003)
SUGGESTED RESEARCH	**16.2** Cognitive dissonance in forced compliance (Festinger & Carlsmith 1959)
SUGGESTED RESEARCH	**16.2** Cognitive dissonance in decision-making (Brehm & Cohen 1956)
SUGGESTED RESEARCH	**16.2** Cognitive dissonance in the significance of effort (Aronson & Mills 1959)
SUGGESTED RESEARCH	**17.2** Social identity theory in discrimination (e.g. 'A Class Divided' 1968 experiment by Jane Elliot in *A Class Divided: Introduction* 2003)
SUGGESTED RESEARCH	**17.3** Social identity theory in group prejudice (e.g. 'The Robbers Cave' 1964, 1958 and 1961 experiments by Muzafer Sherif)
SUGGESTED RESEARCH	**19.2** Prejudice displayed as racism (e.g. racism in Australia in Dunn 2004)
SUGGESTED RESEARCH	**19.3** Prejudice reduction through intergroup contact (e.g. racial bias in neural response to other's pain in Cao, Contreras-Huerta, McFadyen & Cunnington 2015)
SUGGESTED RESEARCH	**19.3** Cultural diversity and implicit instructions (e.g. emotional display rules in Matsumoto 2007)

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GLOSSARY

A

absolute threshold
the minimum level of energy required for a stimulus outside our body to be detected by our internal senses

accommodation
the process by which the ciliary muscles of the eye change the curvature of the lens to focus an image on the retina

acculturation
keeping the core values and ideas from the original culture while abiding by the rules of the adopted culture

acculturation gap
the difference that can arise between the level of assimilation of migrants compared to their children

acetylcholine
a neurotransmitter in the brain, spinal cord and peripheral nervous system involved in muscle contractions, learning and memory and REM sleep

achromotopsia
a lack of cone vision that causes people to see only black, white and grey

action potential
a momentary change in the electrical potential of a cell, which allows a nerve cell to transmit a signal or impulse towards another nerve cell

actor–observer bias
the tendency to explain our own actions by external factors, and explain the actions of others by internal factors

affective component of the tri-component model
how an individual feels about an attitude object

ageism
prejudice and discrimination on the basis of age (typically youth or elderly)

agent
a person or group that facilitates the process of socialisation; could be parents, family, peers, school or the media

age-related macular degeneration
a build-up of grainy deposits in the centre of the retina causing deterioration of central vision

aggression
a behaviour directed towards others that is intended to cause harm

alternative hypothesis
hypothesis that there will be a relationship between the independent and dependent variables

altruism
a prosocial behaviour that involves selflessness or helping others, even if there is nothing to be gained personally or if there is some personal cost

Alzheimer's disease
a disease that progressively destroys neurons in the brain, causing memory loss

ambiguous figure
a type of optical illusion that exploits visual similarities

amygdala
an almond-shaped structure, located in the medial temporal lobe of the brain that is central to emotion, aggression and implicit learning

antisocial behaviour
behaviour that is harmful to others and, ultimately, to the community (e.g., prejudice, aggression)

assimilation
adapting or fitting into a culture completely

association
a learnt connection between two (or more) objects or events – especially significant in classical conditioning

attitude
a learnt, stable and relatively enduring evaluation of a person, object, event or idea that can affect an individual's behaviour

attitude specificity
attitudes and behaviours are more likely to be congruent when the attitude is highly specific to the behaviour

attraction
the ability to evoke interest and attention

attractiveness halo effect
the theory that people who are physically attractive are assumed to have additional positive qualities

attribution
inferences we make about the causes of events or behaviours in order to understand social experiences

attribution theory
the theory that humans need to understand why people behave in certain ways, and there are two ways to explain behaviour: dispositional factors and situational attributions

audience inhibition
the reluctance of bystanders to help due to the perceived negative appraisals of others (or due to feelings of self-consciousness)

authoritarian
a style of leadership where the leader actively makes all decisions and has control over the group

authority
the power to order individuals to behave in a certain manner

autonomic nervous system
consisting of the parasympathetic and sympathetic branches and responsible for the communication between the body's non-skeletal (visceral) muscles and the internal organs and the glands that carry out bodily functions

aversion therapy
a form of treatment using classical conditioning to cause an undesired behaviour to create an unwanted response, thereby reducing the incidence of the behaviour

axon
the part of the neuron along which the electrochemical nerve impulse is transmitted

axon terminals
located at the end of the axon, it transmits messages to the next neuron by secreting neurotransmitters

B

basal ganglia
a set of structures involved in the control of movement, gathering and channelling information from different areas of the brain

behavioural component of the tri-component model
how a person behaves towards the attitude object

bias
an opinion or belief held about a thing or person

binocular depth cues
depth cues that use both eyes to gauge distance and space

biological theories of gender role formation
overarching theory that an individual's gender is predetermined by their biological sex: their genitals and reproductive organs

biosocial theory
a biological theory that states that gender roles are developed as a result of interaction between biological sex and socialisation

Bobo doll
a large inflatable plastic doll, approximately 1.5 metres tall, designed to spring back upright when knocked over, used by Albert Bandura in his research on social learningbiological theories of gender role formation

Broca's area
the speech production centre of the brain

bystander effect
the likelihood of bystanders helping is influenced by the number of bystanders at the scene

bystander intervention
the act of a person voluntarily helping someone else

C

camouflage
where the Gestalt principle of figure-ground is used to 'blend' the contour of the figure (which usually stands out) against the ground (background), making it more difficult to see

carpentered world hypothesis
a theory applied to the Müller-Lyer illusion that proposes that our familiarity with the right angles and straight lines of the built environment informs our interpretation of linear perspective in pictorial depth perception

cataracts
cloudy spots in the lens that cause vision to become blurred when proteins in the lens break down

central executive
the functional component of working memory that is responsible for switching attention from task to task, deciding what material is to be retrieved from or committed to long-term memory and for performing calculations and making linkages

central nervous system
comprises the brain and spinal cord; the CNS controls the body by processing and responding to sensory input from the peripheral nervous system

cerebellum
the area of the brain responsible for coordinating and remembering smooth, well-sequenced movements

cerebral cortex
the multi-layered outer surface of the cerebrum responsible for receiving information from the environment, controlling our responses, and allowing complex voluntary movements and higher order thinking processes

cerebrum
the part of the brain most responsible for voluntary movement and complex thought processes, such as perception, imagination, judgment and decision-making

chunking
the process of grouping items together to improve memory capacity – especially short-term memory as a means of committing to long-term memory

classical conditioning
whereby an animal or other organism can passively learn to show a naturally occurring reflex action, such as salivation, in response to any stimulus – learning through association; also known as Pavlovian conditioning

closure
when an object is perceived as being whole despite actually being incomplete

cognitive approach
changing thinking patterns to decrease prejudice

cognitive component of the tri-component model
how a person thinks about the attitude object

cognitive dissonance
the theory that emphasises a person will feel uncomfortable and try to maintain an internal consistency and agreement between their beliefs and behaviours by altering beliefs to match behaviours

cognitive origins of attraction
the theory that our perception and interpretation of a potential mate is what attracts us

collectivism
prioritises the whole community as a collective over the individual

collectivist culture
priority of society's goals as a whole are emphasised above personal goals

colour vision deficiency
a genetically inherited disorder affecting how people perceive colour

communication
verbal and non-verbal expression between individuals

community
a group of people with common characteristics

competence
an individual's ability to respond effectively to a situation or to perform a task successfully

compliance
a change in people's attitudes publicly, but not privately, so that they are more likeable in their group

conditioned response (CR)
an automatic response developed by being trained to respond to a typically neutral stimulus (classical conditioning)

conditioned stimulus (CS)
a previously neutral stimulus that is associated with the unconditioned stimulus and eventually causes a conditioned response (classical conditioning)

cones
the photoreceptors providing clear vision in colour; they work in bright light

confidentiality
participants must not be identified in any way in terms of test results, their involvement in the study or any other confidential data

confirmation bias
tendency to search for, recall and interpret information to suit already held beliefs

conformity (community)
behaving in a similar way to those around you that is socially acceptable within the social group

conformity (obedience)
behaviour, beliefs and actions that comply with a group's behaviour, beliefs and actions

confounding variable
a variable other than the independent variable that has a systematic effect on the value of the dependent variable; if a confounding variable exists, no valid conclusions about the research can be drawn

congenital visual disorders
visual disorders present at birth

consolidation
process in which the brain forms a permanent representation of memory cued recall recalling assisted by clues, not involving the original items to be retrieved; for example, being given an individual's initials to assist recall of their name

contact hypothesis
prediction that increasing contact can reduce prejudice

context-dependent cues
cues to assist retrieval from long-term memory, due to the external environment in which learning took place

control group (C-group)
the group of research participants not exposed to variations in the independent variable; the results are compared with the experimental group so that the effects of the independent variable can be determined

controlled observation
observation of voluntary behaviours within a structured environment such as a laboratory

convenience sampling
using whoever is available at the time of research

convergence
a binocular cue for depth perception; the automatic turning of the eyes inwards as we watch an object approaching

corpus callosum
the band of neural fibres that connects the right and left cerebral hemispheres

correlation
a statistical measure of the strength and direction of the relationship between two variables; does not show a cause-and-effect relationship, but describes the way in which the variables vary in relation to each other

cost-benefit analysis model
a model of behaviour that suggests that when bystanders are confronted with emergencies, they weigh up the pros and cons of providing help compared to those for not helping

counterbalancing
a method for controlling order effects in a repeated measures design

cued recall
recalling assisted by cues not involving the original items to be retrieved; e.g. being given an individual's initials to assist recall of their name

cultural dimensions
used to group cultures into categories based on values and overall beliefs

cultural diversity
the many cultural, racial and ethnic groups in a society

cultural norms
shared rules set by a specific group to guide behaviour

cultural perspective
psychological investigation that considers the culture from which an individual came in order to explain behaviour

culture
a collection of ideals, values, belongings and ethics that belong to a group of people and are passed on from generation to generation

culture shock
being placed in a new country that has a very different set of ideals or values from your own, and feeling overwhelmed by the differences between the cultures

D

debriefing
the experimental process in which, after the experiment, subjects are told of the purpose of the research, and any deception is explained; a vital ethical component of any psychological research

deception in research
only permitted if the results would be confounded if the participants had too much information before participating in the study; the researcher must ensure that there is no distress and the research must cease immediately if distress occurs

declarative memory
a long-term memory store of personal experiences (episodic) and facts (semantic)

deindividuation
a sense of anonymity and loss of individuality that comes from being in a situation where individuals can't be identified personally; individuals are more likely to commit antisocial acts

democratic
a style of leadership where the leader negotiates decisions with the group

dendrites
a component of a nerve cell that receives information from other nerve cells and transports this information to the cell body

dependent variable (DV)
the property that is measured in psychological research, to look for effects of the independent variable

depth perception
the ability to accurately judge three-dimensional space and distance, using cues in the environment

diffusion of responsibility
the idea that bystanders are less likely to take responsibility for helping in the presence of others

discrimination
prejudice expressed through behaviour

discriminative stimulus
in operant conditioning, Skinner's term for the pre-condition that indicates that behaviour will be reinforced

dispositional attribution
the assumption that behaviour is due to internal or personal factors

DNA
genetic information that is inherited from your parents

dopamine
a neurotransmitter involved in thoughts, feelings, motivation and behaviours

double-blind procedure
the method of allocating participants to groups so that both the experimenter and the participants are unaware of who is in the E-group or the C-group

Duck's model of relationship dissolution
a theory addressing the stages of a breakup including five phases: intrapsychic, dyadic, social, grave-dressing and resurrection

E

echoic memory
auditory memory in the sensory memory register

ecological validity
the accuracy of the data in a natural environment

effective punishment
punishment administered in such a way as to reduce the likelihood of the behaviour recurring

effort justification
a special case of cognitive dissonance where the inconsistency experienced makes the person go to considerable effort to justify the achievement of a relatively modest goal

elaborative rehearsal
a process by which we give meaning to information and link it to other information in our memories

empathy
the capacity to understand and respond to the distress of emotions of others, which often leads to prosocial behaviour

encoding
the process of putting information into a form that will allow it to fit with your personal storage system

encoding specificity principle
the associations formed at the time of encoding new memories will be the most effective retrieval cues

epinephrine
a neurotransmitter and hormone involved in stress responses

episodic buffer
a theoretical component of working memory that acts as both a bridge and a filter= (for auditory and visual information) between long-term memory and the central executive and storage components in working memory

episodic memory
long-term memories of episodes or experiences in your life

equality (equal-status contact)
contact between members of two different groups on the same level and with the same amount of power

equity
equal investment in the relationship from both parties

ethnocentrism
valuing one's own ethnicity or culture more than others, and acting with prejudice towards other groups or people

evolutionary advantage view
the theory that suggests the reason why symmetry in facial characteristics is so attractive is because symmetry suggests good health

excitatory synapses
cause the target cell to become excited and more likely to fire and cause an action potential

experimental group (E-group)
the group of research participants exposed to the independent variable; the results are compared with the control group so that the effects of the independent variable can be determined

experimenter effect
the outcome of an experiment being influenced by the person conducting the experiment

explicit attitude
attitudes that individuals are open about and that are aligned with their behaviour

explicit memory
memories of facts, names, images and events; also called declarative memories

explicit racism
negative actions towards members of a particular cultural group that are overt, such as a racial slur

extinction
the response is extinguished after being shown several times without reinforcement

extraneous variable
a variable other than the independent variable that could cause changes in the value of the dependent variable

F

feature detectors
cells in the optic nerve that individually respond to lines of a certain length, angle or direction to break up an image for visual perception

fight-flight-freeze response
a physiological response to stress that causes an organism to react in a combative manner (flight), by removing itself from the situation (flight), or by not reacting at all (freeze)

figure-ground organisation
a Gestalt principle of perceptual organisation wherein images are organised into the central object of attention (figure) and a background (ground)

floaters
clumps of matter that appear as small specks or spots in central vision

free recall
recalling as much information as possible in any order, without cues

frontal lobe
the largest lobe of the brain; has several functions, including initiating movement of the body, language, planning, judgment, problem-solving, aspects of personality and emotions; extremely well developed in higher order mammals

fundamental attribution error
when people place too much emphasis on dispositional attribution, and too little emphasis on situational attribution

G

GABA (gamma-amino butyric acid)
an inhibitory neurotransmitter imbalance of GABA is implicated in severe anxiety disorders; also involved in arousal and sleep

gender
a socially and culturally constructed idea of what male and female are; this can include, but is not limited to, personality traits, social behaviours and physical appearance

gender constancy
achieved at the age of 5, where children realise that sex is a fixed state that will not change; they also realise that if someone's appearance or behaviour changes, this does not make them a member of the opposite sex

gender identity
achieved around 2–3 years of age, where a child recognises and labels themselves as a boy or a girl

gender schema
a mental representation of what it is to be male or what it is to be female, typically based on stereotypes

gender schema theory
a theory of gender role formation that people build over time that provides information about how a male or female should behave

gender script
gender roles and behaviours that children come to consider as normal, based on their observations of everyday life

gender stability
achieved around 3–4 years of age, where a child realises that their sex will not change over time

General Aggression Model (GAM)
a social-cognitive theory of aggression that suggests that exposure to violent video games increases the likelihood of perceiving a situation as aggressive

genes
a portion of your DNA that codes for a particular characteristic

Geschwind's territory
area of the brain that provides a connection between Broca's area and Wernicke's area

Gestalt principles of visual perception
used to organise and interpret perceptual stimuli; including figure–ground organisation, closure, similarity and proximity

glaucoma
a disease affecting the optic nerve that interferes with the transmission of peripheral visual information to the brain

glutamate
an excitatory neurotransmitter in the brain involved in learning

group
two or more people who interact over a period of time, have influence on each other and share a common goal

groupthink
the tendency of a group to make decisions based on maintaining group cohesion rather than by critically analysing the realities of the situation

H

height in the visual field
a monocular depth cue that shows depth by portraying objects further away as being closer to the horizon

hippocampus
a finger-sized curve structure that lies in the medial temporal lobes; responsible for consolidation of explicit memories and acts to transfer these to other parts of the brain for storage as long-term memory

homeostasis
the state of balance in the body's metabolism

hostile aggression
emotion, impulsive aggression that is a reaction to pain or distress

hostile attribution bias
the tendency to interpret the behaviour of others as having aggressive intent, even when it may be accidental or ambiguous

hostile perception bias
the tendency to interpret social interactions as aggressive instead of pleasant events

HPA axis
a major neuroendocrine system that includes the hypothalamus, pituitary gland and adrenal gland; these structures interact through a feedback system to regulate a number of functions such as a person's digestion, immune system, mood, emotions and their responses to stress

hypothalamus
a structure in the forebrain that plays a major role in controlling emotion and motivated behaviours such as eating, drinking and sexual activity

hypothesis
a prediction of the outcome of research stated in terms of the influence of changes in the value of the independent variable on the value of the dependent variable

I

iconic memory
a sensory register for the fleeting storage of visual information, it lasts about 0.3 seconds and explains why we can see a moving picture from a series of still photos

identification
a change in people's attitude and behaviour because they are influenced by someone and relate to the content of the attitude

illusion
a phenomenon in which perceptions consistently differ from objective reality

immigration
the act of moving to a new country to find a new home

implicit attitude
involuntary, uncontrolled or unconscious attitudes that individuals are often unaware they hold, even though they may influence their behaviour

implicit memory
memories of skills, emotions, preferences and dispositions; also called procedural or non-declarative memories; processed in the amygdala and possibly the cerebellum

implicit racism
negative actions towards members of a different cultural group that are covert and often unconscious or concealed

impossible figure
a type of optical illusion involving a two-dimensional figure which people interpret as three-dimensional

independent groups design
allocates participants to E-group or C-group at random; also known as 'between participants design'

independent variable (IV)
the variable that is manipulated by the experimenter who then measures resulting changes in the dependent variable

individualism
prioritises the individual over the whole community

individualist culture
the importance of oneself achieving goals is prioritised over the needs of society

influence
convincing individuals to do something that you want them to do

informational influence
the increased likelihood that an individual will confrom when they do not believe that have the same ability as others to provide a correct response

informed consent
the ethical basis for psychological treatment or experimentation requiring that the subject (or client) is fully aware of all procedures and their likely and possible effects, and participates on a voluntary basis

in-group
a group of people with a shared interest, identity or beliefs

inherited visual disorders
visual disorders passed down from parents to children due to genetic factors

inhibitory synapses
cause the target cell to become inhibited and less likely to fire and cause an action potential

instrumental aggression
aggression that is deliberately planned

intergroup contact
increasing contact or exposure to a particular group of people can decrease prejudice

internalisation
a change in people's attitude and behaviour because they have taken on a new attitude and have taken this into their belief system

interposition
a monocular depth cue, in which objects further from the observer are partially obscured by those in the foreground

interpretation
stimulus is given meaning in the brain based on our past experiences, motives, values and context

intersex
an individual who is born with both male and female, or ambiguous, genitals and reproductive organs

L

laissez-faire
a style of leadership where the leader does not actively make any decisions, and lets the group control themselves

levels of processing model of memory
a model of memory that suggests that memory comprises a continuous dimension in which memory is encoded, related to the ease with which it can be retrieved: the deeper the processing of information, the greater the chance of it being retrieved

light energy
the visible part of the electromagnetic spectrum

limbic system
structure of the brain consisting of the amygdala, hypothalamus and midbrain; implicated in memory, emotion, behaviour and motivation

linear perspective
a monocular depth cue that parallel lines appear to converge as they retreat into the distance

localisation of function of the brain
specific parts of the brain are responsible for different functions

long-term memory
the information is encoded and stored, and as long as you know enough about the information, the information can be retrieved

M

maintenance rehearsal
a strategy for keeping information in short-term memory or for moving it into long-term memory by simply repeating information over and over

matched participants design
a subject-selection procedure that attempts to eliminate confounding variables by 'matching', on key characteristics, each individual in the experimental group with an individual in the control group

mean
the average of all the scores, calculated by adding up all the scores and dividing that total by the number of scores

median
the middle number (or mean of the two middle numbers) of a number series listed in numerical order

membership
inclusion in a group or society of people and a sense of belonging

mental representation
a cognitive process where information is stored in memory for later retrieval and use

mere exposure effect
a psychological phenomenon that predicts individuals who spend more time with someone and become more familiar with them will prefer them over other people with whom they have not spent as much time

method of loci
a mnemonic that focuses on visualisations to strengthen memory

mnemonics
a strategy or method that can be used to improve or strengthen memory

mode
the most commonly occurring score in the dataset

modelling
when a person copies the behaviour or attitude demonstrated by another person

monocular depth cues
depth cues that use one eye independently or both eyes together to gauge distance and space

monosynaptic reflex arc
a reflex arc made up of only two neurons (one sensory and one motor)

mood
an emotional state that can affect our perceptions, thoughts and behaviours

motor neurons
neurons that communicate messages from the central nervous system to the particular muscles that an organism intends to move at any particular moment; also known as efferent neurons

multiculturalism
where individuals from many cultures coexist and live by one set of rules for all

multi-store model of memory
a model that suggests that memory is comprised of three memory stores: a sensory store, a short-term memory store and a long-term memory store

mutual interdependence
when two groups must rely on each other to successfully complete a task

myelin
a white, fatty, waxy substance that coats some axons and insulates them, protecting them from electrical interference from other neurons; this increases the efficiency of transmission of nerve impulses

N

naturalistic observation
observation of voluntary behaviours occurring within the subject's natural environment

natural selection
mechanism for evolution that can predict the likelihood of survival based on an organism's phenotype

negative reinforcer
the removal, reduction or prevention of an unpleasant stimulus in response to a behaviour, increasing the likelihood that a behaviour will be repeated

negative vicarious reinforcement
where an individual witnesses another being punished for a behaviour so discontinues that behaviour themselves

neurons
nerve cells, responsible for communication within the body

neurotransmitters
chemicals that help communication across nerve synapses

neutral stimulus (NS)
something that causes a response (classical conditioning)

norepinephrine
a neurotransmitter and hormone involved in stress responses, alertness, arousal, emotional regulation and attention

normative influence
the tendency of people to agree with a group so that they fit in

null hypothesis
hypothesis that there will be no significant difference between groups; any difference observed is caused by error

O

obedience
where an individual or group behaves in a certain way on the orders or rules set down by a figure of authority

observational learning
where a person learns by watching the behaviour demonstrated by another

occipital lobe
the cerebral cortex at the rear of the brain; the location of the primary visual cortex and association areas involved with integration of visual stimuli

operant conditioning
a type of learning in which behaviour becomes controlled by its consequences

operationalisation
quantification of a variable

optic nerve
the two tracts of neurons that transmit visual information from the eyes to the occipital lobes of the brain

organisation
sensory information reaches the brain and is reorganised so we can make sense of it

out-group
people or groups that exist outside of someone else's group

P

parasympathetic nervous system
a branch of the autonomic nervous system, responsible for maintaining our day-to-day functioning and for most of the automatic functions of the body such as digestion, heart rate, breathing and some glandular functions

parietal lobe
the location of the primary somatosensory cortex in the brain; enables a person to perceive their own body and where things are located in their immediate environment

Parkinson's disease
a progressive neurological condition, known to affect the control of movement

Pearson product moment correlation
a measure of the strength of the linear relationship between two continuous variables

perception
the process whereby the brain organises and interprets sensory information

perceptual bias view
a theory that states the reason why symmetrical faces are more attractive is because the visual centres of the brain find symmetrical information easier to process

perceptual compromise theory
an explanation for the Müller-Lyer illusion, proposing that we perceive the line with feather-tails as being longer than the arrow-headed line because our minds apply the Gestalt principle of closure

perceptual constancies
the tendency to maintain a stable perception of a stimulus, although the properties of the image on the retina may change

perceptual set
a predisposition to attend to certain aspects of the visual scene, or to interpret stimuli in a particular way, according to certain preconceptions

peripheral nervous system
communicates information from the body to the central nervous system (e.g., aches and pains) and to the body's organs, glands and muscles

phenotype
the physical representation of what your gene codes for (e.g., brown hair, blue eyes)

pheromones
a chemical substance released by the body that can affect other people

phonological loop
a storage system for auditory information in working memory

photoreceptors
a layer of specialised nerve cells that detects visual stimuli; they make up the retina located at the back of the eye and convert (transduce) visual light energy (electromagnetic radiation or light waves within our visual spectrum) into electrochemical energy (nerve impulses)

physical attractiveness
attributes that can be seen on the exterior of a person that draws people to that person

pictorial depth cues
a monocular depth cue used by artists to create a three-dimensional perception of something that exists on a two-dimensional surface

placebo effect
participants' behaviour that is influenced by their expectations of how they should behave, caused by the belief that they have received some treatmentPearson product moment correlation

pluralism
where two or more cultures coexist, each holding on to their own set of rules, traditions and rituals but both in the same geographical location

polysynaptic reflex arc
a reflex arc made up of multiple neurons, with one or more interneurons connecting the sensory and motor neurons

Ponzo illusion
an illusion where people perceive two lines of the same length as different

population
the group of people about which we wish to draw conclusions

positive reinforcer
a consequence that strengthens a response by providing a pleasant or satisfying outcome, increasing the likelihood that a behaviour will be repeated

positive vicarious reinforcement
where an individual witnesses another being rewarded for a behaviour and decides to act in the same way

postsynaptic neuron
a neuron that receives information from another neuron

power
a person has power if they can influence the thoughts or behaviour of others

prefrontal cortex (PFC)
part of the cerebral cortex that connects brain regions that are involved in the processing and production of emotion

prejudice
an unfavourable attitude towards a group of people

presbyopia
a condition that develops as the lens loses elasticity and causes difficulties in focusing on objects that are close

presynaptic neuron
a neuron that transmits information to another neuron

primary auditory cortex
located in the upper part of the temporal lobe; receives sounds from the ears

primary motor cortex
located at the rear of each frontal lobe; responsible for movement of the skeletal muscles of the body

primary socialisation
the process of learning the beliefs, customs and appropriate behaviours of a group during the early stages of life, typically from parents and close family members

primary somatosensory cortex
located at the front of each parietal lobe; processes sensations such as touch, pressure, temperature and pain

primary visual cortex
located in the occipital lobe; processes information from the eyes

proactive interference
when previously learnt material inhibits our ability to encode and store new material

procedural memory
one aspect of implicit memory; memory for how to perform particular tasks, skills or actions

prosocial behaviour
helping behaviour that benefits other people and society in general

proximity
the individual parts of a stimulus pattern are close together, allowing those parts to be perceived visually as a whole

proximity (social theory)
the physical closeness to another person

punisher/punishment
any event that reduces the likelihood of a particular response occurring over time

R

race
the grouping of people based on common descent

racism
negative emotions or actions towards someone based on their race

random allocation
a subject-selection procedure where all participants who have been selected for an experiment have an equal chance of being in the E-group or C-group

random sampling
a sampling procedure in which every member of the population has an equal chance of being selected

range
the difference between the highest score and the lowest score in the dataset

recall
retrieval of stored information using minimal cues

reception
stimulus energy is collected by the sense organ

receptive field
a particular region of the visual space

reciprocity
how much each person in a relationship is giving to the relationship; satisfaction increases when each person gives the same amount of effort

reciprocity principle
the social expectation that you will respond in kind to someone who has helped you or done you a favour

recognition
a process of retrieval that requires identification of a correct response from a set of alternatives

reflex
simple, automatic response to a sensory stimulus

reinforcer
a stimulus that encourages the likelihood of a response

relationship
the connection between two or more people

relationship dissolution
the ending of a relationship initiated by at least one partner in the relationship

relative size
a monocular depth cue based on our tendency to perceive the object producing the largest retinal image as being the nearest, and the object producing the smallest retinal image as being the farthest

relearning
learning again something that has already been committed to memory; the most sensitive measure of retention

reliability
the extent to which a measure could be expected to produce the same result with the same subject(s) under the same conditions on other occasions

repeated measures design
a subject-selection procedure where each participant is part of both the E-group and the C-group

reproductive fitness
a measure of how likely a person is to pass their characteristics to the next generation

resilience
the ability to cope with a difficult situation using mental strategies

response cost
a form of punishment that occurs when something desirable is removed (e.g., removing a mobile phone if misused)

retinal disparity
the binocular depth cue that arises as the brain compares and contrasts the two slightly different images obtained because of the distance between the two eyes

retinal ganglion cell
a type of neuron that is located near the surface of the retina; visual information from the photoreceptors is received by the retinal ganglion cells

retinis pigmentosa
a genetic degenerative disease affecting the retina

retrieval
the process of getting information back from long-term memory to be used in working memory

retrieval cues
mental reminders or prompts that we create to assist our recollection later on

retrieval failure theory
inability to retrieve material due to an absence of the right cues or a failure to use them

retroactive interference
when newly acquired material inhibits our ability to retrieve previously learnt material

rods
the photoreceptors providing peripheral vision in black and white; they work in dim light

S

sample
the members of the population who have been chosen to take part in the research

scapegoating
blaming a person or group for a negative action, event or result

schemas
mental representations of categories

scientific method
a logical process of problem-solving applied in all sciences

secondary socialisation
the process of learning the beliefs, customs, and appropriate behaviours of a group via teachers, extended family, friends and the media

selection
the process of selecting the important sensory information on which to focus attention from the millions of stimuli we receive

self-serving bias
a tendency to view ourselves more favourably than others in the same position

semantic memory
memory for facts or general knowledge

semantic networks
the idea that items in long-term memory are stored in a hierarchic pattern of nodes with links between related nodes

sensation
the process whereby our sensory organs or receptors receive information about the environment and transmit it to the brain

sensory memory
a store for incoming, fleeting sensory information

sensory neurons
neurons that carry information from the body and from the outside world into the central nervous system; also known as effector neurons

serial recall
recalling information in the order in which it was presented

serotonin
a neurotransmitter in the brain involved in the regulation of mood, sleep, eating, arousal and pain

sex
determined by the biological chromosome makeup expressed through an individual's reproductive organs, genitals and other physical characteristics

sexism
prejudice and discrimination on the basis of an individual's sex

shape constancy
an object is perceived to maintain its known shape despite the changing perspective from which it is observed

shaping
a procedure in which a reinforcer is given for each response that is closer and closer and eventually leads to the desired response; also called the 'method of successive approximations'

short-term memory
a store that receives information from the long-term and sensory stores; with a limited capacity of 5–9 pieces of information, and a duration of approximately 12–20 seconds

similarity (relationships)
characteristics that are alike between those in the relationship

similarity (visual perception)
the principle that elements that are similar in appearance will tend to be seen as a unit

similarity–attraction hypothesis
people who are similar to each other are more likely to find each other attractive and start a relationship, compared to those who are not familiar

single-blind procedure
allocating participants to groups in such a way that they do not know whether they are in the E-group or the C-group

situational attribution
the assumption that behaviour is due to environmental or external factors

size constancy
the constant perception of an object's size, even though the size of the image on the retina alters as the object moves nearer to or further from us

social categorisation
assembling similar objects and people so that we are able to identify and understand them

social comparison
comparing our in-group with other groups to affirm our identity

social desirability effect
the tendency to answer questions in a way that frames the person favourably even if it is not the truth

social exchange
meaningful interactions with others

social identification
a process where people modify their behaviour, attitudes and beliefs to match the group that they belong to

social identity
a person's sense of self-based on the groups they belong to

social identity theory
a theory that suggests that groups are part of our identity and self-esteem, through three processes: social categorisation, social identification and social comparison

social influence
the likelihood that bystanders will be more likely to help based on the reaction of others

social influence theory
suggests people are more likely to change their attitudes, beliefs or behaviours because of compliance, identification or internalisation

socialisation
the process of how people learn the beliefs, customs and appropriate behaviours of a society or group

social learning theory
describes the way in which people acquire certain behaviours by watching and learning from role models; the initial focus of observational learning

social loafing
an individual puts in less effort when in a group then they do individually

social origins of attraction
the theory that repeated exposure to a potential partner through regular interactions will influence attraction

social responsibility norm
the expectation that members of a society will provide help to people who are dependent or in need, without the expectation of favours being returned

soma
largest part of a neuron: it controls the metabolism and maintenance of the neuron

somatic nervous system
the division of the peripheral nervous system that carries sensory information into the central nervous system and motor commands from the central nervous system to the skeletal muscles

Spearman correlation
a measure of two ordinal variables that uses the ranked values for each variable to examine how they change together but not necessarily at a constant rate

spinal cord
the bundle of nerve fibres connecting the brain with the peripheral nervous system

spontaneous recovery
the reappearance of an extinguished response after a rest period

SQ4R method
a mnemonic that involves six steps: survey, question, read, recite, relate and review to help learning and retention

standard deviation
a measure that tells us how far, on average, scores are different from the mean

state-dependent cues
cues to assist retrieval from long-term memory, due to the internal environment (mood-state or physical condition) in which learning took place

status
the position of an individual within a group

stereotype
generalised and simplified belief about a group of people or a person based on their membership to a group

stimulus discrimination (classical conditioning)
when an organism responds to the conditioned stimulus but not to any stimulus that is similar to the conditioned stimulus

stimulus discrimination (operant conditioning)
when a behaviour stops being applied to similar situations and only to the discriminative stimulus

stimulus generalisation (classical conditioning)
when an organism responds to any stimulus that is similar to the conditioned stimulus

stimulus generalisation (operant conditioning)
when a behaviour is displayed because of a discriminative stimulus that is similar to the original

storage
maintaining encoded information in a memory store

stratified sampling
a sampling process by which the effects of a certain variable can be eliminated as a possible confound in an experiment

subculture
small alternative cultures or norms that exist within a larger community

superordinate goals
shared goals whereby members within one group cannot achieve the overall result without the help of the other group

sustained contact
long-term interaction between individuals of different cultural backgrounds, which can reduce prejudice

sympathetic nervous system
a branch of the autonomic nervous system that activates the fight-flight-freeze response

synapse
the connection between two neurons

synaptic transmission
the process of neurons sending information to each other via neurotransmitters

T

temporal lobe
the part of the forebrain beneath the temporal plate of the skill, at the side of the head above the ears; contains Wernicke's area and the primary auditory cortex

texture gradient
a monocular depth cue in which texture in the foreground is seen in finer detail than that further away

thalamus
structure in the brain located between the cerebral cortex and the midbrain, just above the brain stem; responsible for relaying motor and sensory signals to the cerebral cortex

theory of psychosexual differentiation
a biological theory of gender role formation that focuses on the way testosterone affects the brain to determine masculinity

three-phase model (ABC of operant conditioning)
the assumption that the antecedent makes the conditions right for the behaviour to follow and be encouraged or discouraged by its consequences

tip-of-the-tongue phenomenon (TOT)
the feeling that something we know is just not available to be recalled from memory; an indication that some forgetting is due to retrieval failure

transduction
stimulus energy is converted by the receptor cells into electrochemical nerve impulses

transmission
the sending of neural signals to the primary sensory cortex where specialised receptor cells respond as the process of perception begins

tri-component model of attitudes
the theory that an attitude consists of cognitive, affective and behavioural components

U

unconditioned response (UCR)
a response that occurs naturally in response to the unconditioned stimulus (classical conditioning)

unconditioned stimulus (UCS)
a stimulus that causes an unconditioned response (classical conditioning)

V

validity
the extent to which an instrument measures what it is supposed to measure

variance
a measure of how much, on average, the scores differ from the mean validity the extent to which an instrument measures what it is supposed to measure

vicarious learning
witnessing a type of behaviour in another and establishing whether this is acceptable or not based on the observation

vicarious punishment
when a child observes a behaviour being punished

vicarious reinforcement
a theory that individuals are more likely to engage in a behaviour or activity if they witness another individual being rewarded for that activity or behaviour

vicarious reward
when a child observes a behaviour being rewarded

visual acuity
the clarity or sharpness of vision

visual illusion
a figure structured so that perception will consistently differ from objective reality

visuospatial sketchpad
the storage system for visual information in working memory

voluntary behaviour
actions that are controlled by the person or animal performing them

voluntary participation
participants have the right to decline to participate in a study; they must not be pressured to take part in the study and must not be tricked into taking part

W

Wernicke's area
part of the left temporal lobe, responsible for language reception and interpretation and for creation of grammatically correct speech

withdrawal rights
the right of participants to leave a study at any stage, including the right to withdraw their results after the study has been completed, regardless of the possible effects on the results

working memory
the mental work that is occurring at any given time, including retrieving information, problem-solving, and comprehending sounds and visions; draws on information from sensory and long-term memories

X

xenophobia
fear of, or strong animosity towards, people of different races or cultural backgrounds

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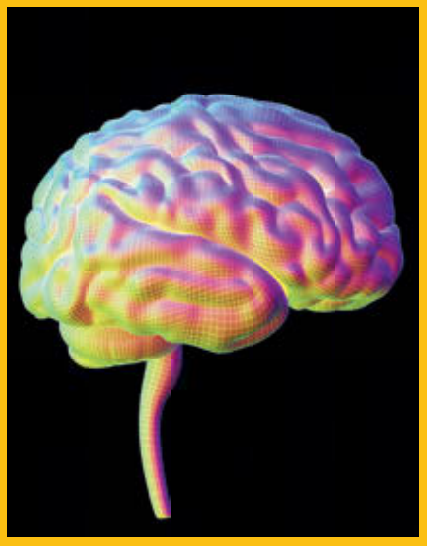

The front cover shows a digital impression of the human brain. The human brain has four lobes: frontal, temporal, occipital and parietal. Each of these areas is responsible for a certain function. The cerebral cortex, made of sulci (grooves) and gyri (ridges), surrounds the four lobes and is implicated in higher order functioning.

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