learnon
www.jacplus.com.au

Adam BYLSMA | Nicole LETCH

WORKBOOK FOR PSYCHOLOGY

VCE UNITS 1 AND 2

NINTH EDITION

jacaranda
A Wiley Brand

WORKBOOK FOR PSYCHOLOGY

VCE UNITS 1 AND 2

NINTH EDITION

WORKBOOK FOR PSYCHOLOGY

VCE UNITS 1 AND 2

NINTH EDITION

Adam BYLSMA

Nicole LETCH

jacaranda
A Wiley Brand

First edition published 2023 by
John Wiley & Sons Australia, Ltd
155 Cremorne Street, Cremorne, Vic 3121

Typeset in 9.5/15 pt Roboto

© Bremar Holdings Pty Ltd, 2023

The moral rights of the authors have been asserted.

ISBN: 978-1-1198-8842-0

Reproduction and communication for educational purposes
The *Australian Copyright Act 1968* (the Act) allows a maximum of one chapter or 10% of the pages of this work, whichever is the greater, to be reproduced and/or communicated by any educational institution for its educational purposes provided that the educational institution (or the body that administers it) has given a remuneration notice to Copyright Agency Limited (CAL).

Reproduction and communication for other purposes
Except as permitted under the Act (for example, a fair dealing for the purposes of study, research, criticism or review), no part of this book may be reproduced, stored in a retrieval system, communicated or transmitted in any form or by any means without prior written permission. All inquiries should be made to the publisher.

Trademarks
Jacaranda, the JacPLUS logo, the learnON, assessON and studyON logos, Wiley and the Wiley logo, and any related trade dress are trademarks or registered trademarks of John Wiley & Sons Inc. and/or its affiliates in the United States, Australia and in other countries, and may not be used without written permission. All other trademarks are the property of their respective owners.

Cover and internal design images: © Boguslaw Mazur / Shutterstock

Illustrated by Harry Slaghekke (page 77), diacriTech and Wiley Composition Services

Typeset in India by diacriTech

A catalogue record for this
book is available from the
National Library of Australia

CONTENTS

UNIT 1

HOW ARE BEHAVIOUR AND MENTAL PROCESSES SHAPED?

jacaranda
A Wiley Brand

5 Brain plasticity and brain injury 151

UNIT 2

HOW DO INTERNAL AND EXTERNAL FACTORS INFLUENCE BEHAVIOUR AND MENTAL PROCESSES?

6 Social cognition 181

7 Factors that influence individual and group behaviour 223

8 Perception 251

jacaranda
A Wiley Brand

INTRODUCTION

This workbook provides students with a variety of worthwhile learning activities to assist development and understanding of key knowledge and skills specified for VCE Psychology Units 1 & 2. The activities complement those in the textbook and are designed for use in conjunction with the text to enhance learning and revision options.

All activities have been selected in collaboration with Psychology teachers and many have been trialled in classrooms. All activities are different from those in the textbook and can be completed independently by students in the classroom or at home.

Each topic has a matrix showing the relationship of each activity to key knowledge and skills in the Psychology Study Design (2023–2027). Each activity has an assessment guide specifically designed to support self-assessment. These guides are published separately but easily accessed in learnON by teachers.

jacaranda
A Wiley Brand

ACKNOWLEDGEMENTS

The authors and publisher would like to thank the following copyright holders, organisations and individuals for their assistance and for permission to reproduce copyright material in this book.

Images

Shutterstock: **72**/OSTILL is Franck Camhi; **85 (top left)**/CREATISTA; **85 (top right)**/AlohaHawaii; **85 (2nd row left)**/Nika Art; **85 (2nd row right)**/Andrey_Kuzmin; **85 (3rd row left)**/John Grivas; **85 (3rd row right)**/dekazigzag; **85 (bottom left)**/John Gomez; **85 (bottom right)**/LightField Studios; **87**/Claudia Paulussen; **107**/Tinseltown; **130**/NIshop; **138**/miha de; **183 (middle)**/paulaphoto; **184 (middle)**/pathdoc; **184 (bottom)**/Rachata Teyparsit; **187 (top)**/Monkey Business Images; **187 (middle)**/Azman Bin Jaeh; **188 (top)**/Syda Productions; **188 (2nd row)**/Gorodenkoff; **188 (3rd row)**/Denis Kuvaev; **188 (bottom)**/tairome; **198**/SpicyTruffel; **246**/Roland Marconi; **257 (right)**/Irina Kamysh; **259 (2nd row)**/**259 (3rd row)**/**268**/victoriaKh • **73**/Mark Kolbe/Getty Images Entertainment/Getty Images • **74**/Monica Schipper/Getty Images Entertainment/Getty Images • **91**/Paul Tarnowski/CartoonStock Ltd • **183 (top)**/jochem wijnands/Alamy Stock Photo • **183 (bottom)**/Caique Silva/Unsplash.com • **184 (top)**/Suzy Bennett/Alamy Stock Photo • **187 (bottom)**/The Good Funeral Guide/Unsplash.com • **200**/Ryan Quintal/Unsplash.com • **214**/ Martin, L. (2019). St Kilda beach rally: far-right and anti-racism groups face off in Melbourne. *The Guardian*, Australian edition • **257 (left)**/What's Happening To Our Vision? A Working Theory of Myopia Progression Part 1, Eyedolatry • **258 (bottom)**/Monocular Depth Cues, Chegg Inc. • **261**/Based on Gibson, E. J., & Walk, R. D. The visual cliff. *Scientific American*, 202(4), 67–71. 1960, April • **264**/Adapted from Mozell, M.M., et al. (1969). Nasal chemoreception in flavor identification. *Archives of Otolaryngology*, 90(3), 367–373 • **265 (top)**/Eleana Gkogka, Gestalt principles in UI design. Medium • **307** Victor Habbick Visions/Science Photo Library • **309** Adapted from Mozell, M.M., et al. (1969). Nasal chemoreception in flavor identification. *Archives of Otolaryngology*, 90(3), 367–373

Text

• Selected extracts from the VCAA VCE Psychology Study Design (2023–2027) are copyright Victorian Curriculum and Assessment Authority (VCAA), reproduced by permission. VCE® is a registered trademark of the VCAA. The VCAA does not endorse this product and makes no warranties regarding the correctness or accuracy of its content. To the extent permitted by law, the VCAA excludes all liability for any loss or damage suffered or incurred as a result of accessing, using or relying on the content. Current VCE Study Designs and related content can be accessed directly at www.vcaa.vic.edu.au. Teachers are advised to check the VCAA Bulletin for updates. • **72** Tracy, J.L., & Matsumoto, D. (2008). The spontaneous expression of pride and shame: Evidence for biologically innate nonverbal displays. *Proceedings of the National Academy of Sciences of the United States of America*, 105(33), 11655–11660 • **73** University of Melbourne (2019). *Let's hear twins sing!* (Expression of interest site). Retrieved https://twinsvox.wixsite.com/letssing/our-study • **167–9** About Stroke, 2019. National Stroke Foundation • **198–9** Laura Scholes and Sarah McDonald, Caring or killing: harmful gender stereotypes kick in early — and may be keeping girls away from STEM, 2021. *The Conversation*. Licensed under CC BY-ND 4.0. • **214–15** Martin, L. (2019). St Kilda beach rally: far-right and anti-racism groups face off in Melbourne. *The Guardian*, Australian edition • **238** Based on Kilham, W., & Mann, L. (1974). Level of destructive obedience as a function of transmitter and executant roles in the Milgram obedience paradigm. *Journal of Personality and Social Psychology*, *29*(5), 696–702 • **261** Based on Gibson, E. J., & Walk, R. D. The visual cliff. *Scientific American*, 202(4), 67–71. 1960, April

Every effort has been made to trace the ownership of copyright material. Information that will enable the publisher to rectify any error or omission in subsequent reprints will be welcome. In such cases, please contact the Permissions Section of John Wiley & Sons Australia, Ltd.

KEY SCIENCE SKILLS AND RESEARCH METHODS IN PSYCHOLOGY

Key science skills	Activities																										
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27
Develop aims and questions, formulate hypotheses and make predictions																											
• identify, research and construct aims and questions for investigation																											
• identify independent, dependent and controlled variables in controlled experiments					✔	✔				✔																	
• formulate hypotheses to focus investigations										✔																	
• predict possible outcomes of investigations										✔																	
Plan and conduct investigations																											
• determine appropriate investigation methodology: case study; classification and identification; controlled experiment (within subjects, between subjects, mixed design); correlational study; fieldwork; literature review; modelling; product, process or system development; simulation		✔								✔	✔	✔	✔														
• design and conduct investigations; select and use methods appropriate to the investigation, including consideration of sampling technique (random and stratified) and size to achieve representativeness, and consideration of equipment and procedures, taking into account potential sources of error and uncertainty; determine the type and amount of qualitative and/or quantitative data to be generated or collated		✔					✔	✔	✔			✔	✔	✔													

continued

Key science skills	Activities																									
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27
• work independently and collaboratively as appropriate and within identified research constraints, adapting or extending processes as required and recording such modifications		✔																									
Comply with safety and ethical guidelines																											
• demonstrate ethical conduct and apply ethical guidelines when undertaking and reporting investigations	✔																✔	✔	✔								
• demonstrate safe laboratory practices when planning and conducting investigations by using risk assessments that are informed by safety data sheets (SDS), and accounting for risks																	✔	✔	✔								
• apply relevant occupational health and safety guidelines while undertaking practical investigations																	✔	✔	✔								
Generate, collate and record data																											
• systematically generate and record primary data, and collate secondary data, appropriate to the investigation														✔						✔	✔						
• record and summarise both qualitative and quantitative data, including use of a logbook as an authentication of generated or collated data																				✔	✔						
• organise and present data in useful and meaningful ways, including tables, bar charts and line graphs																											

continued

Key science skills	Activities																										
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27
Analyse and evaluate data and investigation methods																											
• process quantitative data using appropriate mathematical relationships and units, including calculations of percentages, percentage change and measures of central tendencies (mean, median, mode), and demonstrate an understanding of standard deviation as a measure of variability																					✔						
• identify and analyse experimental data qualitatively, applying where appropriate concepts of: accuracy, precision, repeatability, reproducibility and validity; errors; and certainty in data, including effects of sample size on the quality of data obtained										✔				✔	✔	✔											
• identify outliers and contradictory or incomplete data														✔	✔												
• repeat experiments to ensure findings are robust														✔	✔												
• evaluate investigation methods and possible sources of error or uncertainty, and suggest improvements to increase validity and to reduce uncertainty		✔								✔				✔	✔						✔						

continued

Key science skills	Activities																									
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27
Construct evidence-based arguments and draw conclusions																											
• distinguish between opinion, anecdote and evidence, and scientific and non-scientific ideas			✔																		✔						
• evaluate data to determine the degree to which the evidence supports the aim of the investigation, and make recommendations, as appropriate, for modifying or extending the investigation										✔				✔							✔				✔		
• evaluate data to determine the degree to which the evidence supports or refutes the initial prediction or hypothesis										✔											✔	✔			✔		
• use reasoning to construct scientific arguments, and to draw and justify conclusions consistent with evidence base and relevant to the question under investigation										✔				✔	✔						✔	✔			✔		
• identify, describe and explain the limitations of conclusions, including identification of further evidence required														✔	✔						✔				✔		
• discuss the implications of research findings and proposals, including appropriateness and application of data to different cultural groups and cultural biases in data and conclusions																	✔	✔	✔		✔				✔		

continued

Key science skills	Activities																										
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27
Analyse, evaluate and communicate scientific ideas																											
• use appropriate psychological terminology, representations and conventions, including standard abbreviations, graphing conventions and units of measurement																									✔	✔	✔
• discuss relevant psychological information, ideas, concepts, theories and models and the connections between them	✔																										
• analyse and explain how models and theories are used to organise and understand observed phenomena and concepts related to psychology, identifying limitations of selected models/theories			✔																								
• critically evaluate and interpret a range of scientific and media texts (including journal articles, mass media communications, opinions, policy documents and reports in the public domain), processes, claims and conclusions related to psychology by considering the quality of available evidence																											
• analyse and evaluate psychological issues using relevant ethical concepts and guidelines, including the influence of social, economic, legal and political factors relevant to the selected issue																											

continued

Key science skills	Activities																								
	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27
• use clear, coherent and concise expression to communicate to specific audiences and for specific purposes in appropriate scientific genres, including scientific reports and posters																					✔				✔		
• acknowledge sources of information and assistance, and use standard scientific referencing conventions																											

Source: © VCAA, *VCE Psychology Study Design: 2023–2027.* pp. 12–13

Note: Although convenience sampling is not specified in the 2023–2027 Psychology Study Design, it has been included in this topic to help inform students. This is the most common type of sampling used by students when completing VCE Psychology research tasks.

ACTIVITY 1.1

Defining psychology and its subject matter

Part A

Select terms from the shaded panel below to correctly complete the passage about thoughts, feelings and behaviour – the subject matter of psychology. Each term can only be used once and not all terms are used.

interrelated	animals	conclusions	risk
observable	human	think	externally
behaviour	investigations	scientific	internal
research	case studies	subjects	mental
directly	influence	anecdotes	simulations

Psychology is the scientific study of human behaviour and mental processes. Scientific means that the discipline is underpinned by peer reviewed research rather than anecdotes or personal opinions. Psychological research can include a range of different types of investigations, including controlled experiments, case studies, correlational studies, modelling and simulations. Mental processes include thoughts and feelings. They are private, internal experiences that cannot be directly observed as they take place. In contrast, behaviour is externally expressed, meaning it can be seen or recorded as it occurs. Because mental processes cannot be directly observed, psychologists draw conclusions about them on the basis of the behaviour expressed. Although psychologists distinguish between behaviour and mental processes, and often study them separately, in reality, behaviour and mental processes are closely interrelated and continually influence each other. For example, how you feel about someone may influence how you think about the person and the way you behave towards them. Similarly, what you think about something may cause you to feel a certain way about it, which in turn may influence your observable behaviour whenever you encounter it. People are usually the main subjects in psychological research, however, at times, animals may also be used. This is mainly done when human subjects are not available for an investigation or when human participants cannot be used because of the potential risk of psychological or physiological harm.

Part B

Complete each row by describing a thought, feeling and behaviour that illustrates how all three may be interrelated. The first row has been completed as an example.

Mental processes		
Thought	**Feeling**	**Behaviour**
I have not adequately prepared for the exam.	anxious and regretful	pacing the corridor, talking quickly
I like this song playing on the radio.	e.g. content, happy	e.g. taps foot to rhythm of song, sings along
e.g. Why did my friends go there without asking me?	upset	e.g. eats alone, avoids friends when next sees them
e.g. I really like my friend.	e.g. pleased, excited, happy	smiling, high-fiving and hugging a friend
I don't know how to do this classroom activity.	e.g. regretful (for not paying attention), discouraged, embarrassed	e.g. scratches head, looks around, asks for help
e.g. I have let my team down by missing that last goal.	disappointed	e.g. apologises to team mates, talks to coach, isolates oneself, practices goal-shooting

jacaranda
A Wiley Brand

ACTIVITY 1.2

Summarising the steps in psychological research

Cut out the following statements and paste them in the correct order next to the relevant step in the table on page 13. There are three statements for each step. Begin by grouping the statements under the headings and then think about the most logical order in which they should be completed.

Repeat experiments to ensure findings are robust

Identify independent, dependent and controlled variables in controlled experiments

Apply relevant occupational health and safety guidelines while undertaking practical investigations

Evaluate data to determine the degree to which the evidence supports the aim of the investigation

Design and conduct investigations, including consideration of sampling technique

Record and summarise both qualitative and quantitative data

Identify outliers and contradictory or incomplete data

Work independently and collaboratively as appropriate and within identified research constraints

Discuss relevant psychological information, ideas, concepts, theories and models and the connections between them

Demonstrate ethical conduct and apply ethical guidelines when undertaking and reporting investigations

Distinguish between opinion, anecdote and evidence, and scientific and non-scientific ideas

Systematically generate and record primary data, and collate secondary data if appropriate

Acknowledge sources of information and assistance, and use standard scientific referencing conventions

Process quantitative data using appropriate mathematical relationships and units

Formulate hypotheses to focus investigations predict possible outcomes of investigations

Demonstrate safe laboratory practices when planning and conducting investigations by using risk assessments

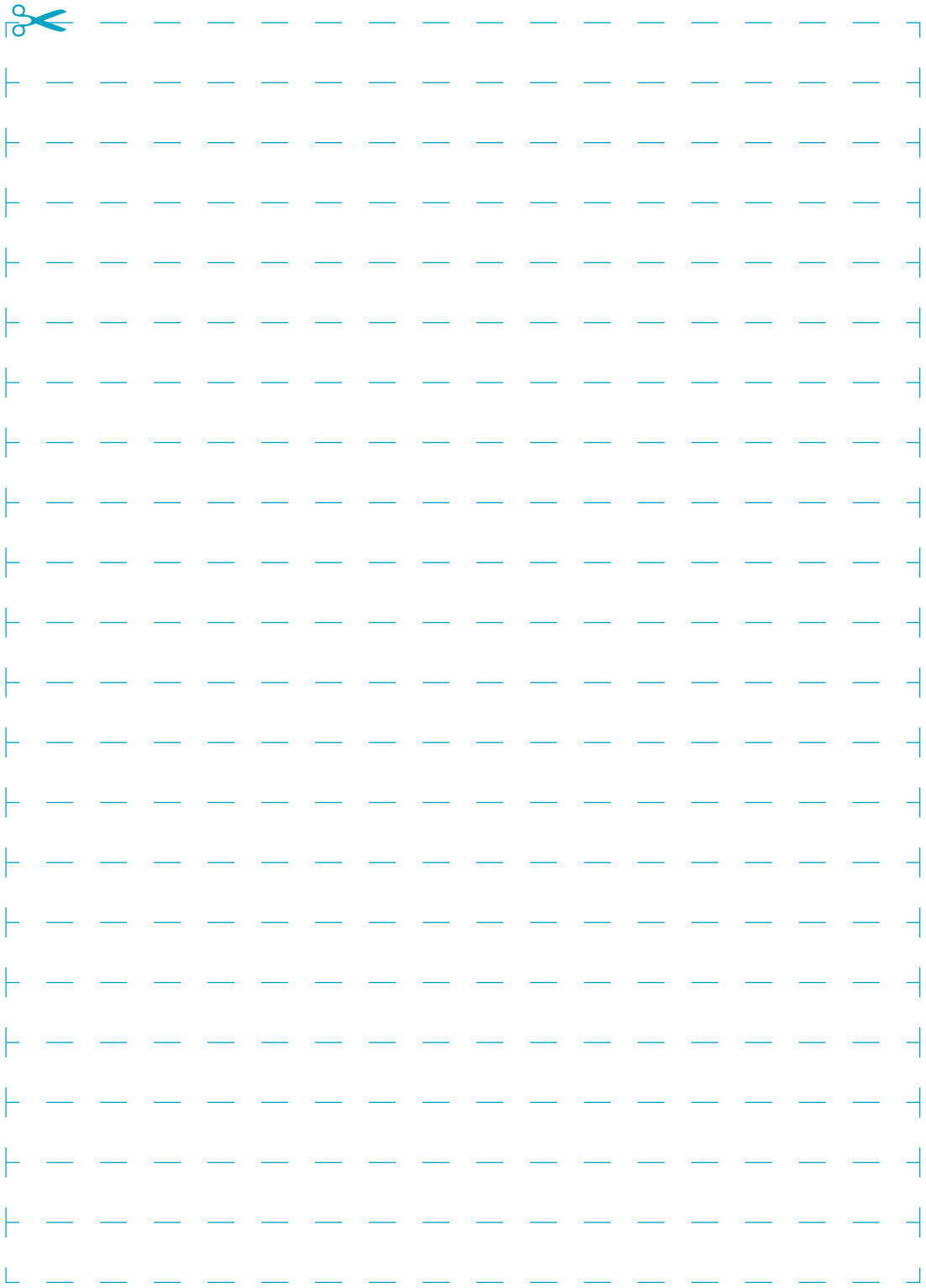
Organise and present data in meaningful ways, including tables, bar charts and line graphs

Determine appropriate investigation methodology

Evaluate data to determine the degree to which the evidence supports or refutes the initial prediction or hypothesis

Identify, research and construct aims and questions for investigation

Use appropriate psychological terminology, representations and conventions



jacaranda
A Wiley Brand

Step 1: Develop aims and questions, formulate hypotheses and make predictions	• Identify, research and construct aims and questions for investigation • Identify independent, dependent and controlled variables in controlled experiments • Formulate hypotheses to focus investigations predict possible outcomes of investigations
Step 2: Plan and conduct investigations	• Determine appropriate investigation methodology • Design and conduct investigations, including consideration of sampling technique • Work independently and collaboratively as appropriate and within identified research constraints
Step 3: Comply with safety and ethical guidelines	• Demonstrate ethical conduct and apply ethical guidelines when undertaking and reporting investigations • Demonstrate safe laboratory practices when planning and conducting investigations by using risk assessments • Apply relevant occupational health and safety guidelines while undertaking practical investigations
Step 4: Generate, collate and record data	• Systematically generate and record primary data, and collate secondary data if appropriate • Record and summarise both qualitative and quantitative data • Organise and present data in meaningful ways, including tables, bar charts and line graphs
Step 5: Analyse and evaluate data and investigation methods	• Process quantitative data using appropriate mathematical relationships and units • Identify outliers and contradictory or incomplete data • Repeat experiments to ensure findings are robust
Step 6: Construct evidence-based arguments and draw conclusions	• Distinguish between opinion, anecdote and evidence, and scientific and non-scientific ideas • Evaluate data to determine the degree to which the evidence supports the aim of the investigation • Evaluate data to determine the degree to which the evidence supports or refutes the initial prediction or hypothesis
Step 7: Analyse, evaluate and communicate scientific ideas	• Use appropriate psychological terminology, representations, and conventions • Discuss relevant psychological information, ideas, concepts, theories and models and the connections between them • Acknowledge sources of information and assistance, and use standard scientific referencing conventions

ACTIVITY 1.3

Hypothesis, theories and models

1 Cross out the incorrect term (within the pairs) to make the following statements accurate.

(a) A **theory**/~~**hypothesis**~~ is a body of **interrelated**/~~**unrelated**~~ concepts that attempt to ~~**prove**~~/**explain** research observations.

(b) A ~~**theory**~~/**hypothesis** makes a specific prediction about the relationship between **variables**/~~**measurements**~~ that can be **tested**/~~**explained**~~.

(c) The main ~~**similarity**~~/**difference** between a theory and a hypothesis is that a theory is usually more **general**/~~**specific**~~ whereas a hypothesis is more ~~**general**~~/**specific**.

(d) **Hypotheses**/~~**theories**~~ are formulated based on the body of knowledge from ~~**hypotheses**~~/**theories**.

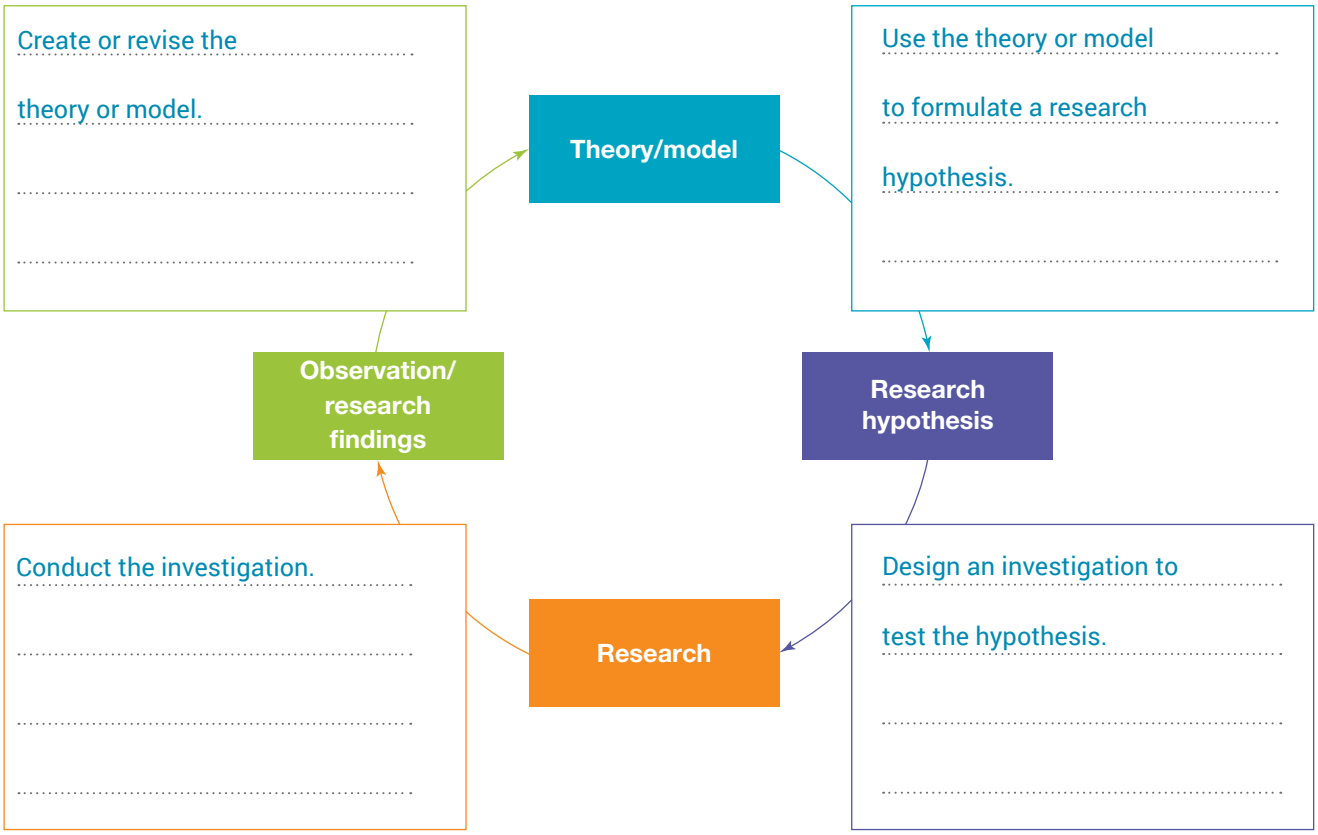
(e) A **model**/~~**theory**~~ focuses more on representing how behaviour or mental processes occur, such as showing a cause-effect relationship, whereas as a ~~**model**~~/**theory** is more focused on the interrelatedness of concepts.

(f) A useful theory or model is one that **can**/~~**cannot**~~ be tested. This means it is **capable**/~~**incapable**~~ of generating **hypotheses**/~~**methods**~~ and helping to guide future research.

(g) The **strength**/~~**weakness**~~ of theories and models is that they can help to explain how research findings fit together in an **organised**/~~**disorganised**~~ way, thereby contributing to psychology as a science discipline rather than just reporting of isolated facts.

(h) Both theories and models **can**/~~**cannot**~~ be refined or changed as further research is conducted. Those that are ~~**more**~~/**less** useful are overlooked or discarded, while those that contribute to a greater understanding are **retained**/~~**rejected**~~.

2 Complete the boxes in the diagram below to illustrate the cycle of how theories and models are improved over time.



jacaranda
A Wiley Brand

ACTIVITY 1.4

Understanding variables

1 (a) A variable is: something that can change ('vary') in amount or type and is measurable.

(b) Identify five variables that may influence your happiness.

Examples: physical environment, past experiences, sleep, weather, social interactions, employment status, health (mental and physical), quality of relationships, money, VCE results

2 Identify five variables that may influence your performance in a test.

Examples: time spent studying, sleep, engagement during class, relationship with teacher and other students, interest in the topic, time management, how well the topic is taught, access to support

3 Use the words in the shaded panel to complete the passage below about variables in an experiment. Each word is used once.

manipulated	quantitatively	qualitatively	cause-effect
dependent	influences	experiments	change
treatment	effect	observed	independent

In every experiment, there is at least one independent variable and at least one dependent variable. Generally, the independent variable is manipulated (systematically changed) by the researcher to assess how it influences the dependent variable. This helps the researcher to establish the level of cause-effect relationship. The independent variable is sometimes referred to as the treatment (or treatment conditions) variable. The independent variable can be manipulated qualitatively by changing 'type of condition' or quantitatively by changing 'amount'. The dependent variable is the variable that is observed and measured to determine the effect of the independent variable. In psychological experiments, the dependent variable is usually some aspect of a participant's behaviour that is expected to change as a result of their exposure to the independent variable.

ACTIVITY 1.5

Thinking about types of variables

1 Write a precise definition of each of the following types of variables:

Independent variable:

The variable that is manipulated in order to measure its effect on the dependent variable

Dependent variable:

The variable that is used to observe and measure the effects of the independent variable

Controlled variable:

A control variable is any variable held constant in a research study. It is held constant because it could potentially influence the research outcome.

2 Explain why it is impossible and not desirable to control all variables in an experiment.

There are factors that can influence any experiment that are beyond the control of the researcher. These can include things like diet, home environments of participants, level of health, level of stress etc. The more a researcher controls these types of variables, the less realistic the research may become. This can cause a different type of extraneous variable called artificiality. The researcher should attempt to control the most relevant/obvious variables that can affect the independent variable so they can be more certain the changes are only due to the independent variable they have manipulated.

jacaranda
A Wiley Brand

3 For each of the following research questions, identify an independent variable, a dependent variable and three possible controlled variables that could apply to an experiment relating to the research question posed.

Research question	Independent variable	Dependent variable	Three controlled variables
Does temperature affect concentration?	e.g. temperature of room	e.g. performance on a test	e.g. subject area tested, time of day, participant attitude
How does alcohol affect reaction time?	e.g. blood alcohol concentration	e.g. reaction time in a computer-based test	e.g. medications, genetic predisposition, level of fatigue
Do increased hours spent revising increase school performance?	e.g. hours per day spent revising	e.g. school performance (grades)	e.g. study environment at home, level of distraction such as social media, amount of exercise
Can hunger affect thinking?	e.g. time since last main meal	e.g. self-reported content of thoughts	e.g. participant honesty, social circumstances, medications
Does exercise alter resting heart rate?	e.g. average minutes of exercise per day	e.g. average resting heart rate	e.g. medications, diet, body mass

ACTIVITY 1.6

Operationalising variables

1 In your own words, explain what 'operationalising a variable' means.

Operational variables refer to how you will define and measure a specific variable in your study. This requires defining the variable in more narrow terms and then specifying its measure. For example, 'health' might be operationalised as 'resting heart rate in beats per minute'.

2 Julie is a VCE Psychology student who wants to test the effect of listening to music on memory. She decides to operationalise her independent variable as 'listening to Mozart, set at low volume from a background speaker'. Give three reasons why this is helpful to her research.

It helps ensure her IV is more objectively testable.

Readers of her research will be clear about how she manipulated her IV.

It helps keep her experimental measurement consistent, which improves the validity of her data.

jacaranda
A Wiley Brand

3 For each of the following, provide two examples of how each of the following variables could be operationalised for research purposes.

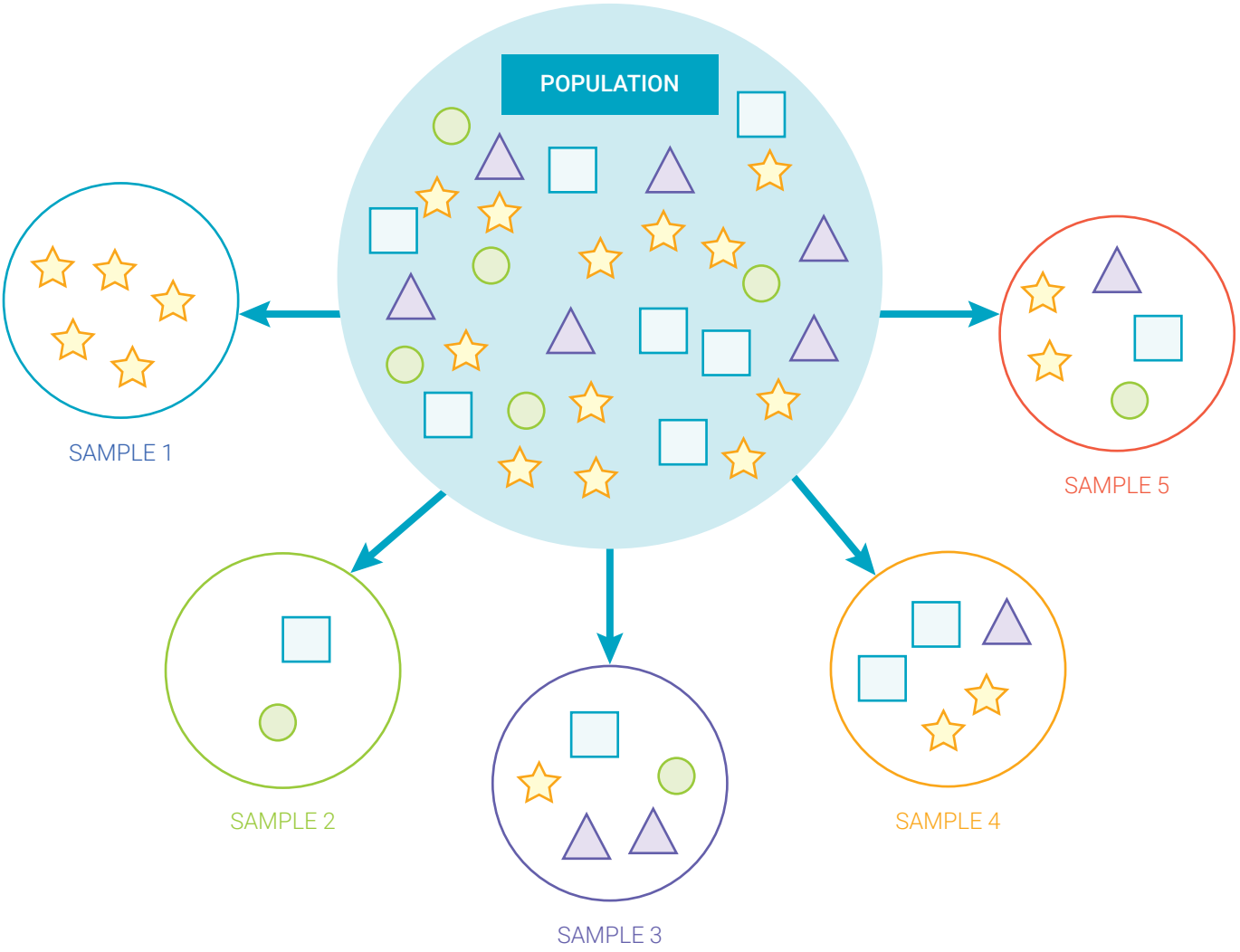
Variable	The variable when operationalised
creativity	e.g. number of ways of using a brick stated within 3 minutes; mean score on a bridge building task using only straws, coloured paper and tape
teenagers	e.g. individuals aged between 13–18 years; individuals aged between 15–16 years
self-confidence	e.g. a participant's rating of their 'belief in themself and their own abilities' on a 10-point 'self-confidence' scale; time taken to engage in a risk-taking activity
physical health	e.g. resting heart rate after completing a 5-minute course on an exercise bike; body mass index (BMI) value indicating whether overweight, underweight or ideal weight
popularity	e.g. number of 'likeable' votes received from peers; mean approval rating score given by viewers

ACTIVITY 1.7

Analysing a population and samples

A sample is selected from a group of research interest (population). It is desirable that the sample is representative of its population.

Consider the population and samples shown below, then answer the following questions.



1 Using a calculator, work out the percentage of the following items in the population.

(a) stars 40%

(b) triangles 20%

(c) circles 17%

(d) squares 23%

jacaranda
A Wiley Brand

2 Based only on the data in each sample, draw a conclusion about the composition ('makeup') of the population.

Sample	Conclusion about population drawn from sample
1	Example: The population has only stars.
2	e.g. Half (50%) the population are squares and the other half (50%) are circles.
3	e.g. There are twice as many triangles as there are circles, squares and stars in the population.
4	e.g. Approximately 80% of the population are stars or squares and the rest are triangles.
5	e.g. 60% of the population is made up of equal numbers of triangles, circles and squares, and the remaining 40% is stars.

3 Consider the nature of the population and the samples. Determine whether each sample is representative of the population and explain each of your answers.

Sample	Is this a representative sample? Why/why not?
1	Example: Sample 1 is not representative of the population because it has only stars, whereas the population also includes four other shapes.
2	Sample 2 is not representative of the population because the sample does not include stars and triangles (both of which occur in relatively larger numbers in the population).
3	Sample 3 is not representative of the population because stars are under-represented and triangles tend to be over-represented.

Sample	Is this a representative sample? Why/why not?
4	Sample 4 is not representative of the population because it does not include circles and squares tend to be over-represented.
5	Sample 5 is representative of the population because every shape is represented in appropriate proportions.

4 Explain the importance of selecting a representative sample when conducting research.

Explanation should demonstrate understanding that results obtained from a representative sample can be more confidently applied (generalised) to the population from which it was drawn, or even other groups or situations (assuming the results are valid and reliable).

5 Another way of making a sample more representative is to increase its size. Explain how this can make a sample more representative.

The larger the sample the more likely it is that it will include subjects from all of the different strata within the population based on the law of large numbers. This means the variation of individual differences within the population will also be well-represented in the sample because there are sufficient members to represent them.

jacaranda
A Wiley Brand

ACTIVITY 1.8

Identifying sampling procedures

1 In the boxes below, define the three different types of samples.

Type of sample	Definition
Stratified	Sampling procedure that involves dividing the population into different subgroups (strata), then selecting a separate sample from within each subgroup (or stratum) in the same proportions as they occur in the research population
Random	Sampling procedure that ensures every member of the population of research interest has an equal chance of being selected as a participant and thereby helps achieve a representative sample
Convenience	Sampling procedure involving selection of participants who are readily available; also known as opportunity sampling

2 For each of the following statements, tick the relevant box that indicates the type of sampling that has been applied.

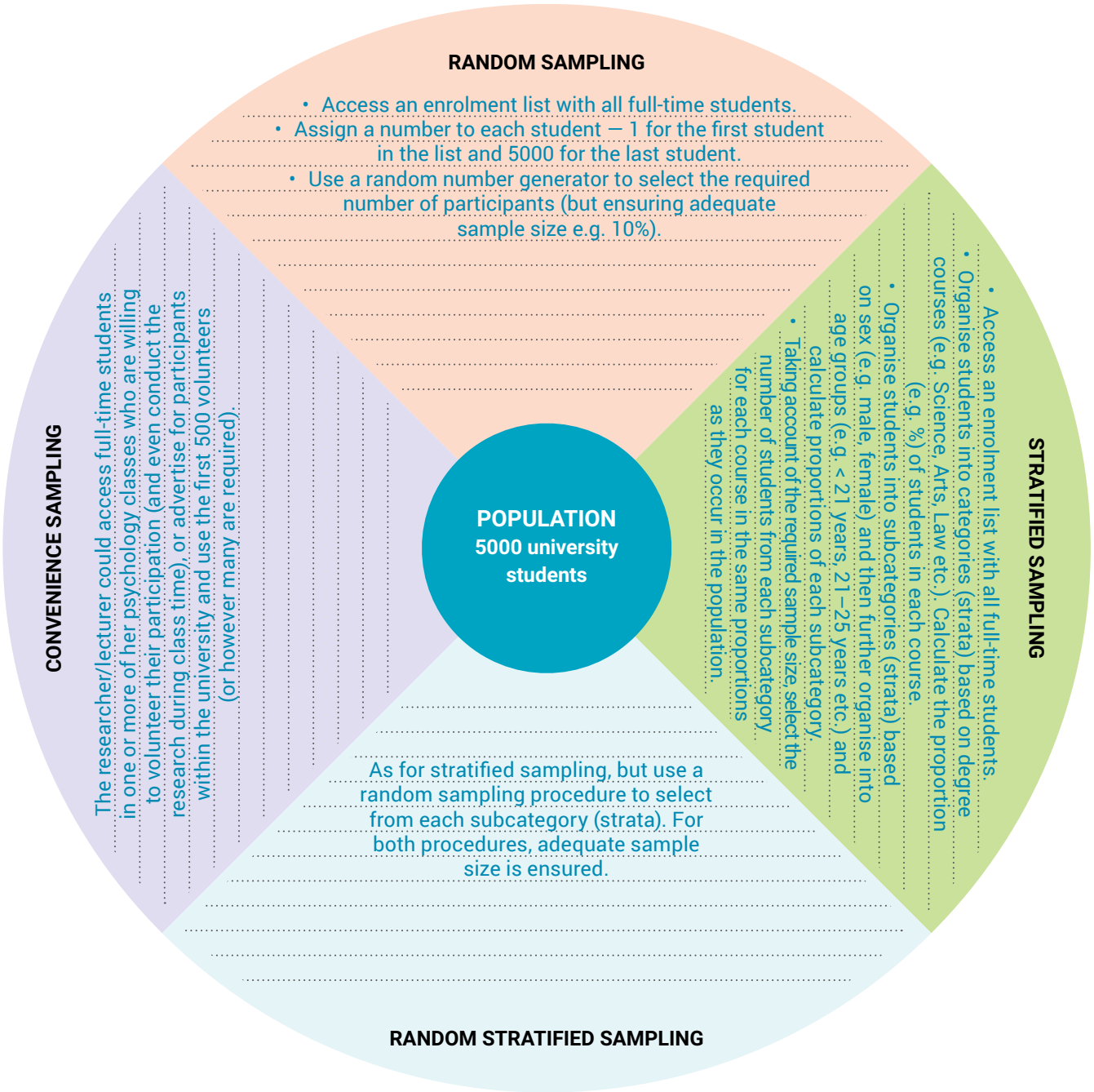
Statement	Convenience	Random	Stratified
A soft drink company surveys shoppers exiting a grocery store.	✔		
A school wishes to survey its students about sport preferences and ensures the sample from each year level is in the same proportion as the numbers of students in each year level.			✔
A university professor asks his first year students to be the subjects in an experiment on stress.	✔		
A social media platform randomly contacts users in its database to fill in a satisfaction survey.	✔		
A kindergarten teacher puts all the names of the children in her class in a hat and then draws three names to be the singers in a classroom production.		✔	
All families in Australia fill in the census for the government planning of infrastructure			✔
A random number generator is used to select research participants who have been allocated numbers, from a population that has been previously chosen because they all have a genetic illness that is being studied.		✔	
A tollway company logs every vehicle that crosses through a toll gate to determine road usage.	✔		
A researcher investigating the incidence of smoking and lung cancer ensures that her sample includes 50% men and 50% women.			✔
A hospital asks its patient to fill in a customer satisfaction survey regarding their recent hospital care.	✔		
Every parent/caregiver on the school register is allocated a number. A computer randomly selects 100 parents/caregivers to give feedback on the structure of a new school timetable.		✔	
A salesperson randomly approaches people on a busy street corner and hands them brochures for a new bar that is opening up in the area.	✔		

jacaranda
A Wiley Brand

Applying sampling procedures

A psychologist will conduct research to study the relationship between sleep and adverse health effects among the 5000 full-time students at the university campus where she is a lecturer. The psychologist is particularly interested in potential differences between male and female students of various ages and whether there are course-related differences.

1 In the diagram below, include a brief description of how an appropriate sample could be obtained when using each of these four sampling procedures: random sampling, stratified sampling, random stratified sampling and convenience sampling.



ACTIVITY 1.10

Analysing experimental research on the relationship between exercise and cognitive abilities

A psychologist working with retirement village communities is interested in examining the effect that regular exercise has on cognitive abilities of elderly people aged over 75 years. An experiment is conducted with participants from a retirement village where the psychologist does not work as it is believed familiarity with the residents may influence the results. Instead, the psychologist recruits 30 physically healthy volunteer participants at a retirement village where a colleague works. Three equal sized groups (A, B, C) are created through random allocation. The experiment is conducted in 3 × 3-week sessions over an 11-week period, as outlined below.

Weeks 1–3
Group A: 30 minutes of daily exercise
Group B: Abstain from exercise
Group C: 30 minutes of exercise three days a week
Test cognitive abilities in all groups

Weeks 5–7
Group A: 30 minutes of exercise three days a week
Group B: 30 minutes of daily exercise
Group C: Abstain from exercise
Test cognitive abilities in all groups

Weeks 9–11
Group A: Abstain from exercise
Group B: 30 minutes of exercise three days a week
Group C: 30 minutes of daily exercise
Test cognitive abilities in all groups

1 Identify the population and sample used for this research.

population: people over the age of 75 years

sample: 30 retirement village residents

2 Name the sampling procedure used for this research.

convenience sampling

3 Outline one limitation of using this sampling procedure.

sample bias e.g. less likely to achieve a representative sample

4 Name the experimental design used for this research.

within subjects design (repeated measures)

5 Outline one advantage of using this experimental research design.

Explanation should demonstrate understanding that participants are in both the experimental and control groups/conditions, so individual participant differences in relevant variables such as age (e.g. very old people over 75 years), physical health and cognitive abilities are strictly controlled.

6 What is the purpose of the no exercise (abstain from exercise) condition?

Explanation should demonstrate understanding that this is a control condition for comparison with the effects of the exercise conditions on cognitive abilities.

7 Identify the operationalised independent variable.

amount of exercise (i.e. none, 30 minutes per week, 3 × 30 minutes per week)

8 Identify the operationalised dependent variable

score on the cognitive abilities test(s)

9 Write a research hypothesis for this experiment.

Examples: Regular exercise improves cognitive abilities of people aged over 75 years; The more an elderly person exercises, the greater the improvement in their cognitive abilities; Daily exercise for 30 minutes is more beneficial for the cognitive abilities of elderly people than exercising for 30 minutes three days per week or not at all.

jacaranda
A Wiley Brand

10 Identify at least two extraneous variables that could affect the results of this experiment and explain how they could influence the dependent variable. Suggest how each could be better controlled in a future experiment.

Potential extraneous variables include:

- No pretesting of cognitive abilities before the experiment commenced so there is no 'baseline data' to compare improvement (except Group B)
- No control of the type of exercise performed by participants (e.g. aerobic vs anaerobic, vigorous vs passive) so exercise type (which can potentially impact on cognitive abilities among elderly people) is not necessarily constant throughout the experiment
- If walking is exercise, then 'No exercise' is impossible so there may not have actually been a 'No exercise' condition
- No control of amount or type of exercise during the week-long breaks between sessions.
- If the same cognitive abilities test(s) was used after each 3-week session instead of similar but different tests (i.e. comparable in task type and difficulty), then measured improvement could be attributed to a practice effect resulting in improved performance due to test familiarity rather than amount of exercise.
- All 30 participants are 'physically healthy', which is unlikely to be representative of people aged over 75 years, so the sample bias will limit generalisations that can be made.

Responses should suggest improvements congruent with the issue identified. For example, to establish a baseline level of cognitive ability, all residents could be pre-screened by testing using a computer-based test for cognitive ability.

ACTIVITY 1.11

What am I?

Identify the research method, procedure or data collection technique described by each statement.

1 I interact with participants through a written set of questions, often in a survey.	questionnaire
2 I observe people in a real-world setting.	naturalistic observation
3 I study groups over an extended period of time.	longitudinal study
4 I am any method that requires a participant to answer a question or state something about themself.	self-report
5 I ask participants to rank me after selecting an option from a number of choices.	rating scale or Likert scale
6 I compare existing groups at a single point in time, which makes me look like an independent groups design even though I am not.	cross-sectional study
7 I am the reproduction of a situation/environment/setting in a realistic way to investigate the behaviour and/or mental processes.	simulation
8 I am a series of pre-determined questions that are asked orally in a controlled way.	structured interview
9 I make every effort to conceal my presence so as to not influence the behaviour I am watching.	non-participant observation
10 I am a highly regulated setting in which all variables are held constant except the one(s) being studied.	experiment/laboratory experiments
11 I am an in-depth investigation of one person.	case study
12 I watch and record behaviour as it occurs.	observational study
13 I like to vary my questions and let people describe their thoughts, feelings or behaviour in their own words.	unstructured interview
14 I am an in-depth investigation of behaviour, activity or event of interest in a single individual, group, organisation or situation.	case study
15 I sometimes like to ask participants to tell me how much they agree or disagree with something.	rating scale

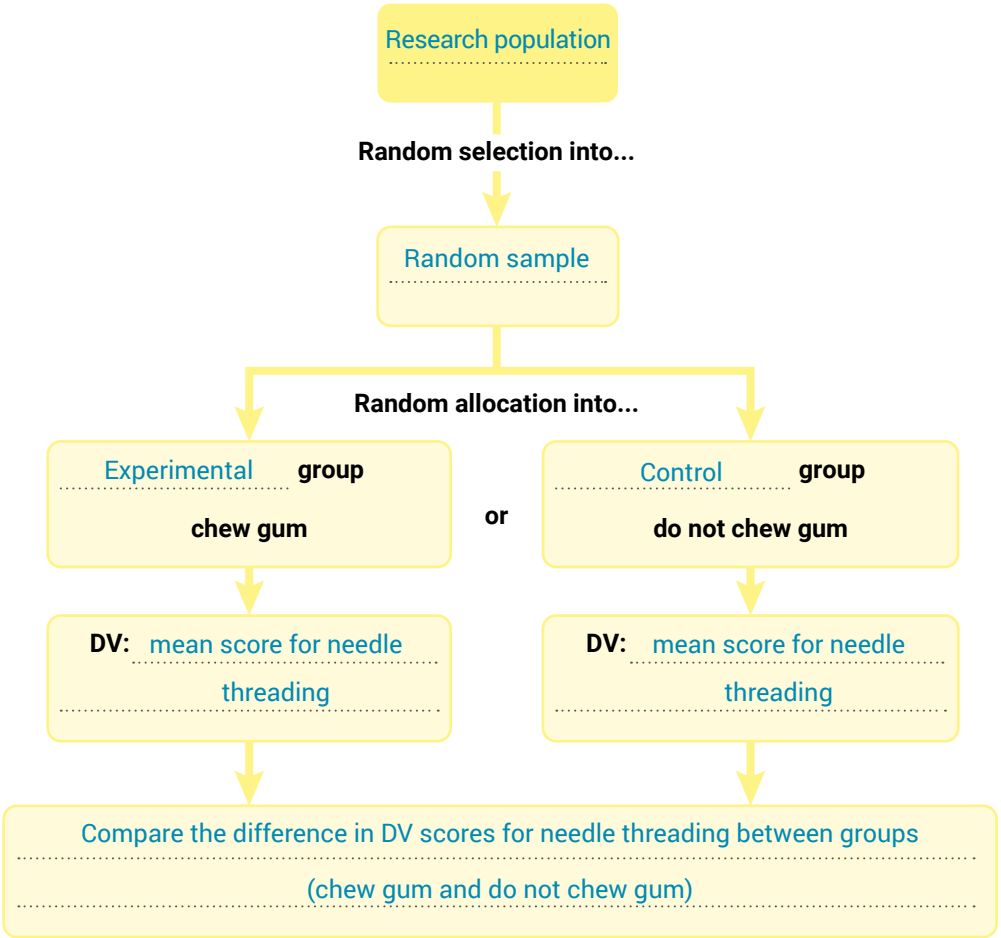
jacaranda
A Wiley Brand

Comparing three experimental research designs

A researcher will conduct an experiment to investigate whether chewing gum during a visual–motor task involving eye–hand coordination improves performance on that type of task. Participants will be asked to thread a needle as many times as possible during a five minute period. Use the statements in the boxes to complete the flow diagrams summarising different experimental research designs that could be applied and then provide the information for each design.

Design 1

• Experimental	• Random sample	• Control
• mean score for needle threading	• Compare the difference in DV scores for needle threading between groups (chew gum and do not chew gum)	• Research population



Name of design: independent groups (between groups design)

Key feature of the design: random allocation of participants to either the experimental or control group (conditions)

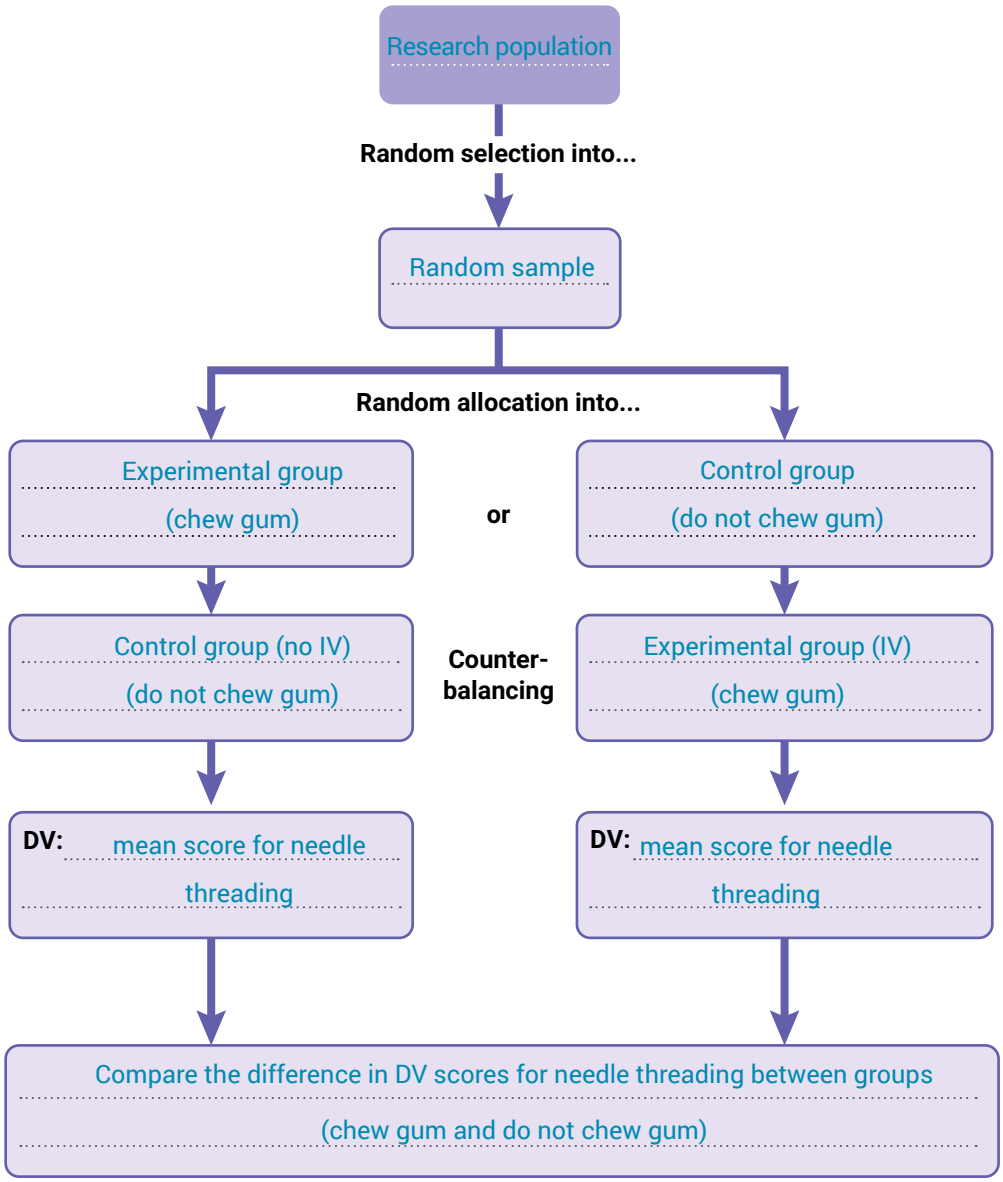
Advantage: a relatively simple design that controls individual participant differences by ensuring they are relatively evenly distributed in each group

Limitation: less control over participant variables than in the other designs, especially when a small sample is used

Design 2

• Experimental group (chew gum)	• Random sample	• Control group 2 – (no IV) (do not chew gum)
• mean score for needle threading	• Compare the difference in DV scores (when chewing gum and not chewing gum)	• Research population

jacaranda
A Wiley Brand



Name of design: repeated measures (within groups design)

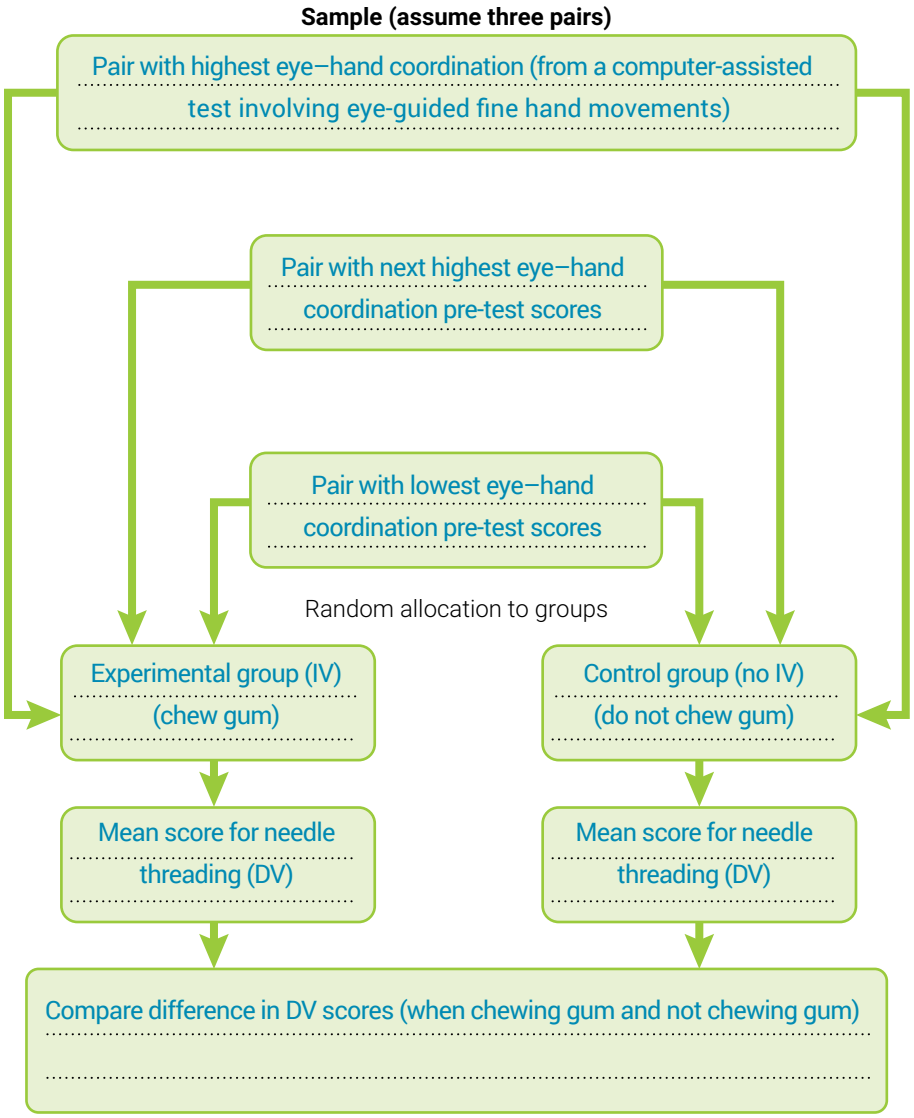
Key feature of the design: each participant is in both the experimental and control groups (conditions).

Advantage: E and C groups are identical so individual participant differences are strictly controlled.

Limitation: must consider potential order effects (e.g. practice, boredom) and participant attrition

Design 3

• Experimental group (IV) (chew gum)	• Control group (no IV) (do not chew gum)	• Compare difference in DV scores (when chewing gum and not chewing gum)
• Pair with highest eye–hand coordination (from a computer-assisted test involving eye-guided fine hand movements)	• Pair with next highest eye–hand coordination pre-test scores	• Pair with lowest eye–hand coordination pre-test scores • Mean score for needle threading (DV)



ACTIVITY 1.12 *continued*

Name of design: Between groups design (matched participants)

Key feature of the design: Each participant in one condition is matched to a participant in another condition on one or more relevant participant variables (e.g. eye–hand coordination ability, eye health).

Advantage: There is a participant with very similar or identical scores on the variable(s) the researcher seeks to control in each condition.

Limitation: Difficult and time consuming to recruit and/or pre-test participants who are sufficiently alike in key participant variables.

Correlational studies

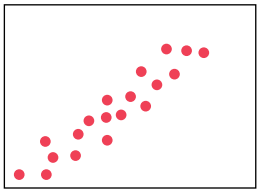
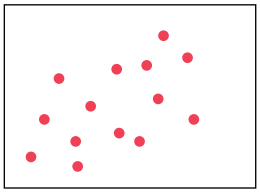
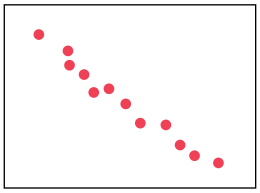
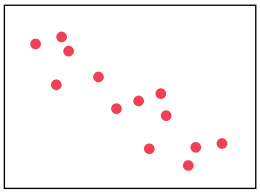
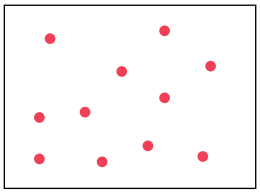
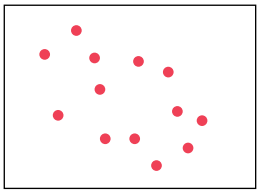
1 Select terms from the shaded panel to correctly complete the passage about correlational studies. Each term is only used once but not all terms need to be used.

volume	numeric	strength	primary
pattern	correlational coefficient	variables	positive
relationship	scores	investigate	causation
controlled	directly	height	evidence
control	direction	decimal	scatter plot

A correlational study is used to investigate the relationship between variables without any control over the setting in which the relationship occurs or any manipulation by the researcher. The researcher may collect primary data or analyse secondary data that already exists so long as they have a sufficient volume of data points that can then be mapped into a scatter plot. A scatter plot represents two different numeric values that correspond to two different variables of interest, such as height and body weight. A researcher can then examine the pattern or trend within the scatter plot to determine if there is evidence of a relationship. The strength of this relationship can be calculated using a statistical process that generates a correlational coefficient (*r* value). When calculated, this is expressed as a decimal number that can range from +1.00 to −1.00. The plus or minus sign describes the direction of the relationship between the two variables. A correlation coefficient with a plus (+) sign indicates a positive correlation. This means that high scores for one variable tend to go with high scores on the other, middle scores with middle scores, and low scores with low scores. A correlation close to 0 suggests no relationship exists between the variables. Correlations, however, do not show causation. They only indicate that a relationship may exist. Further controlled experiments are required to determine if one variable directly effects the other. Variables can increase or decrease together as a result of a third variable influencing them both. For example, height and body weight might both increase or decrease in response to level of human growth hormone produced over a given time.

jacaranda
A Wiley Brand

2 For each of the following scatter plots, decide if the degree of correlation is **none**, **weak positive**, **weak negative**, **moderate positive**, **moderate negative**, **strong positive** or **strong negative**.

 Strong positive	 Weak positive	 Strong negative
 Moderate negative	 None	 Weak negative

3 Explain why correlational studies are very useful even though they cannot directly establish a cause and effect relationship.

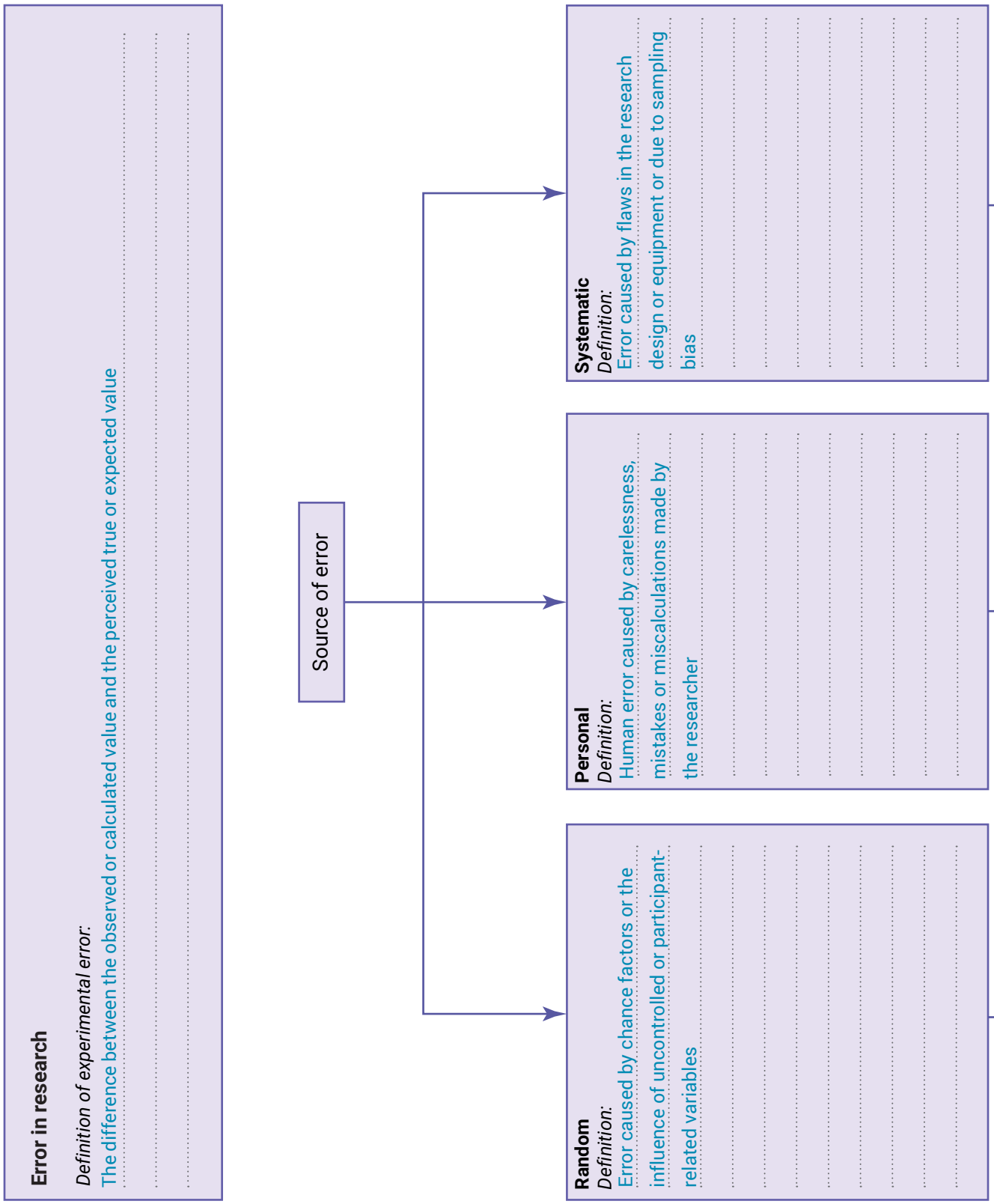
They can be used to rule out variables or to identify other variables of research interest that might be involved.

They can help researchers to make predictions about possible relationships that *may* exist.

ACTIVITY 1.14

Types of error

Complete the concept diagram relating to sources of error by filling in the boxes.



jacaranda
A Wiley Brand

Examples:
personality type, health status, motivation, mood, alertness, education etc.

Influence can be minimised by:
Anticipating and then setting up better controls for extraneous variables; by applying random and stratified sampling techniques; by repeating measurements; by using averages rather than individual data; by reducing the number of researchers involved in collecting data.

Reported in research? Yes/No
Yes

Examples:
calculating incorrectly, misreading a score, using the wrong formula to calculate a score, running late or out of time etc

Influence can be minimised by:
Repeating measurements and taking greater care or by adopting data logging techniques to reduce human error

Reported in research? Yes/No
No

Examples:
sampling bias, poorly calibrated equipment, allocation error, order effects etc.

Influence can be minimised by:
Try to identify and predict the source of the bias (e.g. human, equipment calibration or sampling) and then rectifying it by adjustment or change of procedure

Reported in research? Yes/No
Yes

ACTIVITY 1.15

Thinking about experimental design – What's the difference?

Explain the difference between each of the following concepts relating to sources of error, experimental design and analysis.

What is the difference between…
systematic and random error? Systematic error is caused by flaws in the research design or equipment, or by sampling bias, whereas random error is caused by chance factors or the influence of uncontrolled or participant related variables.
error and uncertainty? Error refers to the difference between the observed or calculated value and the perceived true or expected value, whereas uncertainty is an indication of the range of values the researcher expects the true value to lie within based on how certain they are of their methods of measurement.
precision and accuracy? Precision refers to how closely a set of measurement values agree with each other without regard to how close the measurements are to the believed true value, whereas accuracy relates to how close the researcher believes their value is to the believed 'true' value of the quantity being measured.

jacaranda
A Wiley Brand

an extraneous variable and a confounding variable?

An extraneous variable is any variable other than the independent variable that can cause a change in the dependent variable. A confounding variable is a type of extraneous variable that affects the experiment and control groups differently, such that its effect cannot be separated from the effect of the independent variable.

an experiment and a simulation?

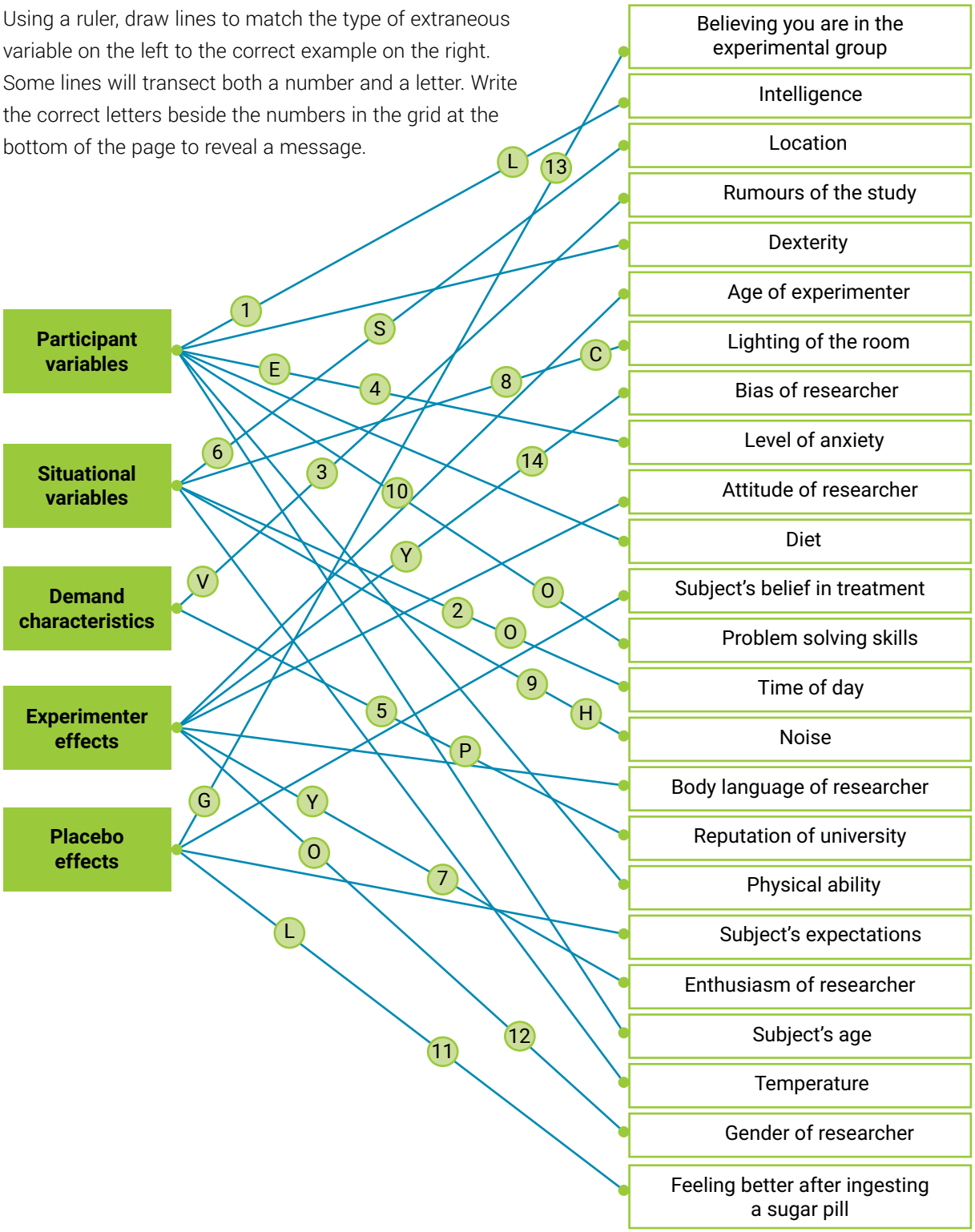
An experiment is when an independent variable is systematically changed to determine its effect on a dependent variable under controlled conditions, whereas a simulation involves reproducing a situation of research interest in a realistic way to investigate the effects of that situation on psychological and behavioural processes.

a cross sectional and longitudinal study?

A cross sectional study uses naturally formed groups to allocate participants into experimental and control conditions to measure a variable at a particular point in time, whereas a longitudinal study tracks the same group of subjects over an extended period of time to observe a change in a variable.

Types of extraneous variables

Using a ruler, draw lines to match the type of extraneous variable on the left to the correct example on the right. Some lines will transect both a number and a letter. Write the correct letters beside the numbers in the grid at the bottom of the page to reveal a message.



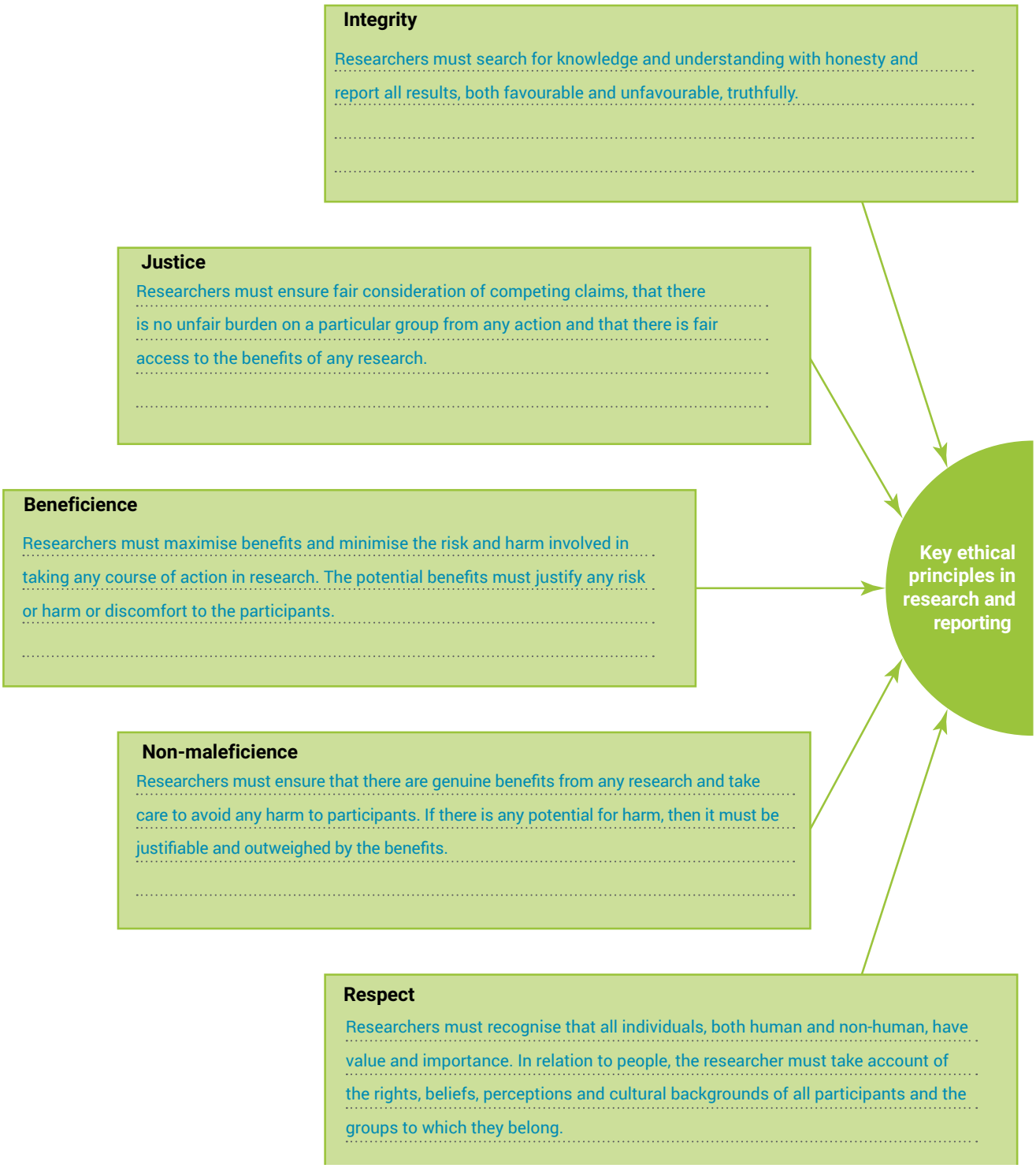
L	O	V	E	P	S	Y	C	H	O	L	O	G	Y
1	2	3	4	5	6	7	8	9	10	11	12	13	14

jacaranda
A Wiley Brand

ACTIVITY 1.17

Summarising ethical principles

Fill in the green panels to complete the chart summarising the five key ethical principles that apply to research.



jacaranda
A Wiley Brand

Summarising the key ethical concepts relating to conducting psychological research

Fill in the purple panels to complete the chart summarising the six key ethical concepts that must apply to psychological research.

Key ethical concepts when conducting psychological investigations

Confidentiality

The researcher must ensure that theprivacy and anonymity of testsubjects is protected and maintained This includes the security of personal data and test results. These protections must be disclosed before the commencement of the study.

Voluntary participation

No coercion or pressure is put upon the participant to partake in an experiment and they freely choose to be involved. The researcher must ensure participants voluntarily consent to be involved in an investigation.

Informed consent

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

Withdrawal rights

Participants are free to end their involvement in an experiment at any time during or after the conclusion of an experiment without penalty. This may include the removal of the participant's results from the study after the study is completed. Participants also have the right to withdraw without giving a reason for doing so.

Debriefing

Debriefing ensures that, at the end of the experiment, the participant leaves understanding the experimental aim, results and conclusions. Any questions participants have are addressed and support is also provided to ensure there is no lasting harm from their involvement in the study. If a study involves deception, debriefing must fully explain the deception and why it was required.

Use of deception in research

By its nature, deception violates the ethical requirement of informed consent. Its use also means the relationship between the researcher and participant is not open and honest. However, deception is considered acceptable if the potential benefits of the research justify its use and there is no feasible alternative to its use.

ACTIVITY 1.19

Classifying ethically appropriate conduct for psychological research

The National Statement on Ethical Conduct in Human Research (2007) has been devised to 'promote ethically good human research'. This comprehensive document is organised around five values that should guide the design, review and conduct of all research with people. Tick the value that best reflects each ethical guideline.

Ethical guideline	Integrity	Justice	Beneficence	Non-maleficence	Respect
1 The research must be carried out with a commitment to following all ethical standards.	✔				
2 The research must have potential benefits to participants or the wider community.			✔		
3 The researcher should avoid continually imposing on the same people to participate in their investigation when other suitable participants are available.		✔			
4 The researcher must understand and accept that informed consent is required from all participants regardless of their age or any other personal characteristic.					✔
5 The research must be carried out honestly.	✔				
6 The potential benefits of the research must justify any risks of potential harm to participants.			✔		
7 The researcher must recognise and take account of the rights, beliefs, perceptions and cultural backgrounds of all participants.					✔
8 The research outcomes should be made accessible to participants in a way that is timely and clear.		✔			
9 The research must be carried out and supervised by someone with the expertise that is appropriate for the research.	✔				
10 The researcher must allow any participant to opt out of the research whenever they want to without giving any reason.				✔	
11 The researcher should be focused on achieving good outcomes from their research.			✔		
12 The researcher must not withhold any unfavourable results.	✔				

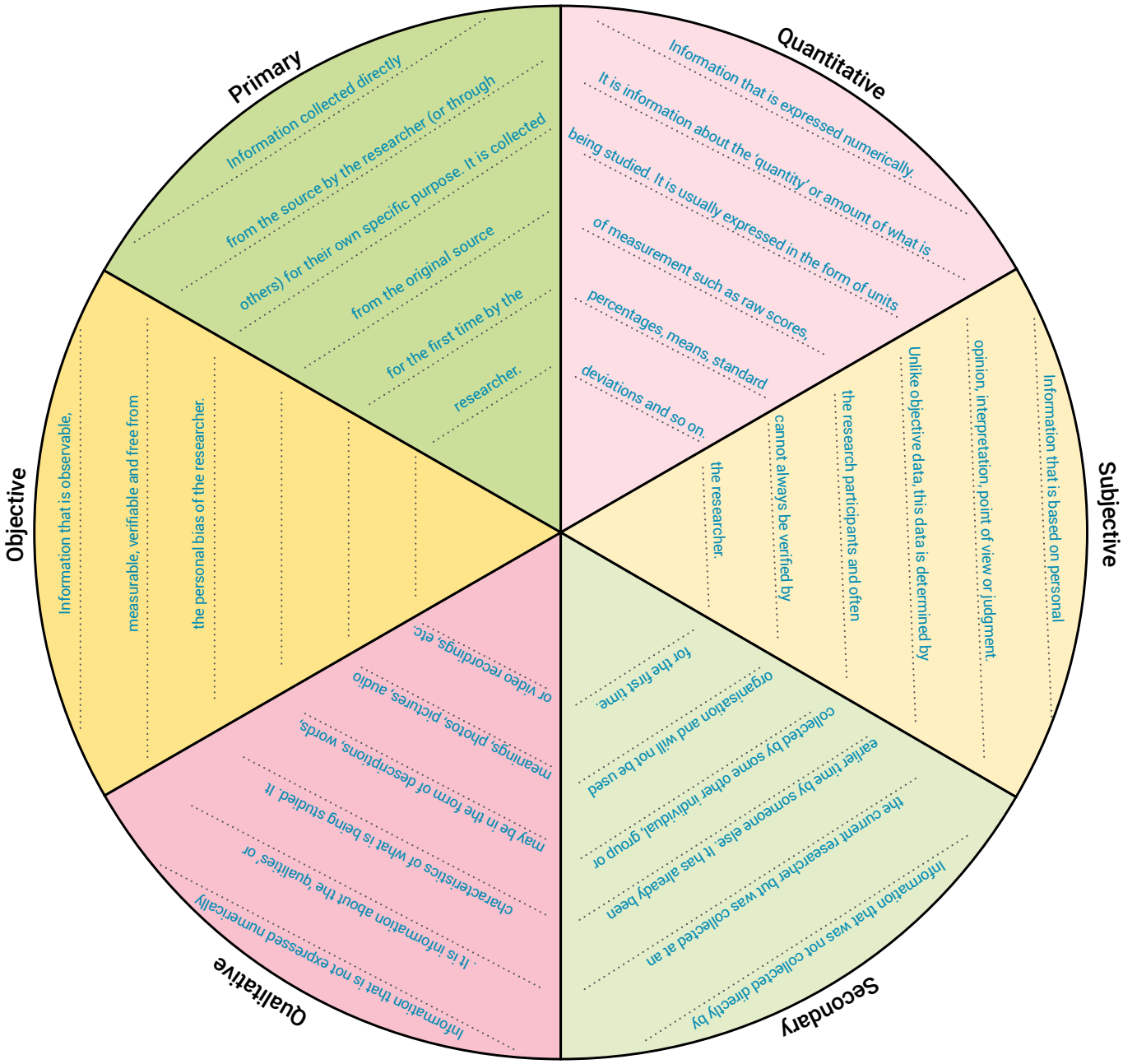
jacaranda
A Wiley Brand

Ethical guideline	Integrity	Justice	Beneficence	Non-maleficence	Respect
13 The researcher must understand and accept that all participants have a right to privacy.					✔
14 The researcher must ensure personal information about participants is protected from loss, misuse and unauthorised access.					✔
15 The researcher must ensure that the costs and benefits of the research are fairly distributed.		✔			
16 The researcher must accurately report all results.	✔				
17 The researcher must properly consider and not overlook the cultural backgrounds and sensitivities of the participants.					✔
18 All participants should be debriefed if the research has unavoidably required that they be deceived about its true purpose or some other aspect.				✔	
19 Whenever possible, the research should be based on a thorough study of the current literature, as well as previous studies.	✔				
20 Where the risks to participants are no longer justified by the potential benefits of the research, the research must be suspended to allow time to consider whether it should be discontinued or at least modified.				✔	

ACTIVITY 1.20

Identifying different types of data

1 Explain the difference between the types of data shown in opposite segments of the circle. The segments have been colour-coded to help you.



jacaranda
A Wiley Brand

2 For each statement below, indicate the segments of the circle that best describe the type of data and then add two of your own. More than one column may be ticked.

Statement	Type of data					
	Primary	Secondary	Qualitative	Quantitative	Objective	Subjective
A researcher collects water samples and tests them for purity	✔			✔	✔	
A volunteer is asked to taste-test water by drinking several different samples	✔		✔			✔
Students fill in a school satisfaction survey using Likert scales from 1–10	✔			✔		✔
A university student writes a report on economic growth based on government data she has researched		✔		✔	✔	
A doctor looks at EEG (brainwave) data to determine a patient's state of consciousness	✔			✔	✔	
A scientist collects rain gauge data from local farmers dating back 20 years and correlates it with verbal recounts of the weather based on the farmer's memory		✔		✔		✔
The federal government collects survey data from every household in Australia every four years	✔			✔		✔
A teacher reviews how well her class performed on the last unit test they completed	✔			✔	✔	
A school reviews all of the test data collected by teachers to evaluate the effectiveness of its teaching programs		✔		✔	✔	
Customers entering a shopping centre are asked why they are shopping there as part of marketing research	✔		✔			✔
.....						
.....						
.....						
.....						
.....						
.....						

ACTIVITY 1.21

Using descriptive statistics to summarise and describe research results

A teacher was interested in examining whether the amount of homework given to his students positively or negatively affected their test results. He decided to conduct research with one of his classes (14 boys and 16 girls) throughout the next semester. During the first topic of study (3 weeks duration), he set no compulsory homework tasks. During the second topic (3 weeks), he set five questions for homework after each class. During the third topic (4 weeks), he set 10 homework questions after each class. After each topic, a test (out of 50 marks) on all key concepts taught for the topic was completed by all students. The scores for each student on each test are shown below

Test 1 (no homework)

37	11	18	34	41	39	23	37	7	17	13	21	23	21	38
37	28	15	50	18	49	28	6	53	10	15	21	10	37	42

Test 2 (five homework questions)

32	18	15	24	47	21	39	38	14	18	27	32	43	19	22
44	31	45	25	43	29	43	41	35	32	49	23	44	35	44

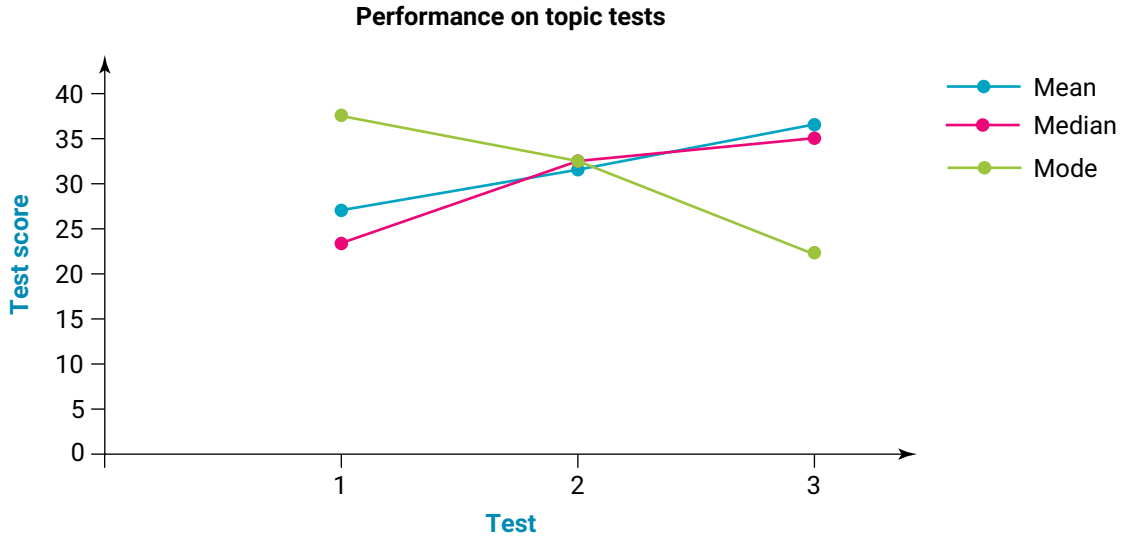
Test 3 (10 homework questions)

48	23	49	30	45	43	47	28	22	24	48	22	28	38	22
49	46	32	50	37	25	31	44	44	50	27	44	31	30	22

1 Use a calculator or spreadsheet to work out the mean, median and mode for the data sets for each test.

Descriptive statistic	Test 1	Test 2	Test 3
Mean	27	32.4	35.97
Median	23	32	35
Mode	37	32	22

2 Use the results to plot the mean, median and mode scores on the same set of axes



jacaranda
A Wiley Brand

3 Look carefully at the graphs you have made. What did you notice about the mean, median and mode for each test?

On test 1, the mode is the highest value and the median is the lowest. On test 2, the mean, median and mode were all similar. On test 3, the mean and median were much higher than the mode.

4 Which descriptive statistics appear to be the most consistent?

Mean and median

5 Explain why the mode is not often used when representing data.

It is often not very representative of the data set. It can be very different from median and mean.

6 Based on the trend shown in the mean test scores for this data set, what conclusion can be drawn?

That increasing the number of homework questions will tend to increase student performance on the unit test scores.

7 Although means are used more frequently than medians to summarise data, medians are useful when dealing with smaller data sets. Suggest why this is.

In smaller data sets, a median is less affected by high or low values, so it is more representative.

ACTIVITY 1.22

Understanding standard deviation

Select terms from the shaded panel to correctly complete the passage about standard deviation. Each term is only used once but not all terms need to be used.

mean	more	values	statistic	standard deviation
mode	percentage	low	two	three
compare	variability	homogenous	scattered	overlap

As well as summarising data sets using values of central tendency such as mean, median and mode, standard deviation is also often useful to describe its level of variability. This is how widely the scores are distributed or scattered around a central value such as the mean. If most of the values lie close to the mean, the data set would be showing low variability and therefore less spread. If most values lie scattered away from the mean, the data set would be showing high variability and also more spread. One way to measure this is to use the standard deviation. This is a summative statistic, which, when calculated, indicates the range of values that include a certain percentage of the sample population. The standard deviation is based on a normal distribution. If data is normally distributed, 68 per cent of scores will lie within one standard deviation, 95 per cent of scores will lie within two standard deviations and over 99 per cent will lie within three standard deviations. The standard deviation can help researchers compare different groups more objectively by indicating the level of variation within the groups. Sometimes this might mean the data values between the two groups overlap or it can mean that one group is more homogenous (has fewer participant-related differences) than the other group.

jacaranda
A Wiley Brand

ACTIVITY 1.23

Reliability and validity in research

Cut and paste each of the following into the concept map on pages 56–57.

- Using different observers/ researchers
- Using different measurement instruments
- Using a different experimental procedure/design
- Conducting the research in a different setting (e.g. laboratory or location)

- Using the same observers/ researchers
- Using the same measuring instruments
- Using the same experimental procedure/design
- Conducting the research in the same setting (e.g. laboratory or location)

The extent to which the results are due to the variable that was tested or measured

The extent to which the results can be generalised to the sample's population or to other people in other settings and over time

- Using research designs and procedures that are appropriate for testing the research hypothesis
- Strictly controling extraneous variables that could influence the IV
- Operationalising experimental variables carefully
- Using appropriate measuring instruments
- Using double blind procedures where possible to reduce participant/experimenter bias

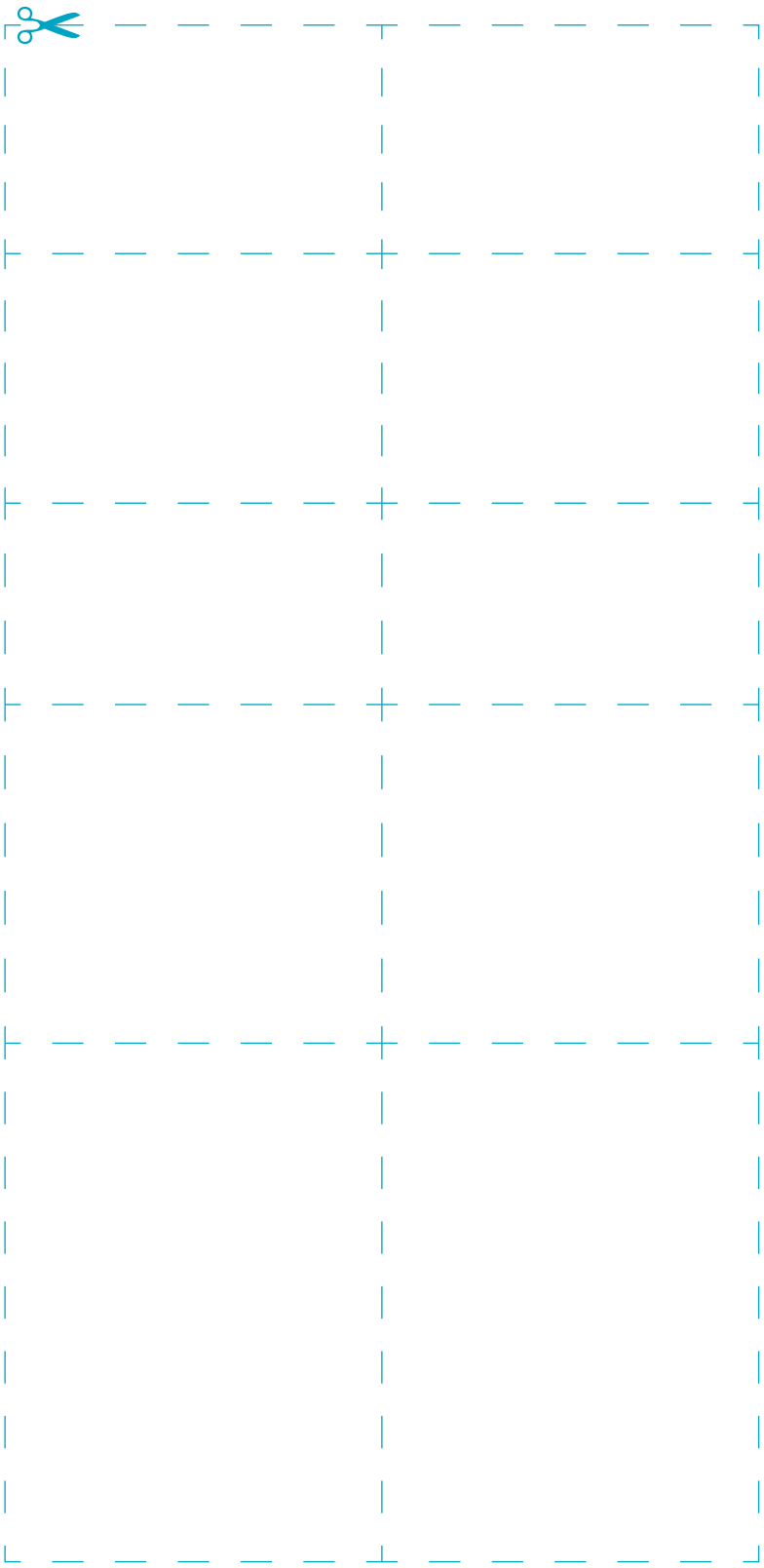
- Using procedures that improve population representation within the sample
- Increasing sample size
- Ensuring research conditions are close to the true life occurrence of the variables under investigation
- Avoiding collecting results that are time dependent (only likely to occur at a specific point in time)

The degree to which a specific research investigation obtains similar results when it is conducted again under the *same* conditions on all occasions

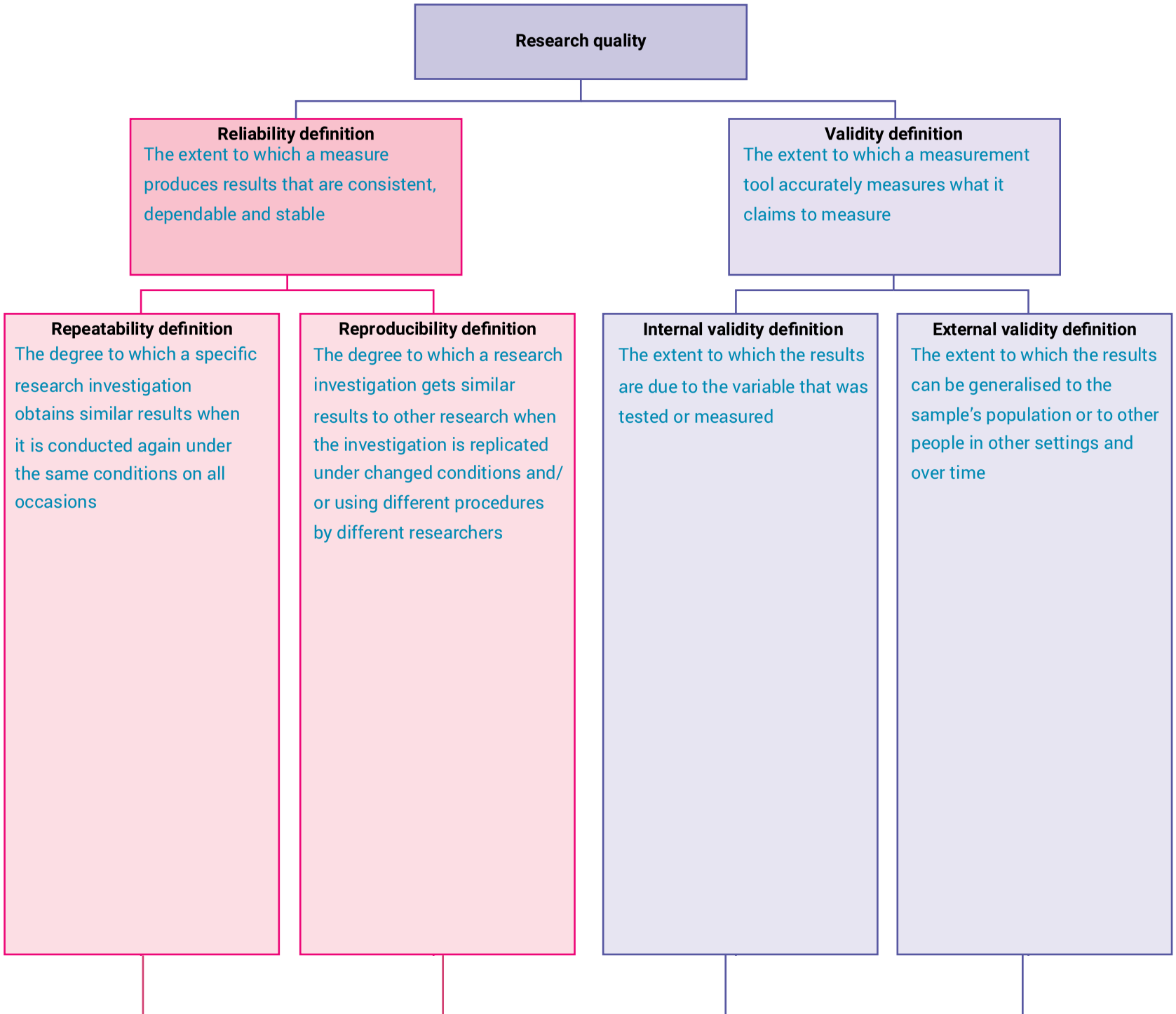
The extent to which a measure produces results that are consistent, dependable and stable

The extent to which a measurement tool accurately measures what it claims to measure

The degree to which a research investigation gets similar results to other research when the investigation is replicated under *changed* conditions and/or using different procedures by different researchers



jacaranda
A Wiley Brand


Research quality
Reliability definition
The extent to which a measure produces results that are consistent, dependable and stable
Validity definition
The extent to which a measurement tool accurately measures what it claims to measure
Repeatability definition
The degree to which a specific research investigation obtains similar results when it is conducted again under the same conditions on all occasions
Reproducibility definition
The degree to which a research investigation gets similar results to other research when the investigation is replicated under changed conditions and/or using different procedures by different researchers
Internal validity definition
The extent to which the results are due to the variable that was tested or measured
External validity definition
The extent to which the results can be generalised to the sample's population or to other people in other settings and over time

Increase repeatability by

- Using the same observers/ researchers
- Using the same measuring instruments
- Using the same experimental procedure/ design
- Conducting the research in the same setting (e.g. laboratory)

Increase reproducibility (verify results) by

- Using different observers/ researchers
- Using different measurement instruments
- Using a different experimental procedure/ design
- Conducting the research in a different setting (e.g. laboratory or location)

Increase internal validity by

- Using research designs and procedures that are appropriate for testing the research hypothesis
- Strictly controling extraneous variables that could influence the IV
- Operationalising experimental variables carefully
- Using appropriate measuring instruments
- Using double blind procedures where possible to reduce participant/ experimenter bias

Increase external validity by

- Using procedures that improve population representation within the sample
- Increasing sample size
- Ensuring research conditions are close to the true life occurrence of the variables under investigation
- Avoiding collecting results that are time dependent (only likely to occur at a specific point in time)

ACTIVITY 1.24

Conclusions, generalisations, opinions and anecdotes

Select terms from the shaded panel to correctly complete the passage about drawing conclusions and making generalisations. Each term is only used once but not all terms need to be used.

generalisation	conclusion	widely	limitations	scientific
relevant	sample	representative	informal	behaviour
extraneous	evidence	investigated	anecdotes	results
population	decision	opinions		

A conclusion is a decision about what the results obtained from a research investigation mean. A conclusion must be consistent with the evidence, relevant to what was investigated, and take account of the quality of the data and acknowledge any limitations of the study. Another type of conclusion is called a generalisation. In research, a generalisation is a decision about how widely the results of an investigation can be applied, particularly to other members of the population from which the sample was drawn. In experimental research, generalising the results from the sample to the population is risky if the sample is not representative. Conclusions and generalisations must be based on the results obtained and consider potential extraneous and confounding variables. Opinions are points of view that are not necessarily based on verifiable evidence and are disputable. They usually involve a judgment. Opinions are vulnerable to change because they are not based on scientific evidence. Anecdotes are informal verbal reports of events that have been casually observed. They tend to be accepted as useful information but are not based on scientific evidence and are therefore considered to be scientifically inadequate. Although anecdotes are personal accounts, they can offer clues about aspects of behaviour and mental processes that may be investigated later through scientific research.

jacaranda
A Wiley Brand

ACTIVITY 1.25

Analysing research on the relationship between eye movements during sleep and dreaming

American psychologist William Dement was among the first researchers to intensively study the connection between rapid eye movement (REM) sleep and dreaming. He did this by recording brain and eye activity during sleep. Early observations had shown that people had periods of rapid eye movements when asleep at night and that brain activity changed in a distinctive way during these REM sleep periods when compared with periods of non-rapid eye movements (NREM) when asleep. Before Dement's research, very little was known about when dreaming is more likely to occur and how often we dreamed during sleep.

In one well-known study, Dement and his colleague Daniel Kleitman (1957) recruited seven adult males and two adult females. Each participant reported to a sleep laboratory just before their usual bed time to help ensure they would fall asleep naturally. They were also instructed to not consume caffeine or alcohol on the day of the sleep lab visit to help ensure their sleep was unaffected.

Electrodes were attached near the eyes to record electrical activity and thereby measure eye movements during the night. Other electrodes were attached to the scalp to measure brain wave activity. The participants were then sent to bed to sleep in a quiet and dark room that had been set up in the lab.

At various times during the night, the participants were woken up (by a doorbell sound) to test their dream recall. In all, the nine participants were studied over a total of 61 nights, with a total of 351 awakenings, which averaged out at 5.7 awakenings per night. Their return to sleep usually took less than 5 minutes.

For one series of awakenings, the participants had to report whether they had been dreaming and, if they had, to describe the content of their dream. This was done by speaking into a recording device near their bed. The participants were assessed as having been dreaming only if they could give a clear and relatively detailed description of the dream content. The results are shown below.

REM sleep awakenings		NREM sleep awakenings	
Recalled a dream	No recall	Recalled a dream	No recall
152	39	11	149

1 Identify the operationalised independent and dependent variables.

independent variable: occurrence of REM or NREM sleep

dependent variable: recall or no recall of a dream after REM and NREM sleep awakenings

2 Tick the types of data that were collected.

- [x] primary
- [ ] secondary
- [x] quantitative (i.e. number of participants who could/could not recall dreams)
- [x] qualitative (i.e. dream descriptions used to assess whether or not a dream had been experienced)

3 Explain whether the sample is best described as a biased or representative sample.

Explanation should demonstrate understanding that the sample is biased and cannot be described as representative because it was not randomly selected and is quite small, all adult and mainly male.

4 **(a)** Explain and give an example of how potential experimenter effects were controlled..

- Experimenter effects were controlled by not communicating with participants during each night of the study.
- Examples include: use of a doorbell sound to awaken participants, use of a recording device for dream reports.

(b) Describe three other variables that were controlled by the researchers.

Variables include:

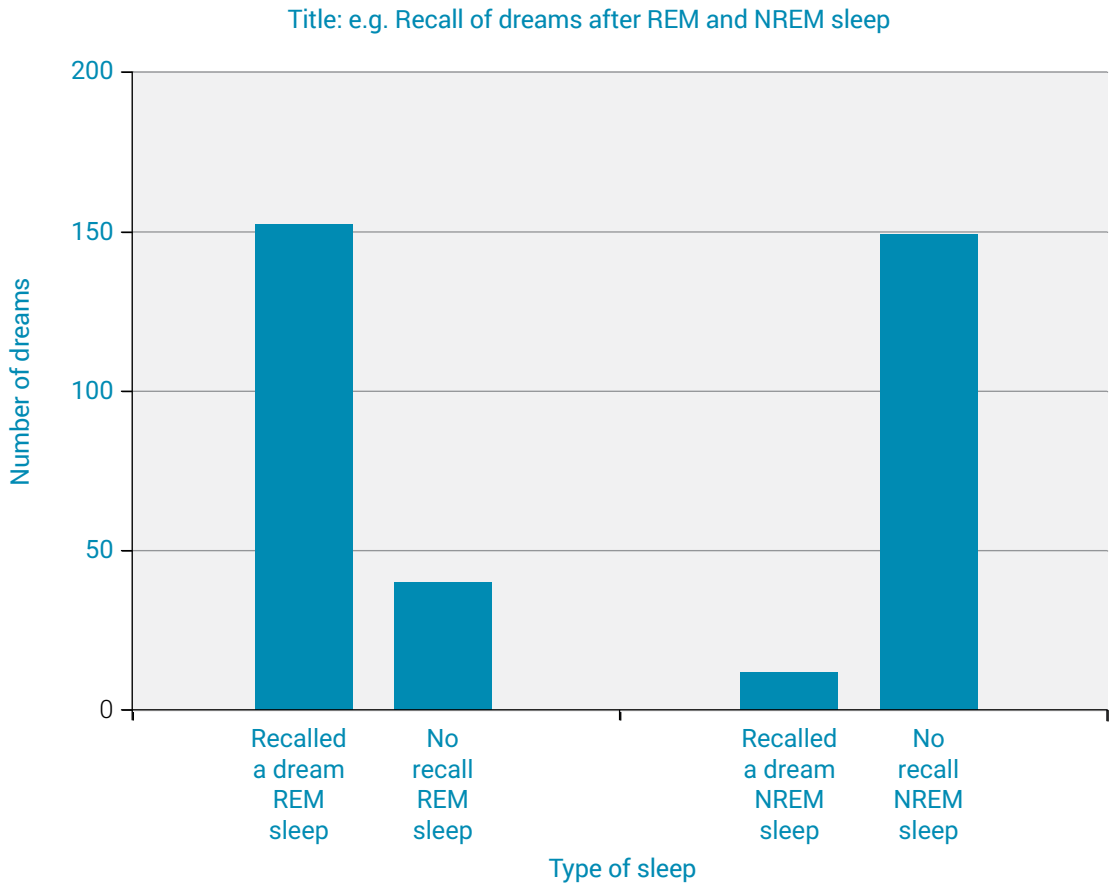
- location of the sleep study was standardised
- using the usual sleeping time of participants
- participants attending the lab and sleeping individually as they normally do (rather than as a group)
- measures (e.g. devices used to record eye movements and brain activity)
- participants were instructed to avoid caffeine (a stimulant) and alcohol (a depressant), both of which can disturb sleep type or quality and influence brain wave type.

5 Explain whether the research method can be described as experimental research.

Explanation should demonstrate understanding that the research is not a true experiment primarily because there is no random allocation of participants to different experimental and control groups/conditions. Instead, an existing group is used in condition(s). The research may, however, be described as a quasi-experiment. It used a within groups (repeated measures) design.

jacaranda
A Wiley Brand

6 Complete the graph below using the results shown in the table. Ensure you label each axis and give the graph a suitable title.



7 What valid conclusion can be drawn from the results of the study?

Example: The results show that participants were much more likely to recall dreams in REM sleep than NREM sleep.

8 **(a)** What are three possible differences between sleeping in a laboratory and sleeping in your own bed at home?

Differences may include familiarity of own bedroom vs lab environment, use of video cameras, being connected to electronic monitoring devices such as EEG, EOG and EMG, privacy vs no privacy, change in night-time routine, awaking naturally or not waking at all during sleep vs being awakened.

(b) How could these differences affect the external validity of the research?

Explanation should demonstrate understanding that external validity refers to the extent to which the results can be generalised to the sample's population or to other people in other settings and over time. This could be limited by the artificiality of the lab environment and the waking procedure that disturbed the participants' normal sleep routine, sleep quantity and/or sleep quality (e.g. sleeping in an unfamiliar environment with electrodes attached to the head, being woken up several times to report dreaming etc. is unlikely to occur in an everyday sleep environment outside the lab).

9 Explain an ethical issue of particular relevance to this study.

All ethical standards are relevant to all research using human participants. For example, participant wellbeing may be proposed as being of particular relevance to this study given the sleep disturbance procedure that was used over a prolonged period (e.g. being awoken several times from the natural sleep process can cause physical discomfort such as fatigue, headaches etc. and psychological discomfort such as irritability, difficulties concentrating, etc). However, other ethical standards such as use of informed consent, confidentiality, withdrawal rights etc. are also relevant and essential.

jacaranda
A Wiley Brand

10 For another series of awakenings, the participants were woken randomly at either 5 or 15 minutes during a REM sleep period and asked whether they had been dreaming for 5 or 15 minutes. The results are shown below.

Woken after 5 minutes of REM sleep		Woken after 15 minutes of REM sleep	
Correct	Incorrect	Correct	Incorrect
45	6	47	13

.

(a) Write a research hypothesis that would be supported by the result in the table.

Examples: participants will accurately estimate dream length; participants will accurately estimate dream length regardless of the length of time spent in REM sleep; if woken after 5 minutes or 15 minutes of REM sleep, participants will accurately estimate dream length.

(b) What valid conclusion can be drawn from the results in the table?

Example: Participants tended to be accurate in the estimation of dream length.

Source: Based on Dement, W. & Kleitman, N. (1957). The relation of eye movements during sleep to dream activity: An objective method for the study of dreaming. *Journal of Experimental Psychology, 53*(5), 339–346.

ACTIVITY 1.26

Crossword on concepts and terms in research methods

Across

6 The individuals in a sample.
8 Conducting a research study again to find out whether the results are reliable.
11 The extent to which a procedure measures what it intends to measure.
14 A general explanation of a set of observations that seem to be interrelated.
19 A statistic that describes how far scores within a set of scores spread out from the mean.
20 Involving personal opinion or interpretation.
21 The type of relationship that can be tested through experimental research.
22 The name given to a type of within groups design where the same participants are used more than once in different experimental conditions
23 A procedure by which every member of a group has an equal chance of being selected to be part of a sample.

Down

1 A procedure used to control order effects.
2 The degree to which research or a specific measure produces stable and consistent results.
3 The variable whose value depends on the independent variable.
4 A variable other than the independent variable that may cause a change in the dependent variable.
5 When there is a change in a participant's behaviour due to their belief that they have received some kind of treatment.
7 A research method that may use questionnaires or interviews.
9 The group that decides whether a research proposal meets all ethical requirements.
10 A control procedure to prevent participants from knowing which condition of the experiment they are in.
12 The ethical standard that is followed when a description of a research study is made available to potential participants.
13 To apply the results of a study to other people or situations.
15 The research method used for an in-depth investigation of a single person or group.
16 A statistic describing the average of a group of scores.
17 The experimental condition in which the treatment under investigation is withheld.
18 When an observation occurs in a real-world setting.

1 C O U N T E R B A L A N C I N G
2 R E L I A B I L I T Y
3 D E P E N D E N T I S
4 E X T R A N E O U S
5 P L A C E B O
6 P A R T I C I P A N T
7 S U R V E Y
8 R E P L I C A T E
9 E T H I C S
10 S I G N I F I C A N T
11 V A L I D I T Y
12 I N F O R M E D C O N S E N T
13 G E N E R A L I Z E S
14 T H E O R Y
15 C A U S E S
16 M E A N
17 C O N T R O L
18 N A T U R A L I S T I C
19 S T I M U L U S
20 S U B J E C T
21 C A U S A L
22 R E P E A T E D M E A S U R E S
23 R A N D O M S A M P L I N G

ACTIVITY 1.27

True/False quiz on research methods in psychology

Indicate whether each statement is true or false by writing T or F in the column on the right.

Statement	T/F
1 The scientific method bases conclusions on evidence.	T
2 Random allocation is an essential characteristic of a true research experiment.	T
3 The use of deception by a researcher is justifiable when it can be reasonably assumed that participants will not give informed consent.	F
4 A difference between primary and secondary data is in who collects the data.	T
5 A limitation of self-report data is that it is always qualitative.	F
6 Whether an observational study is described as naturalistic or contrived depends on where it was conducted.	T
7 Valid conclusions are not really possible if the results are not obtained through experimental research.	F
8 A problem created by extraneous variables is that their potential effects can be difficult to isolate from the independent variables.	T
9 Experimenter bias refers to an effect produced by participants when they know they are in an experimental group.	F
10 Ethical standards apply to research with humans but not animals.	F
11 To operationalise variables means to describe them in testable and measurable ways.	T
12 Only an experiment can have a repeated measures design.	F
13 A control group is matched as closely as possible with an experimental group, but is not exposed to any experimental treatment.	T
14 Participant variables refer to the differences in the research participants.	T
15 Selecting appropriate research methods, measurement tools and procedures helps ensure the internal validity of a research study.	T
16 Convenience sampling is the most efficient way of obtaining a representative sample.	F
17 The repeated measures experimental design is vulnerable to order effects but not the placebo effect.	F
18 Tailoring research instructions and procedures to suit the needs of all the individual participants helps ensure the best results are collected.	F
19 A simulation study is the same as a research experiment.	F
20 The double-blind procedure enables greater control in experimental research.	T
21 A research study cannot have external validity if it does not also have internal validity.	T

jacaranda
A Wiley Brand

Statement	T/F
22 The larger the sample size, the closer the sample's mean score is likely to be to the mean score for the sample's population.	T
23 A research hypothesis should not predict the relationship between the variables to be tested in order to control unwanted experimenter effects.	F
24 Replication of an experiment by the same researcher is used to test the reproducibility of the results.	F
25 The within groups experimental design controls participant variables by ensuring all participants are in both the experimental and control groups.	F

UNIT 1

HOW ARE BEHAVIOUR AND MENTAL PROCESSES SHAPED?

TOPIC 2

The complexity of psychological development

	Activities											
Key knowledge	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	2.11	2.12
• the interactive influences of hereditary and environmental factors on a person's psychological development	✔										✔	✔
• the biopsychosocial approach as a model for considering psychological development and mental wellbeing		✔		✔							✔	✔
• the process of psychological development (emotional, cognitive and social development) over the course of the life span			✔	✔	✔	✔	✔	✔			✔	✔
• the role of sensitive and critical periods in a person's psychological development									✔	✔	✔	✔
Key science skills									✔			

Source: © VCAA; reproduced by permission, *VCE Psychology Study Design: 2023–2027*. p. 24

ACTIVITY 2.1

The influence of hereditary and environmental factors

The various factors influencing the development of our psychological characteristics can be classified as either hereditary ('nature') or environmental ('nurture'). Read each of the following scenarios and answer the questions about them.

Scenario 1

Psychologists Jessica Tracy and David Matsumoto (2008) conducted research in which they compared body language (non-verbal expressions) expressed by sighted and blind athletes. They used photographs of competitors taken immediately after they had experienced success in judo events at the Olympic and Paralympic Games.

The results showed that the body language responses among sighted athletes, athletes who have been blind since birth (congenitally blind) and athletes who went blind later in life were very similar. When sighted and blind athletes won their events, their reactions included expressions such as an expanded posture, the head tilted back, both arms out and raised, chest beating and strutting. These responses occurred spontaneously in the same success situation and regardless of the sex or cultural background of the competitors.

Source: Tracy, J.L., & Matsumoto, D. (2008). The spontaneous expression of pride and shame: Evidence for biologically innate nonverbal displays. *Proceedings of the National Academy of Sciences of the United States of America, 105(33),* 11655–11660.

Do the results of this research suggest that spontaneous body language in response to success is influenced by nature, nurture or both? Explain your answer.

The researchers concluded that 'behavioural expressions associated with success are likely to be innate' and therefore primarily influenced by nature, because it was impossible for congenitally blind athletes to have learned to show this response from watching others or from being taught by their parents. 'Although parents may teach young children to engage in some of these behaviours through direct physical contact (e.g. moving a child's arm above their head) when they experience success, it is unlikely that parents would or could teach the full configuration of these behaviours (e.g. expanded chest, hands in fists, etc.) in this manner. Therefore, these findings strongly suggest that congenitally blind athletes engage in these behaviours in response to victory and feelings of success because humans have an innate biological predisposition to do so' (Tracy & Matsumoto, 2008. p.11658).

jacaranda
A Wiley Brand

Scenario 2

Clinical neuropsychologist Professor Sarah Wilson from the University of Melbourne is leading a research team investigating whether our ability to sing in tune is influenced more by nature or nurture. The team is recruiting up to 1500 pairs of twins aged 15 years and above to test their abilities to hear different pitches accurately, but particularly their ability to sing in tune. Among other tasks, participants are asked to sing 'Happy birthday', as well as listen to and sing back a series of single notes. The study is testing both identical and fraternal twins. By comparing similarities and differences across the two groups of twins, the researchers will work out the extent to which nature and nurture influence singing in tune.

Source: University of Melbourne (2019). *Let's hear twins sing!* (Expression of interest site). Retrieved https://twinsvox.wixsite.com/letssing/our-study

1 If our ability to sing in tune is largely influenced by nature, what will the study find?

If identical twins show greater similarity in their ability to sing in tune, compared to fraternal twins, this will suggest that singing ability is influenced by nature. If one identical twin can (or can't) sing in tune, the chance of the other twin having that same ability will be very high. That is, one twin's singing ability will be a good 'predictor' of the other twin's singing ability.

2 If our ability to sing in tune is largely influenced by nurture, what will the study find?

If our ability to sing in tune is largely influenced by nurture, identical twins will show significant differences in their ability to sing a tune. That is, even if one identical twin can sing in tune, there will be significant variability in whether the other twin can do so. Their ability to do so will depend upon a number of environmental factors such as whether they had singing lessons, studied music at school, the type and amount of exposure to music at home, whether they attended music concerts, and so on.

3 How is studying twins going to assist the researchers to work out the relative influence of nature versus nurture on singing ability?

If a characteristic is more common among identical twins than fraternal twins, it will suggest that nature is partly responsible because identical twins share 100% of their genes, whereas fraternal twins share just 50% of their genes. Studies of monozygotic twins in particular provide valuable information to psychologists because any differences that later develop between them can be attributed to differences in their upbringing and experiences (i.e. nurture).

Scenario 3

Angelina Jolie is a highly successful and talented Hollywood actor. She has three adopted children (Maddox, Pax and Zahara) as well as three biological children (Shiloh, Knox and Vivienne), fathered by fellow highly successful and talented Hollywood actor Brad Pitt.

1 If acting ability is largely influenced by nature, which of Angelina's children would have the most chance of being successful actors themselves? Explain your answer.

If acting ability is largely influenced by nature, Shiloh, Knox and Vivienne would have the most chance of being successful actors themselves because they are the biological children of Angelina and Brad (who are both successful actors) and may have inherited genes that contribute the aspects of acting ability.

2 If acting ability is largely influenced by nurture, which of Angelina's children would have the most chance of being successful actors themselves? Explain your answer.

If acting ability is largely influenced by nurture, any of the 6 children would have the potential to be successful actors if they wanted because they have all been raised by Angelina and Brad (who are both successful actors), so they have all been exposed to similar environmental influences.

3 How would studying children who have been adopted help researchers work out the relative influence of nature versus nurture on acting ability?

Children who have been adopted have no genetic similarity to their adoptive parents. By examining similarities and differences between adopted children and their adoptive and biological parents, researchers can gain insights into the relative influences of nature and nurture on a range of characteristics. Similarities between children and their adoptive parents would suggest the influence of nurture is greater, whereas similarities between adopted children and their biological parents would suggest the influence of nature is greater.

jacaranda
A Wiley Brand

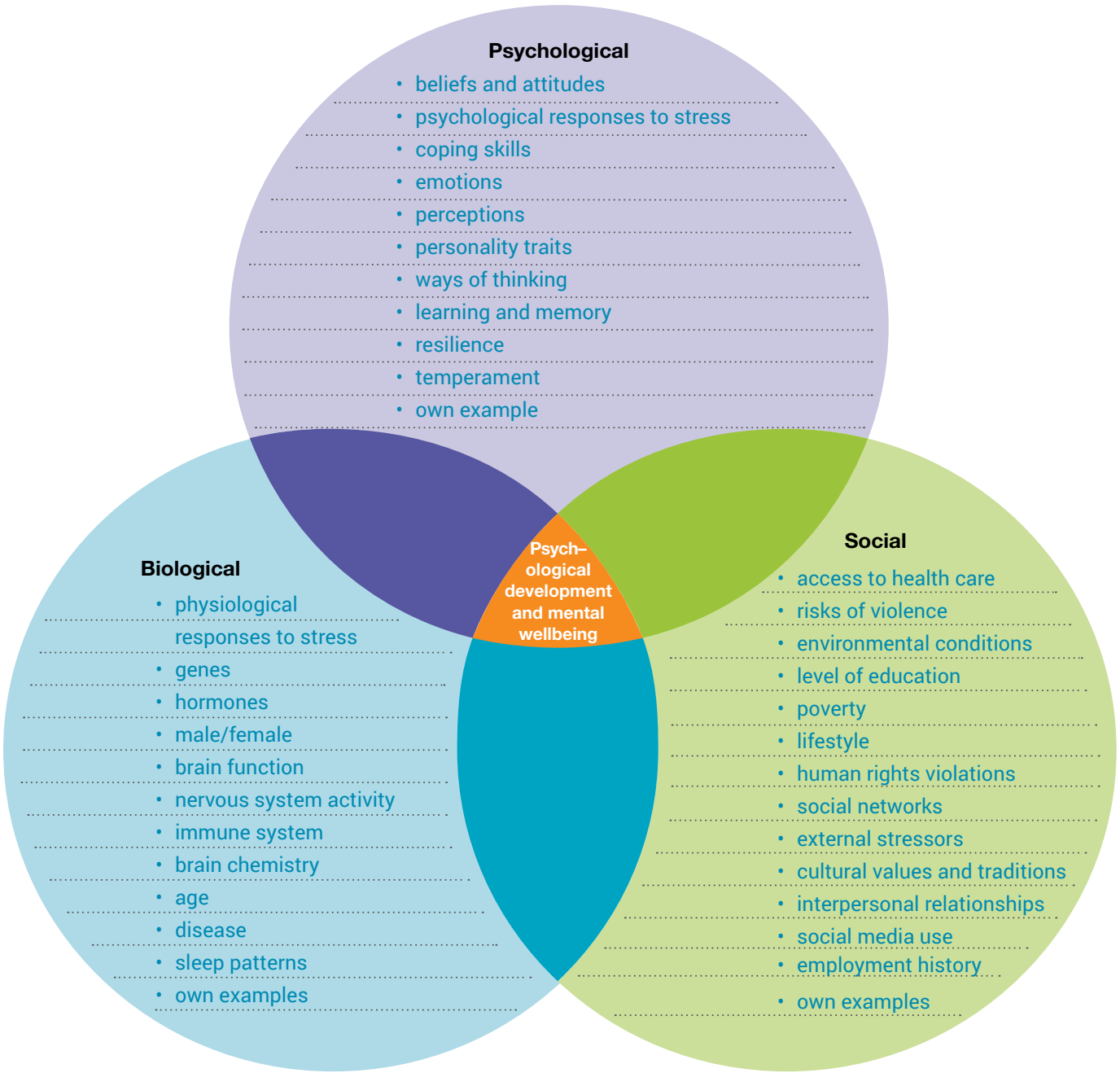
ACTIVITY 2.2

The biopsychosocial model

The biopsychosocial model is a way of describing how biological, psychological and social factors combine and interact to influence a person's psychological development and mental wellbeing.

Categorise each of the following factors as biological, psychological or social by writing them in the correct area of the diagram. Then, write one of your own examples in each area.

physiological responses to stress	access to health care	risks of violence
environmental conditions	level of education	poverty
beliefs and attitudes	genes	lifestyle
psychological responses to stress	hormones	male/female
brain function	human rights violations	nervous system activity
social networks	coping skills	immune system
emotions	perceptions	external stressors
cultural values and traditions	interpersonal relationships	personality traits
ways of thinking	learning and memory	brain chemistry
age	sleep patterns	resilience
social media use	employment history	temperament
disease		



jacaranda
A Wiley Brand

ACTIVITY 2.3

Emotional development: Ainsworth's theory of attachment

Part A

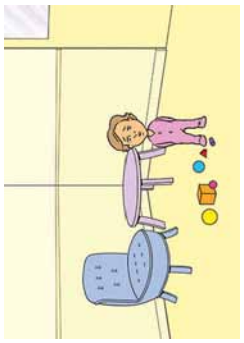
Cut out each of the following images and captions below and paste them in the correct order on page 79 to create a Strange Situation story board.

Experimenter leaves caregiver and infant to play

Caregiver sits while infant plays

Caregiver leaves, stranger lets infant play, offers comfort if needed

Stranger enters and talks to caregiver

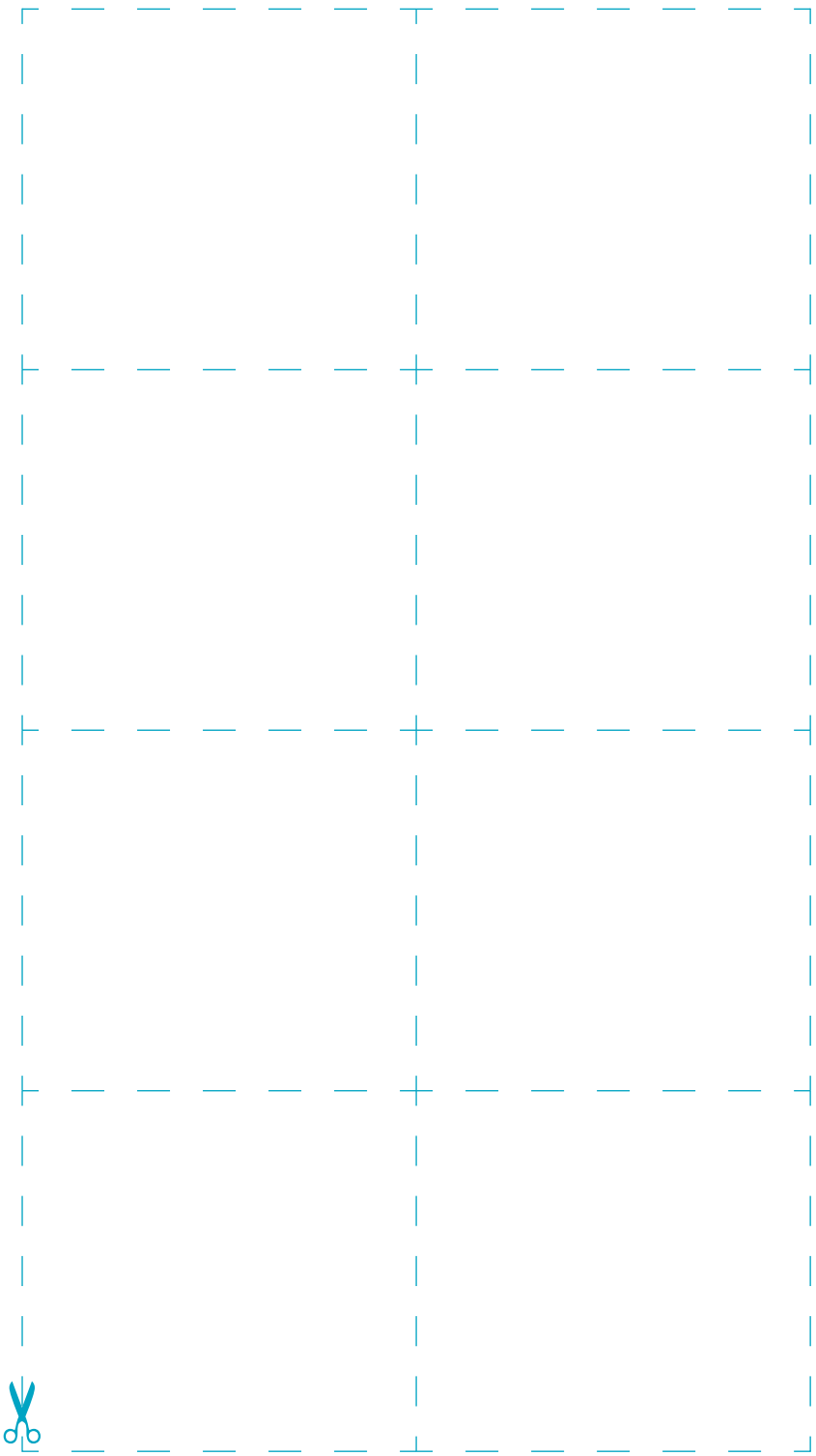


Caregiver leaves

Stranger enters and offers comfort

Caregiver returns, greets infant, offers comfort and lets infant return to play

Caregiver returns, greets infant, offers comfort if needed; stranger leaves



jacaranda
A Wiley Brand

1 Experimenter leaves caregiver and infant to play

2 Caregiver sits while infant plays

3 Stranger enters and talks to caregiver

4 Caregiver leaves, stranger lets infant play, offers comfort if needed

5 Caregiver returns, greets infant, offers comfort if needed; stranger leaves

6 Caregiver leaves

7 Stranger enters and offers comfort

8 Caregiver returns, greets infant, offers comfort and lets infant return to play

Part B

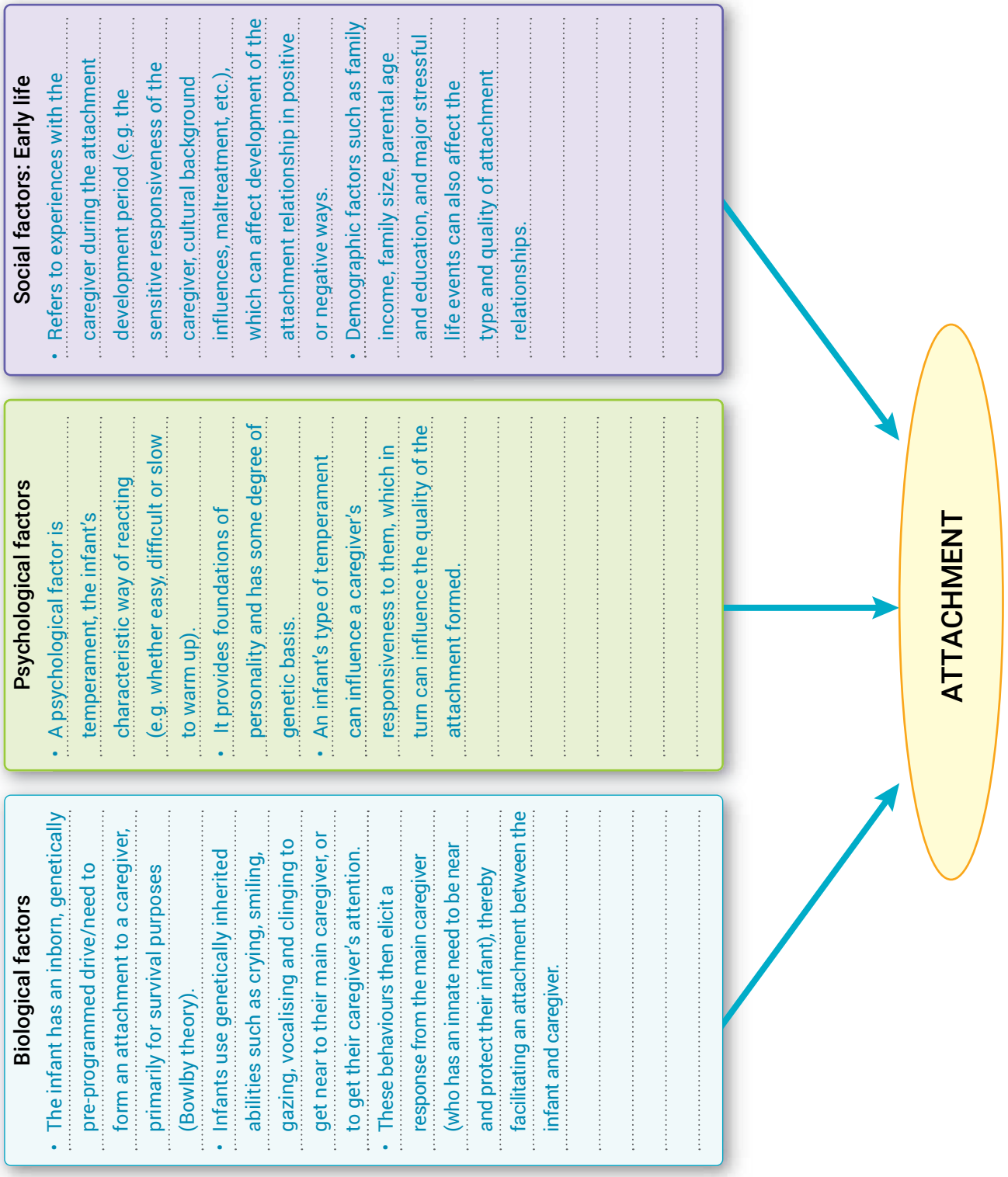
Complete the following table based on the results of Ainsworth's research using the Strange Situation procedure.

	Secure attachment	Insecure avoidant attachment	Insecure resistant attachment
Behaviour observed during the Strange Situation procedure	The infant uses their caregiver as a safe base from which to explore the unfamiliar environment. The infant displays moderate distress and decreases exploration when the caregiver departs, but when the caregiver returns is enthusiastic, seeks physical contact and desires to be comforted by them. The infant appears confident the caregiver will return when they depart.	The infant does not seek closeness or contact with their caregiver and treats them much like a stranger. The infant rarely cries when the caregiver leaves the room and ignores and avoids the caregiver when they return.	The infant appears anxious, even when their caregiver is near. The infant becomes very upset when separated from them. When the caregiver returns, the infant approaches them and cries to be picked up, but then resists contact by squirming and fighting to get free.
Estimated percentage of one-year-olds in this category	about 65%	about 20%	about 12%

ACTIVITY 2.4

Summarising biopsychosocial influences on attachment

Complete the chart below to summarise how biopsychosocial factors may influence the development and emergence of attachment.



ACTIVITY 2.5

Analysing Harlow's experiment on emotional development

Use the words in the shaded panel below to complete the dot points about Harlow's experiment on emotional attachment in monkeys. Each term may be used more than once but not all terms are used.

adoptive	attachment	cloth	comfort
eight	food	foster	four
infant	less	more	privation
security	surrogate	10	wire

In Harry Harlow's experiment (1958):

- a total of eight newborn Rhesus monkeys were individually reared in cages, each of which contained two surrogate mothers
- it was hypothesised that if an infant's attachment to its mother is based on feeding, then the monkey will prefer and form an attachment with the surrogate mother that provides food.
- the wire surrogate offered food, whereas the cloth surrogate offered comfort.
- the infant monkeys' preferences for the cloth surrogate was particularly evident when they were emotionally distressed
- the infant monkeys spent significantly more time with the cloth surrogate regardless of which surrogate provided food.

jacaranda
A Wiley Brand

ACTIVITY 2.6

Development of cognitive abilities

Tick the correct column(s) to indicate the stage(s) of Piaget's theory of cognitive development to which each statement relates.

Statement	Stage of cognitive development			
	Sensori-motor	Pre-operational	Concrete operational	Formal operational
1 Most young adolescents entering secondary school at 12 or so years of age are in this stage.				✔
2 A cognitive accomplishment in this stage is abstract thinking.				✔
3 Compared to the previous stage, there is increasing use of the ability to use symbols to represent objects that are not physically present.		✔		
4 A cognitive accomplishment in this stage is the ability to mentally follow a sequence of events or line of reasoning back to its starting point.		✔		
5 This stage spans from birth to about 2 years of age.	✔			
6 A cognitive accomplishment in this stage is learning that objects still exist, even if they cannot be seen, heard or touched.	✔			
7 A cognitive accomplishment in this stage is the ability to classify objects or events into categories based on common features that set them apart from other categories.			✔	
8 Children in this stage are unable to, or have difficulty in considering, another person's point of view.	✔	✔		
9 This stage spans from ages 2 to 7 years.		✔		
10 Children in this stage can focus on only one quality or feature of an object or event at a time.	✔	✔		
11 This stage spans from ages 7 to 12 years.			✔	

Statement	Stage of cognitive development			
	Sensori-motor	Pre-operational	Concrete operational	Formal operational
12 A cognitive accomplishment in this stage is understanding conservation of number, mass, volume and length.			✔	
13 A cognitive accomplishment in this stage involves transformation.		✔		
14 Deductive reasoning and idealistic thinking are unlikely before this stage.				✔
15 Children in this stage believe that everything that exists has some kind of consciousness.		✔		
16 In this stage, the focus is on exploring and learning about the world primarily through the senses and motor activities.	✔			
17 In this stage, more complex thought process are common, including scientific reasoning and understanding the concepts of time and distance.				✔
18 In this stage, the person is now capable of true logical thought and can perform mental 'operations'.			✔	
19 In this stage, logical reasoning can only be applied to objects or events that can be touched, seen or experienced in some way through the senses.			✔	
20 A characteristic of this stage is the ability to solve problems systematically.				✔

jacaranda
A Wiley Brand

Social development: Identifying Erikson's stages

Identify which of Erik Erikson's stage of psychosocial development is best depicted by each image. Include the full name and age range of the stage in your answer.

Stage 5: Identity vs role confusion
(12 to 18 years)

Stage 1: Trust vs mistrust
(0 to 12–18 months)

Stage 8: Integrity vs despair
(65+ years)

Stage 2: Autonomy vs shame and doubt
(12–18 months to 3 years)

Stage 3: Initiative vs guilt
(3 to 5 years)

Stage 6: Intimacy vs isolation
(18 to 25 years)

Stage 7: Generativity vs stagnation
(25 to 65 years)

Stage 4: Industry vs inferiority
(5 to 12 years)

ACTIVITY 2.8

Matching exercise on Erikson's theory of psychosocial development

Match each stage with the correct psychosocial crisis on the right. Write the letter of the crisis you select on the line to the left of each stage. Each crisis may be used only once.

(d)	Stage 1: Early infancy	**(a)** generativity vs stagnation
(h)	Stage 2: Late infancy	**(b)** industry vs inferiority
(f)	Stage 3: Early childhood	**(c)** identity vs role confusion
(b)	Stage 4: Middle and late childhood	**(d)** trust vs mistrust
(c)	Stage 5: Adolescence	**(e)** integrity vs despair
(g)	Stage 6: Young adulthood	**(f)** initiative vs guilt
(a)	Stage 7: Adulthood	**(g)** intimacy vs isolation
(e)	Stage 8: Late adulthood	**(h)** autonomy vs shame and doubt

jacaranda
A Wiley Brand

ACTIVITY 2.9

Evaluation of research on a sensitive period in development

A researcher, John Smith, conducted an investigation to find out whether there is a sensitive period for learning music and therefore a best possible time for musical training. It was hypothesised that specific cortical areas in the brains of musicians who had learnt to play an instrument early in life would be larger than corresponding areas in the brains of musicians who started their musical training when older. The researcher also expected that those who started their musical training earlier would be more able musicians.

Thirty-two highly trained musicians were recruited. All had at least eight years of musical experience, and were currently practicing and performing professionally. These participants were matched on 3 variables and then randomly allocated to either of two groups. The matching variables were sex (male and female), years of musical experience (total years and practicing music) and years of formal training (total years of music lessons). The two groups were:

- Group 1: 20 early learner (EL) adults (mean age 24.2 years) who started music lessons before age 9
- Group 2: 20 late learner (LL) adults (mean age 25.1 years) who started music lessons after age 9.

The researcher also recruited 20 non-musicians (NM) and formed Group 3. This group comprised 10 males and 10 females (mean age 24.6 years) who had no formal musical experience and were not currently practicing an instrument or undergoing musical training.

All participants were given theoretical and practical tests of musical abilities. They were also required to undergo a CT scan so that the size of three brain areas assumed by the researcher to have a role in musical ability — auditory cortex, motor cortex and the cerebellum — could be measured.

The results showed no significant difference in the musical abilities of Group 1 (EL) and Group 2 (LL), but both of these groups of musicians performed significantly better than Group 3 (NM) on the tests. The CT scans showed some differences in the size of the targeted cortical areas, especially between those of musicians and non-musicians. However, differences were not significant. The researcher concluded that it is unlikely that there is a sensitive period in development for learning music.

ACTIVITY 2.9 *continued*

1 Identify the operationalised independent and dependent variables.

independent variable(s): age at which the musicians started their musical training (before or after 9 years of age)

dependent variable(s): (1) mean score/performance on theoretical test of musical ability; (2) mean score/performance on practical test of musical ability; (3) size/volume of auditory cortex; (4) size/volume of lower area of motor cortex; (5) size/volume of the cerebellum

2 Identify the experimental and control groups.

experimental group(s): Group 1 (EL) and Group 2 (LL)

control group(s): Group 3 (NM)

3 (a) Name the experimental research design.

matched participants

(b) What is the main purpose of using this design for this particular experiment?

Explanation should demonstrate understanding that the design enabled the researcher to strictly control participant variables considered to be potentially very influential on the DV and therefore the results (i.e. strict control of sex, years of musical experience and years of formal training by ensuring equivalent allocation and therefore distribution of these variables/characteristics in Groups 1 and 2).

4 Explain the meaning of 'sensitive period for learning music'.

Explanation should demonstrate understanding that this refers to a period of time in development when an individual is/may be more responsive to learning music/more able to learn music.

5 (a) In which part of the brain are each of the scanned areas located?

auditory cortex: temporal lobe

motor cortex: frontal lobe

cerebellum: hindbrain/base of brain/attached to brain stem

jacaranda
A Wiley Brand

(b) What role would each area have in the musical abilities of the participants?

auditory cortex: e.g. sound detection and location, receive and process sounds from both ears to enable auditory perception and identification, listening skills

motor cortex: e.g. initiating and executing voluntary movements for instrument playing

cerebellum: e.g. coordinating fine motor movements that need to be executed smoothly, precisely and rapidly, and more or less automatically/without conscious thought or effort

6 Identify and explain three major limitations of the research design and its measures or procedures.

Limitations include: use of CT rather than MRI (or an even more sensitive technique) may account for failure to detect significant differences in the targeted brain areas (e.g. the brains of Groups 1 and 2 may have differed significantly, but the differences were not detected by CT); lack of control of other relevant participant variables in Groups 1 and 2 that could have impacted on the results (especially if a more appropriate neuroimaging technique had been used) (e.g. amount and quality of recent and current practice, including whether currently studying music at university, may significantly influence brain plasticity (and impact on change that may have occurred during the targeted developmental years)); training (e.g. age when started, frequency, quality of training); existing brain abnormalities in participants; use of medications or other substances that could affect task performance; type of instrument played (e.g. a violin requiring numerous fine motor movements vs a timpani drum requiring few such movements); values/level of the IV (i.e. the age at which the musicians started their musical training (before or after 9 years of age) e.g. there may be a sensitive period but it has a very early age of onset); targeted brain areas (e.g. change may occur, but in one or more other areas); lack of control of potential researcher effects (e.g. bias through knowledge of the hypotheses and groups/conditions to which participants were allocated).

7 Suggest two improvements to the research design if the experiment were to be replicated.

Improvements include:

- use a more sensitive neuroimaging technique
- if a matched participants design, then match participants on additional relevant variables (e.g. amount and quality of current practice, type of instrument)
- use of exclusion criteria to ensure non-selection of participants unsuitable for Groups 1 and 2 in particular (e.g. existing brain abnormalities in participants; use of medications or other substances or products that could affect task performance)
- use an independents group design with random allocation to groups to control more participant variables.

8 If there is research evidence for a sensitive period for learning music during early childhood, does this mean that parents should start their child's musical training at an early age if they want their child to be musically talented? Explain your answer.

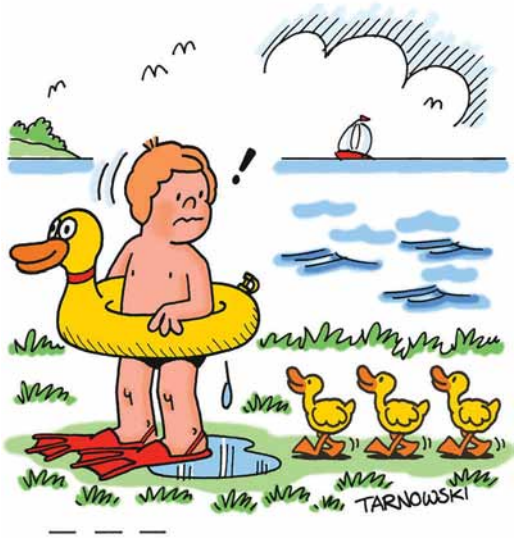
- No.
- Explanation should demonstrate understanding of the difference between sensitive and critical periods in development and potential outcomes if learning does or does not occur (e.g. the child may be more responsive to music learning during the sensitive period, but not learning during that time does not mean that a single, 'critical' period for learning has been missed and that the child can never become proficient. If a child misses the sensitive period, it is still possible to learn and perform music to a high level.)

jacaranda
A Wiley Brand

ACTIVITY 2.10

Media response on an aspect of development

Consider the following cartoon and then answer the questions.



Source: CartoonStock

1 Name and define the behaviour being exhibited by the ducklings.

Imprinting: a type of learning in which a very young animal fixes its attention on or attaches to the first object with which it has visual, auditory or tactile experience and thereafter follows that object and seems to form an attachment to that object.

2 What is the name of the zoologist who first identified this behaviour?

Konrad Lorenz

3 Assuming the ducklings have recently hatched, explain why they started following the boy.

Explanation should demonstrate understanding that the ducklings started following the boy because he was the first noisy, moving object they encountered within a critical period after birth (instead of their mother, which is usually the first moving object encountered). The rubber duck worn by the boy is unlikely to have any influence on the ducklings' behaviour.

4 Assuming the ducklings are of the mallard species, how old must they be in order for this behaviour to occur? Could it have occurred at any other time? Explain your answer.

Researchers have identified a critical period during which imprinting can occur. Critical periods have identifiable start and end times. The critical period for imprinting in a mallard duckling is the 3-hour period when the bird is between 13 hours and 16 hours old. After this time, imprinting is difficult to achieve. Therefore, the ducklings would need to have been exposed to the boy between 13–16 hours after birth in order for this behaviour to have occurred. It could not have occurred at any other time.

5 How long will the ducklings follow the boy? Explain your answer.

It is believed that once an animal (e.g. a duckling) begins following a particular moving noisy object, it generally will not follow anything else but that object. After about 10 minutes of following that object, the duckling will have formed an ongoing attachment to that object. So, the ducklings could, potentially, follow the boy for the rest of their lives.

jacaranda
A Wiley Brand

ACTIVITY 2.11

Crossword on complexity of psychological development concepts and terms

Across

3 Specific period in development most vulnerable to certain environmental experiences.
7 Involving mental abilities.
8 An example of a response occurring during a critical period in development in some animals.
11 A personal conflict involving a struggle between two opposing tendencies.
13 Physiologically based influences that can impact on our psychological development and mental wellbeing.
14 Changing a pre-existing mental idea in order to fit new information.
16 A period of time in development when there is heightened responsiveness to learning.
18 Change over time.
19 The emotional bond that forms between an infant and another person

Down

1 Experiences, events and objects to which we are exposed.
2 Model that considers the interaction of biological, psychological and social factors.
4 Biological transmission of characteristics from parents to offspring via genes.
5 Any action that is influenced by the actual, imagined, expected or implied presence of others.
6 A test used to measure a child–parent attachment relationship.
9 Orderly and sequential developmental changes controlled by our genes.
10 From birth to death.
12 Our characteristic way of reacting to people, objects and events.
15 Another word for dizygotic twins.
17 A complex reaction pattern to a personally significant event or matter.

1 E N V I R O N M E N T
2 B I O P S Y C H O L O G I C A L
3 C R I T I C A L T H I N K I N G
4 H E R E D I T Y
5 S O C I A L B E H A V I O U R
6 S T R A N G E S I T U A T I O N
7 C O G N I T I V E D I S S O N A N C E
8 I N T R I N S I C M O T I V A T I O N
9 M A T U R A T I O N
10 L I F E S P A N
11 P S Y C H O A N A L Y T I C
12 T E M P E R A M E N T
13 B I O L O G I C A L
14 A C C O M M O D A T I O N
15 F R A T E R N A L
16 S E N S I T I V E
17 E M O T I O N
18 D E V E L O P M E N T A L
19 A T T A C H M E N T

True/False quiz on psychological development

Indicate whether each item is true or false by writing T or F in the column on the right.

Statement	T/F
1 Psychological development and mental wellbeing is influenced by simultaneously occurring biological, psychological and social factors.	T
2 Psychological development stops at old age.	F
3 Psychological development proceeds in the same way for different individuals.	F
4 Hereditary influences are determined at the time of but not before birth.	F
5 Children view the world very differently from adolescents and adults.	T
6 Infants have a natural, biologically pre-programed tendency to form an attachment to their mother.	F
7 Infants tend to have little capacity to learn, remember or think.	F
8 Either nature or nurture determines psychological development.	F
9 Attachment has an important role in emotional development.	T
10 Biological factors are unimportant when considering a person's psychological development.	F
11 Cognitive development is the single most important area of development.	F
12 According to Piaget, cognitive development is a process of adaptation to the environment.	T
13 According to Erikson, our psychosocial development is shaped by how we deal with and resolve various crises encountered in different stages of life.	T
14 Monozygotic twins are also called fraternal twins.	F
15 An attachment relationship may be considered two-way because both individuals involved in the relationship play an active role in establishing the bond.	T
16 According to Erikson, each psychosocial crisis has a positive and a negative aspect.	T
17 Research evidence has found that children know a lot less and learn what they don't know later than Piaget believed they did.	F
18 Adopted children are more genetically like their adoptive parents than dizygotic twins are to each other.	F
19 Some environmental factors exert a greater influence at some stages of life than in others.	T
20 The term 'critical period' refers to a restricted time for learning.	T
21 Both the parent's and infant's responsiveness influence the strength of their attachment relationship.	T

jacaranda
A Wiley Brand

Statement	T/F
22 According to the principle of readiness, a child can learn to walk or talk when he or she is ready to do so.	F
23 One of the best ways to distinguish how much hereditary and environmental factors affect psychological development is to compare children who have the same genes but different environments.	T
24 Environmental factors can influence the expression of genetic information.	T

TOPIC 3

Defining and supporting psychological development

	Activities							
Key knowledge	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8
• the usefulness, and limitations, of psychological criteria to categorise behaviour as typical or atypical, including cultural perspectives, social norms, statistical rarity, personal distress and maladaptive behaviour				✔	✔		✔	✔
• the concepts of normality and neurotypicality, including consideration of emotions, behaviours and cognitions that may be viewed as adaptive or maladaptive for an individual	✔	✔					✔	✔
• normal variations of brain development within society, as illustrated by neurodiversity		✔	✔				✔	✔
• the role of mental health workers, psychologists, psychiatrists and organisations in supporting both psychological development and mental wellbeing as well as the diagnosis and management of atypical behaviour, including culturally responsive practices						✔	✔	✔
Key science skills								

Source: © VCAA, *VCE Psychology Study Design: 2023–2027*. p. 24

ACTIVITY 3.1

Adaptive and maladaptive behaviour

The concept of normality and neurotypicality are commonly described with reference to the way in which people behave. In particular, reference is made to adaptive and maladaptive behaviour.

Part A

Complete the table below by defining each type of behaviour and providing at least two examples of each type.

Type of behaviour	Adaptive behaviour	Maladaptive behaviour
Definition	Any behaviour that enables the individual to 'adapt' and adjust to the environment appropriately and effectively	Any behaviour that interferes with the individual's ability to adjust to the environment appropriately and effectively
Examples	• Being productive at school or work • Maintaining relationships • Eating and preparing food • Attending to personal hygiene • Having a good night's sleep • Getting up on time • Dressing yourself • Solving problems • Controlling your emotions	• Nail-biting and tantrums (mild) • Excessive fear in response to a harmless stimulus • Avoidance behaviour • Excessive hand-washing • Self-harm • Addictive behaviours (severe)

jacaranda
A Wiley Brand

Part B

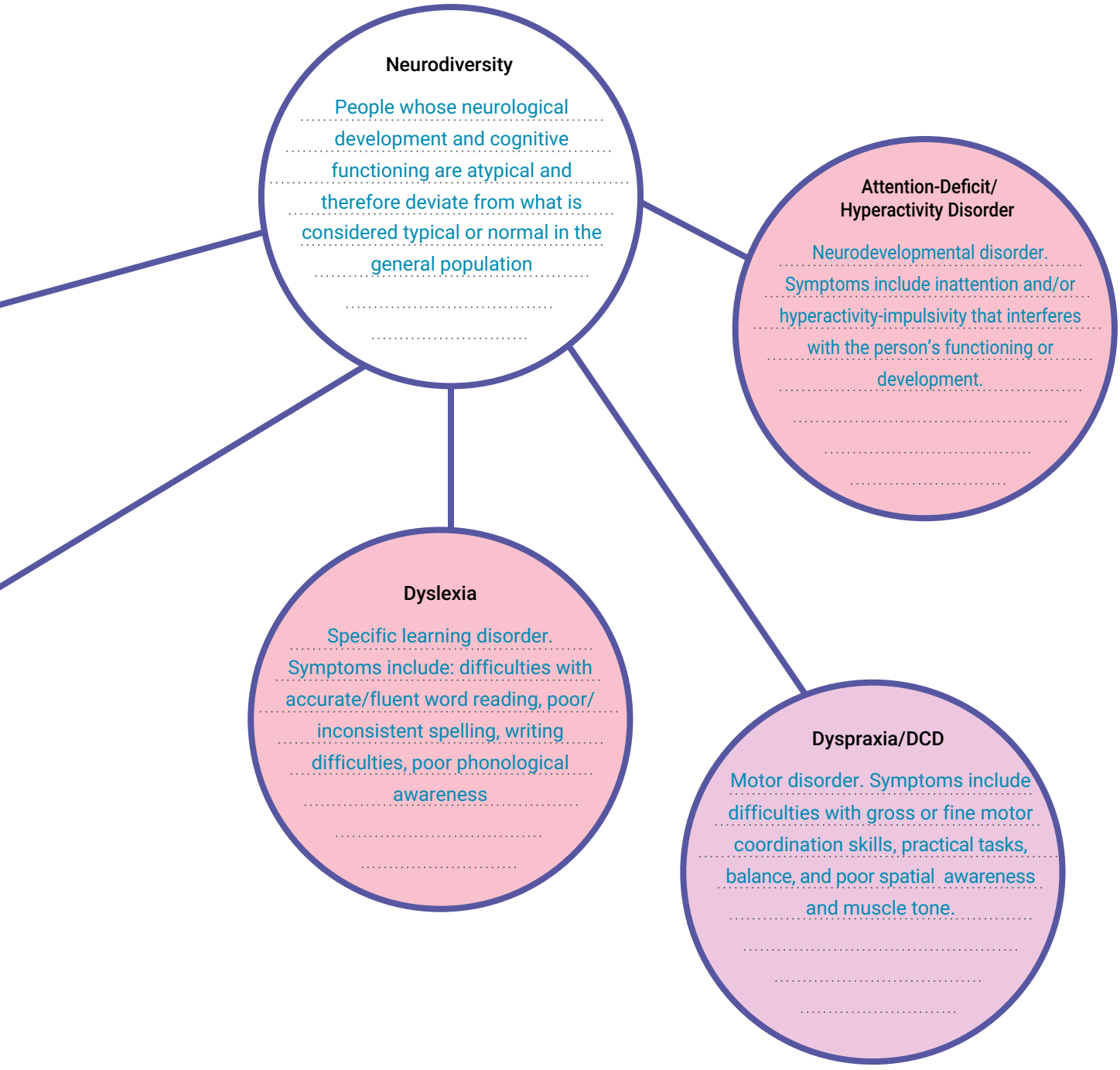
For each of the following scenarios, underline the behaviour being displayed by the person and then in the column on the right, indicate with a tick whether the behaviour is adaptive or maladaptive.

Scenario	Adaptive or maladaptive?
1 Kayla is having a stressful day at work, so she goes out for a 15-minute run during her lunch break.	☑ Adaptive ☐ Maladaptive
2 Henry decides to have an 'early night' on Sunday night because he had a really busy weekend and has a big week ahead.	☑ Adaptive ☐ Maladaptive
3 Sara becomes angry and throws chairs around the classroom when another child sits where she normally sits.	☐ Adaptive ☑ Maladaptive
4 Gregor works as a nurse and uses anti-bacterial gel after each contact he has with a patient.	☑ Adaptive ☐ Maladaptive
5 Pedro walks an extra 20 minutes to and from work each day in order to avoid the park, just in case he comes into contact with any dog. Because he has to 'go the long way around', he is sometimes late for work.	☐ Adaptive ☑ Maladaptive
6 Cher becomes extremely nervous whenever she has face-to-face interactions with other people (other than her immediate family). To manage this, she stays inside her house, orders everything she needs over the internet and only uses text messaging.	☐ Adaptive ☑ Maladaptive
7 Jack has been told that he is under review at work and unless his performance improves, he is at risk of losing his job. Jack copes with this by going out late each night with friends.	☐ Adaptive ☑ Maladaptive
8 Penny has high blood pressure, is overweight and also has diabetes. In response, Penny joins a weight loss program and starts walking each day for 30 minutes.	☑ Adaptive ☐ Maladaptive
9 Ann's colleague has gone on sick leave and she is becoming increasingly overwhelmed because she is now doing the work of 2 people. She calmly speaks to her boss about the problem and they come to a resolution.	☑ Adaptive ☐ Maladaptive

Neurotypicality and neurodiversity

Define 'neurotypicality' and 'neurodiversity', and then complete the diagram by listing the symptoms/characteristics associated with each.

jacaranda
A Wiley Brand


Neurodiversity
People whose neurological development and cognitive functioning are atypical and therefore deviate from what is considered typical or normal in the general population
Attention-Deficit/ Hyperactivity Disorder
Neurodevelopmental disorder. Symptoms include inattention and/or hyperactivity-impulsivity that interferes with the person's functioning or development.
Dyslexia
Specific learning disorder. Symptoms include: difficulties with accurate/fluent word reading, poor/ inconsistent spelling, writing difficulties, poor phonological awareness
Dyspraxia/DCD
Motor disorder. Symptoms include difficulties with gross or fine motor coordination skills, practical tasks, balance, and poor spatial awareness and muscle tone.

Neurodiversity: Normal variations of brain development

Autism Spectrum Disorder (ASD), Attention-Deficit/Hyperactivity Disorder (ADHD), specific learning difficulties (dyslexia, dyscalculia) and dyspraxia are some of the many forms of neurodivergence.

Match each symptom to the correct disorder by adding the corresponding number to the disorder column on the right.

1. Autism Spectrum Disorder	2. Attention-Deficit/ Hyperativity Disorder	3. Dyslexia	4. Dyscalculia	5. Dyspraxia

Symptom	Disorder
poor eye contact	1
poor phonological awareness	3
clumsiness	5
obsessional interests	1
poor mathematical reasoning	4
difficulties with handwriting	5
reverses letters when reading	3
inattention	2
impulsivity	2
difficulties with times tables	4
difficulties sitting still	2
difficulties with social interactions	1
inconsistent spelling	3
difficulties dressing	5
difficulties counting	4

jacaranda A Wiley Brand

ACTIVITY 3.4

Typical and atypical behaviour

Whether a person's behaviour is categorised as typical or atypical depends on the individual, the specific circumstances and the perspective from which it is considered.

Part A

Complete the table below by defining each type of behaviour and providing at least two examples of each type.

Type of behaviour	Typical behaviour	Atypical behaviour
Definition	When a person acts as they usually or 'typically' would	When a person acts in ways that are unusual or 'atypical' for them (i.e. acting 'out of character')
Examples	• If a person is usually friendly and they behave in a friendly manner towards you and others, then they are behaving as they 'typically' would. • If a teacher comes over and helps you after you have put up your hand, and they usually do this, they are behaving as they 'typically' would.	• If a person is usually friendly but they become withdrawn, do not talk or interact with anyone and stay alone in their bedroom for long periods of time, this is 'atypical' for them. • If your teacher usually helps you, but when you put up your hand, they snap at you and tell you to 'work it out on your own', this behaviour is 'atypical' for them.

Part B Approaches to categorising behaviour

Complete the diagram to summarise the five possible approaches to categorising typical and atypical behaviour. Include the usefulness and limitations of each approach in your answer.

jacaranda
A Wiley Brand

Perspectives on typical and atypical behaviour

Look at the image below of the Kardashian/Jenner family. All of them are describing certain behaviours, but which would you categorise as 'atypical' behaviour?

For each family member, decide if the behaviour is typical or atypical, taking into consideration the different criteria described in Topic 3 of Psychology VCE Units 1 and 2 9e. Discuss each of your answers in the spaces provided on the next pages.

Khloe
I like to keep myself healthy, so I exercise every day and eat a balanced diet.

Kylie
I am petrified of dogs and avoid them at all costs.

Kim
I have spent over $500 000 on cosmetic surgery to enhance my face and body.

Kris
I often talk to my deceased husband Robert. It brings me comfort.

Kourtney
To help me cope with my divorce from Scott, I started seeing a psychologist each week.

Kendall
I like to keep myself healthy, so i don't drink any alcohol at all.

Kylie

Kylie's behaviour would be considered atypical using a number of the criteria. For example:

- whenever she encounters a dog, Kylie experiences *personal distress* (has a strong emotional reaction, most likely a panic attack)
- her behaviour is *maladaptive* as she 'avoids dogs at all costs', meaning that there may be times when her extreme fear disrupts her everyday functioning (e.g. it may impact on her ability to run errands, go out with friends, force her to take a longer route, etc.)
- the percentage of the population that is petrified of dogs to this extent is small, hence the behaviour is *statistically rare*.

Kris

- Whether Kris' behaviour of speaking to her deceased husband is typical or atypical would depend upon the *cultural context* in which it is occurring. In some cultures, this would be considered atypical (and a possible sign of mental illness), but in other cultures this could be viewed as typical (and a possible sign of having a special and precious gift).
- It is *statistically rare* because few people would experience this behaviour, so it is atypical using this criterion.
- Importantly, however, this behaviour is providing her comfort and not causing *personal distress*, so it is not atypical using this criterion.
- We need to know more information to determine whether this *behaviour* is maladaptive and affecting her functioning.

jacaranda
A Wiley Brand

Kendall

- From a *statistical perspective*, only 23 per cent of the Australian population abstains from alcohol (i.e. a minority). Kendall's lack of alcohol consumption would therefore be considered atypical behaviour because it is rare in Australian society.
- Consuming alcohol is a widely accepted social behaviour and intrinsic part of the Australian culture, therefore abstaining may be seen as a violation of social norms and atypical from a cultural perspective.
- However, the behaviour is not causing *personal distress*, so it is not atypical using this criterion.
- Importantly, although abstaining from alcohol would be considered atypical from statistical, social and cultural perspectives (in Australia), it is adaptive and desirable because it is correlated with positive health outcomes.

Kim

- Whether Kim's behaviour of having extensive cosmetic surgery and spending over $500 000 is typical or atypical would depend upon the *cultural context* in which it is occurring. In some cultures, this would be considered atypical, but in other cultures this could be viewed as typical (and socially acceptable, even desirable).
- However, the percentage of the population that has had the high number of cosmetic procedures Kim has and that has spent this large amount is very small, hence the behaviour is *statistically rare*, so would be considered atypical using this criterion.

Khloe

Khloe's eating and exercise behaviour does not violate any social norms, is culturally appropriate, is adaptive, is not causing personal distress and is not statistically rare. Her behaviour is therefore considered typical according to all these criteria.

Kourtney

- Kourtney's behaviour of going to see a psychologist following a major personal life crisis is adaptive (i.e. helpful to her functioning), does not violate social norms and is not statistically rare. It is therefore typical from all these perspectives.
- However, the *cultural context* should be taken into consideration, because while seeing a mental health professional when you need help is considered typical behaviour in some cultures, it might be considered atypical and a sign of 'weakness' in others.

jacaranda
A Wiley Brand

ACTIVITY 3.6

Supporting psychological development and diagnosing atypical behaviour

Complete the following sets of exam style questions.

Multiple-choice questions

All correct answers score 1 mark.

Question 1

Which of the following professionals can diagnose atypical behaviour?

A. Psychologist
B. General practitioner
C. Psychiatrist
D. All of the above

Question 2

Hayley completed ..... and then additional qualifications in the diagnosis and treatment of mental illness in order to become a ..... .

A. a bachelor's degree; general practitioner
B. medical school; psychiatrist
C. an internship; psychologist
D. a PhD; mental health worker

Question 3

The DSM-5 is used for

A. reducing stigma
B. outlining treatment options
C. classifying mental disorders
D. distinguishing between the biological, psychological and social causes of mental disorders.

Question 4

A psychologist would be more likely than a psychiatrist to

A. conduct medical examinations before starting therapeutic work
B. treat people with schizophrenia
C. conduct assessments of children's learning abilities
D. prescribe medication as part of a treatment plan.

Question 5

Miss Turnbull is a Learning support assistant who has been working with 10-year-old Chloe in class, supporting her learning and behaviour. Miss Turnbull has noted that Chloe is often impulsive, can't sit still and has trouble concentrating. These symptoms are affecting her learning and relationships with her peers. She suspects that Chloe might have Attention-Deficit/Hyperactivity Disorder (ADHD), so she discusses this with Chloe's parents and recommends they take her to see a psychiatrist.

Which of the following reasons best explains why Miss Turnbull recommended Chloe's parents take Chloe to see a psychiatrist and not a psychologist or other mental health worker?

A. She believes Chloe needs a diagnosis of ADHD and medication to help manage the ADHD symptoms.
B. She wants Chloe to have surgery.
C. She wants the psychiatrist to undertake a neuropsychological assessment.
D. She believes Chloe would benefit from extensive psychotherapy.

Question 6

Assessment is the process of collecting and interpreting information in order to make a diagnosis so that appropriate treatment can be provided. Information may be collected through

A. psychological tests
B. a clinical interview
C. behavioural observations
D. all of the above.

Short answer questions

Question 1 (7 marks)

Name and explain the process by which a psychologist, psychiatrist or other mental health professional would diagnose atypical behaviour.

Step 1: Assessment **(1 mark)**

- This involves collecting and interpreting information about how the person thinks, feels and behaves.
- Conduct a face-to- face *clinical interview* **(1 mark)**. During the interview the mental health professional will ask the person open and closed questions and make *behavioural observations* **(1 mark)**.
- They will often ask the person to complete a psychological test of some kind (if suitably qualified) such as a personality test, mood questionnaire, intelligence test, etc **(1 mark)**.

jacaranda
A Wiley Brand

Step 2: Diagnosis **(1 mark)**

Based on all the information collected as part of the assessment process, the mental health professional will determine whether the person's symptoms meet the diagnostic criteria for one (or more) mental disorders outlined in the Diagnostic and Statistical Manual of Mental Disorders (DSM) **(1 mark)**. If so, the mental health professional will make a formal diagnosis of that mental disorder(s) (e.g. major depressive disorder). The term *co-morbidity* is used to describe the experience of having more than one disorder at the same time.

Step 3: Develop a treatment plan **(1 mark)**

Once a diagnosis is made, the mental health professional develops a treatment or management plan for the specific disorder(s) that has been diagnosed.

Question 2 (2 marks)

Outline one strength and one limitation of the using the Diagnostic and Statistical Manual of Mental Disorders (DSM) to diagnose atypical behaviour.

Strength: Any one of the following answers – it provides a common language between mental health professionals for diagnosing mental disorders; the diagnostic criteria are very clear-cut; it helps guide research; some clients find it helpful and validating to have a 'name' for their difficulties, etc **(1 mark for any correct answer)**

Limitation: Any one of the following answers – labelling and stigmatisation (labels can 'stick' for life and may negatively affect the way the person is treated from that point on); overlap between symptoms of different diagnosis; possibility of misdiagnosis, etc **(1 mark for any correct answer)**

Question 3 (6 marks)

Complete the following table by outlining three similarities and three differences between psychologists and psychiatrists in their role in supporting psychological development and the diagnosis of atypical behaviour.

Similarities	Differences
1. Both can assess, diagnose and treat mental disorders/atypical behaviour. 2. Both are trained to understand how an individual's brain works, and how they think, feel and behave. 3. Both can use different types of counselling and psychotherapeutic approaches to help clients.	(Any three of the following): 1. Psychiatrists can prescribe medications, but psychologists cannot. Because of this, psychiatrists tend to look after people with more severe mental illnesses who need medication. 2. Psychiatrists can admit people to hospital, which psychologists can't do. Psychiatrists must train for 11 years, but psychologists must only train for six years. 3. Psychologists focus solely on providing psychological treatments (talking therapy) to help clients.

jacaranda
A Wiley Brand

ACTIVITY 3.7

Matching exercise on typical and atypical psychological development

Match each description with the most appropriate term on the right. Write the letter of the term you select to the left of each description. Each term can only be used once.

(f)	**1** Behaviour that interferes with a person's ability to adjust to the environment appropriately and effectively	**(a)** atypical behaviour
(o)	**2** Perspective on categorising behaviour that asserts that behaviour should be considered by how frequently it occurs in the population	**(b)** cultural perspective
(h)	**3** Qualified medical doctor who has obtained additional qualification to become a specialist in the diagnosis and treatment of mental illnesses	**(c)** psychologist
(l)	**4** Term used to describe people whose neurological development and cognitive functioning are typical	**(d)** autism spectrum disorder
(c)	**5** Professional trained in the science of how people think, feel and behave	**(e)** dyslexia
(k)	**6** Behaviour that would usually occur, and is appropriate and expected, in a given situation	**(f)** maladaptive behaviour
(b)	**7** Perspective on categorising behaviour that asserts that behaviour should be considered in relation to the cultural context in which it is occurring	**(g)** normality
(d)	**8** Disorder that affects the way people communicate and interact with others and the world	**(h)** psychiatrist
(i)	**9** Widely held standards that govern what people should or should not do in different situations	**(i)** social norms
(a)	**10** Behaviour that differs markedly in some way from what is expected in a given situation	**(j)** attention-deficit/hyperactivity disorder (ADHD)
(q)	**11** Term describing someone who is extremely upset and suffering emotionally	**(k)** typical behaviour
(n)	**12** Term used to describe people whose neurological development and cognitive functioning are atypical	**(l)** neurotypical
(j)	**13** Disorder involving difficulties with inattention, hyperactivity and impulsivity	**(m)** dyscalculia

ACTIVITY 3.7 *continued*

(p)	**14** Behaviour that enables a person to adjust to the environment appropriately and effectively	**(n)** neurodiverse
(e)	**15** Disorder characterised by significant difficulties with accurate and fluent word reading, spelling and writing words	**(o)** statistical rarity
(m)	**16** Disorder that affects the ability to acquire mathematical concepts and skills	**(p)** adaptive behaviour
(g)	**17** Roughly the equivalent of good mental health	**(q)** personal distress

jacaranda
A Wiley Brand

Crossword on typical and atypical psychological development

Across

1 Specific learning disorder characterised by significant difficulties with accurate and fluent word reading, spelling and writing words

3 Specific learning disorder characterised by difficulties acquiring mathematics concepts and skills

7 Approach to categorising behaviour that considers the person's subjective experience

9 Individuals whose neurological development and cognitive functioning are typical

10 One of the three core symptoms of Attention-Deficit/ Hyperactivity Disorder (ADHD)

13 Approach to categorising behaviour that considers the culture in which the behaviour is occurring

14 Professional trained in the science of how people think, feel and behave

16 Any behaviour that is detrimental or interferes with an individual's ability to successfully adjust to the environment and fulfill their typical roles in society

18 Neurodevelopmental disorder that affects the way people communicate and interact with others and the world

19 The process of identifying the type of disorder affecting the individual based on signs and symptoms

Down

2 Behaviour displayed by a person that is unusual for them and inconsistent with the way they would normally behave

4 Approach to categorising behaviour that emphasises how many people think, feel or behave in some way

5 Any behaviour that enables an individual to adjust to the environment appropriately and effectively

6 Broad concept, commonly used in relation to good mental health and wellbeing

8 Qualified medical doctor who has obtained additional qualifications to become a specialist in the diagnosis and treatment of mental illnesses

11 Individuals whose neurological development and cognitive functioning are atypical

12 Behaviour that would usually occur and is appropriate and expected in a given situation

15 Widely held standards that govern what people should and should not do in different situations, especially in relation to others

17 Condition that affects coordination of physical movements, including muscles for speaking

jacaranda
A Wiley Brand

1 DYSLEXIA
2 ATYPICAL
3 DYSTRESS
4 SCALCULIA
5 ADAPTIVE
6 NORMALITY
7 PERSONALDISTRESS
8 PSYCHIATRIC
9 NEUROTICISM
10 HYPERACTIVITY
11 NEUROLOGICAL
12 TYPICAL
13 CULTURAL
14 PSYCHOLOGIST
15 SOCIAL
16 MALADAPTIVE
17 DYSPRAXIA
18 AUTISM
19 DIAGNOSIS

ACTIVITY 3.9

True/False quiz on typical and atypical psychological development

Indicate whether each item is true or false by writing T or F in the column on the right.

Statement	T/F
1 Neurodiversity, as a concept, is primarily about encouraging everyone to include and respect people whose brains work in atypical ways, regardless of their level of disability.	T
2 According to the 'statistical rarity' approach to categorising behaviour, what is considered typical depends on how many people think, feel or behave in a certain way.	T
3 The presence of atypical behaviour is always a symptom of a mental health problem or disorder.	F
4 Adaptive behaviour is any behaviour that interferes with an individual's ability to adjust to the environment, whereas maladaptive behaviour is any behaviour that enables an individual to adjust to the environment.	F
5 People with autism spectrum disorder (ASD) have difficulties with phonological awareness.	F
6 The DSM-5 does not suggest specific causes of any disorder unless a cause can definitely be established.	T
7 One of the limitations of the 'personal distress' approach to categorising behaviour is that not all individuals displaying behaviour considered atypical experience distress.	T
8 The titles 'psychologist' and 'psychiatrist' refer to the same profession.	F
9 Behavioural observations are usually made in conjunction with a clinical interview.	T
10 The DSM-5 is based on a dimensional approach to the classification of mental disorders.	F
11 'Neurotypical' refers to individuals whose neurological development and cognitive functioning are typical, whereas 'neurodiversity' refers to individuals whose neurological development and cognitive functioning are atypical.	T
12 Psychiatrists primarily offer psychotherapy (talking therapy) to help their clients with mental disorders.	F
13 A cultural perspective is useful for categorising behaviour because cultural norms are widely known, and we can therefore use them intuitively to distinguish between typical and atypical behaviour.	F
14 Dyspraxia and ADHD are two of the many forms of neurodivergence.	T
15 Being neurotypical means you have a mental disorder.	F
16 There is no universally accepted single definition of normality in psychology.	T
17 A learning disability is relatively short-term in nature and may change when the individual's circumstances change, whereas a learning difficulty is long-term and lasting.	F
18 Dyscalculia is a condition affecting the ability to acquire mathematical concepts and skills.	T
19 The terms typical and atypical can be used in relation to development, behaviour and mental processes, either generally or for a specific characteristic.	T
20 Dyslexia is a form of 'word blindness'.	F

jacaranda
A Wiley Brand

TOPIC 4

Role of the brain in mental processes and behaviour

	Activities										
Key knowledge	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	4.10	4.11
• different approaches over time in understanding the role of the brain in behaviour and mental processes	✔	✔	✔						✔	✔	✔
• the roles of the hindbrain, midbrain, and forebrain, including the cerebral cortex, in behaviour and mental processes				✔	✔	✔	✔	✔	✔	✔	✔
Key science skills									✔		

Source: © VCAA, *VCE Psychology Study Design: 2023–2027*. p. 25

Note: Although convenience sampling is not specified in the 2023–2027 Psychology Study Design, it has been included in this topic to help inform students. This is the most common type of sampling used by students when completing VCE Psychology research tasks.

ACTIVITY 4.1

Summarising three early approaches to understanding the brain

Complete the following summary table about three early approaches to understanding the role of the brain. In the first column, summarise key ideas believed at the time, in the second column identify people associated with the concepts and in the third column summarise our modern understanding.

Approach	Brief description	Influential person(s)	Contemporary view
Brain vs heart debate (500 BCE)	Whether our brain or heart is primarily responsible for human mental processes	Empedocles (heart hypothesis) Alcmaeon/Aristotle (brain hypothesis) Galen (brain hypothesis but around 150 CE)	The brain controls mental processes and behaviour (but its activity can be influenced by heart function).
Mind–body problem (Early seventeenth century)	Whether our mind and body are distinct, separate entities, or whether they are one and the same thing	Descartes	The mind and body continually interact and each can influence the other (but the pineal gland does not govern the process).
Phrenology (Late eighteenth century)	The study of the relationship between the skull's surface features and a person's personality and behavioural characteristics	Gall and Spurzheim	There is no scientific evidence supporting a relationship between bumps on the skull and human personality and behavioural characteristics.

jacaranda
A Wiley Brand

ACTIVITY 4.2

Comparing three early brain experiments

Complete the following summary table about three early experiments that increased our understanding of brain function. In the first column, summarise the procedure, in the second column identify people associated with pioneering the experiment and in the third column summarise our modern understanding.

Approach	Brief description	Influential person(s)	Contemporary view
Brain ablation (1700s–1900s)	Intentionally disabling, destroying or removing selected brain tissue, followed by an assessment of subsequent changes in behaviour	• Flourens • Lashley	Brain ablation experiments can provide valuable information but are unethical with human participants due to potential harm.
Electrical stimulation of the brain (1800s–present day)	Direct stimulation of electrical activity in the brain using an electrode	• Fritsch and Hitzig • Penfield	ESB experiments can provide valuable information, but are unethical with human participants, especially when the early type of technology is used due to potential harm. Safer ESB technologies and procedures are now available and used.

Approach	Brief description	Influential person(s)	Contemporary view
Split-brain (1900s–present day)	Experimental research with human or animal participants who have undergone split-brain surgery i.e. a corpus callosotomy to surgically cut the corpus callosum, thereby disconnecting the two cerebral hemispheres and preventing their direct exchange of information	Sperry and Gazzaniga	Split-brain experiments have provided valuable information about the human brain's hemispheric specialisation and interaction.

jacaranda
A Wiley Brand

ACTIVITY 4.3

Sentence completion on neuroimaging techniques

Select terms from the shaded panel to complete the passage about four neuroimaging techniques commonly used in psychological research on the brain. Terms may be used more than once and not all terms are used.

2D	3D	areas	blood	brain
colour	combined	contrast	CT	detailed
engaged	fMRI	functional	functions	glucose
identifying	less	level	mean	more
MRI	oxygen	PET	proportional	radioactive
structural	tissue	useless	radio	X-rays

Computed tomography (CT) uses X-rays to build up a picture of the brain. For a CT scan of the brain, the research participant must be given a substance called contrast. This is used to highlight the brain's blood vessels and enable interpretation of the resulting images. The images provide only structural information about the brain, but not as well as other types of techniques. The images are useful for identifying problematic brain tissue, but give little insight into how the brain functions during any given mental process or behaviour.

Magnetic resonance imaging (MRI) uses a magnetic field and radio waves to create an image of the brain. The technique can capture pictures of tissue that do not show up on a CT scan. Consequently, MRI images are clearer and more detailed than CT. The images may also be produced in colour rather than black and white, or combined to create a 3D picture. However, like CT, the standard MRI provides only structural information about the brain.

Positron emission tomography (PET) uses a radioactive substance given to the participant in a glucose solution to produce images of the brain in 2D or 3D colour. The scanner detects the brain's use of the

glucose as the person thinks, feels or behaves in some way so the pictures can show which structures or areas are active. Each PET scan uses a colour code to indicate areas of high and low brain activity. PET scans provide functional information about the brain as well as structural information. This allows researchers to see how the brain works and to identify problematic brain tissue or abnormalities. PET images are less detailed than MRI images so they are often combined with CT images to achieve a more detailed image.

Functional magnetic resonance imaging (fMRI) detects and records brain activity by measuring oxygen consumption across the brain. It uses standard MRI technology to produce images like those of a PET scanner. However, the images are more detailed and precise. As with the PET images, the colour variations reflect the level of activity of different brain structures and areas while a participant engages in an experimental task.

Although functional neuroimaging techniques such as PET and fMRI have advanced psychological research on the brain, an image of more or less blood flow does not necessarily mean more or less brain activity. Similarly, just because a brain area is active (or inactive), it does not necessarily mean that it is actually engaged (or not engaged) in the mental process or behaviour under investigation.

jacaranda
A Wiley Brand

ACTIVITY 4.4

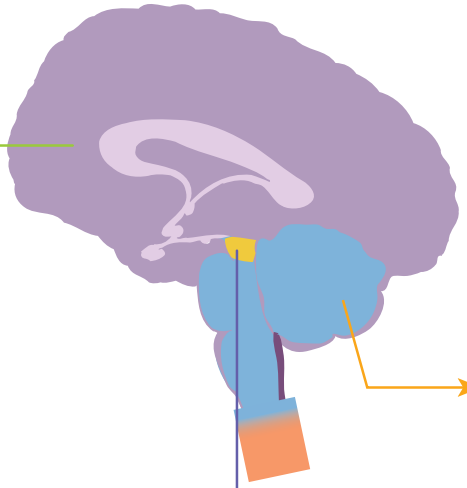
Understanding the roles of the forebrain, midbrain and hindbrain

1 Write the name of each of the following brain areas and structures as a header in the correct shaded panel in the flow chart on the next page.

Cerebellum	Cerebrum	Forebrain	Hindbrain
Hypothalamus	Medulla	Midbrain	Pons
Thalamus	Reticular formation		

2 Write an outline of the key function(s) of each of the following structures in the appropriate panel.

- Cerebellum
- Cerebrum
- Hypothalamus
- Medulla
- Pons
- Reticular formation
- Thalamus



Forebrain

Hypothalamus
Regulates body's internal environment (homeostasis); influences a range of behaviours

Thalamus
Receives information from sensory organs and relays it to relevant parts of the brain for analysis

Cerebrum
Primarily responsible for cognitive processes such as learning, memory and thinking

Hemispheres

Lobes

Midbrain

Reticular formation
Network of neurons that regulates alertness and modifies muscle movements; extends into hindbrain and links upper and lower areas

Hindbrain

Cerebellum
Coordinates movement (especially rapid movement) and regulates posture and balance; also involved in learning, memory and other cognitive processes

Medulla
Controls vital survival functions such as breathing and heart rate

Pons
Regulates sleep, arousal and some muscle movement

jacaranda
A Wiley Brand

ACTIVITY 4.5

Classifying hemispheric specialisations

1 Define 'hemispheric specialisation'.

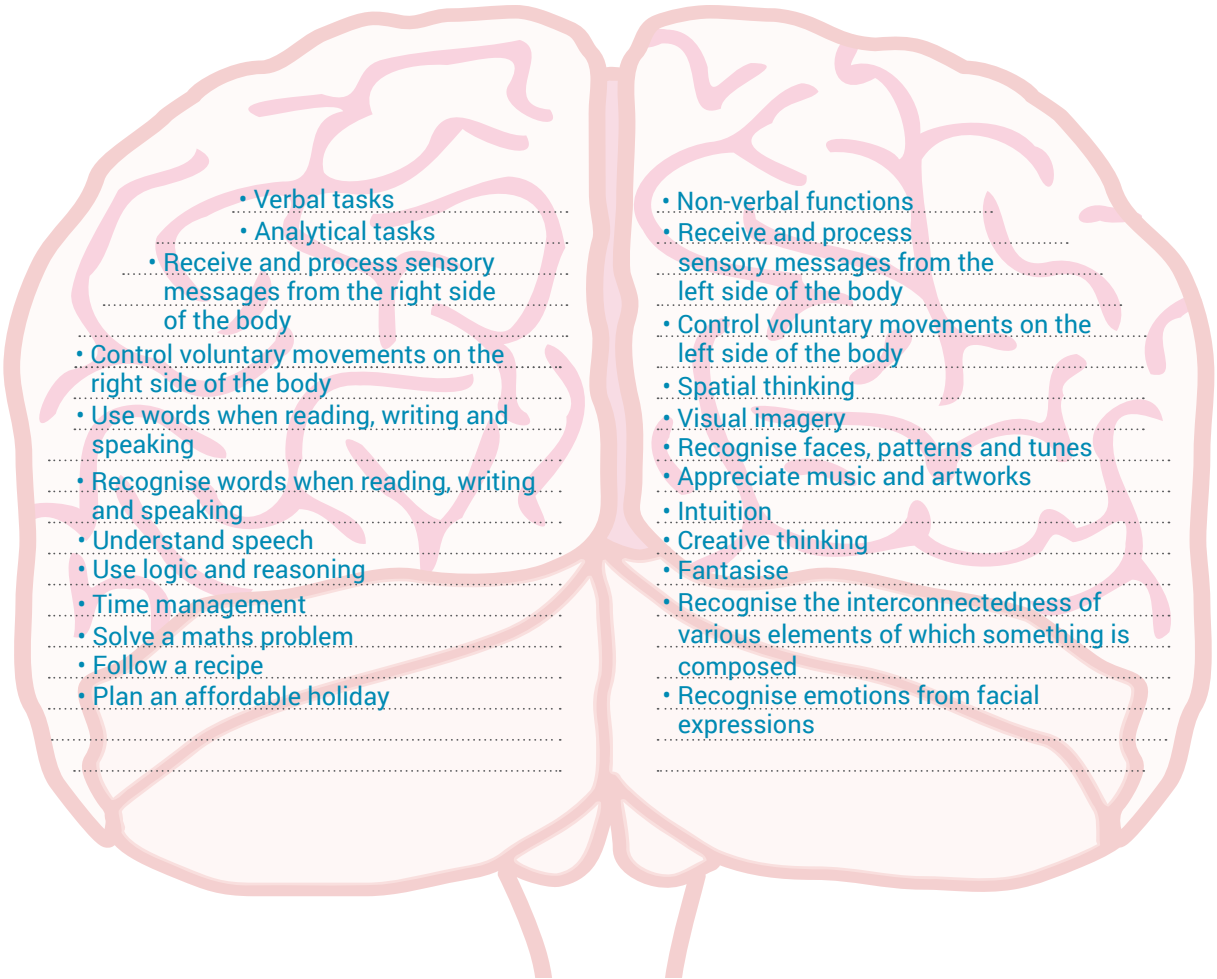
The idea that one cerebral hemisphere has specialised functions or exerts greater control over a particular function at any given time.

2 Cross out the incorrect terms to make the passage correct.

Although each **~~cortex~~/hemisphere** can exert a greater influence when we complete **~~simple~~/complex** tasks, in reality, the left and right hemispheres are both involved in **~~some~~/most** activities we perform. Some examples include reading, eating, running and solving jigsaw puzzles. The hemispheres can act **~~separately~~/together** in a **~~uncoordinated~~/coordinated** way because the neural information is **transmitted**/**~~lost~~** between them via a band of **~~muscle~~/nerve** tissue called the **~~cerebellum~~/corpus callosum**. Ordinarily, we do not use one hemisphere more than the other, however, some tasks such as writing with your right hand will activate more neurons in the **~~right~~/left** side of the brain. Some specific tasks, such as solving a maths problem, are more likely to activate more cortical area on the **~~right~~/left** side, whereas appreciating an artwork is **~~less~~/more** likely to activate more cortical area on the **right/~~left~~** side.

3 Classify each of the following functions as either predominantly left or right hemispheric specialisations by writing your answer in the appropriate side of the diagram.

- Use logic and reasoning
- Time management
- Verbal tasks
- Recognise the interconnectedness of various elements of which something is composed
- Recognise emotions from facial expressions
- Recognise words when reading, writing and speaking
- Understand speech
- Recognise faces, patterns and tunes
- Appreciate music and artworks
- Intuition
- Solve a maths problem
- Follow a recipe
- Analytical tasks
- Receive and process sensory messages from the right side of the body
- Control voluntary movements on the right side of the body
- Use words when reading, writing and speaking
- Plan an affordable holiday
- Non-verbal functions
- Receive and process sensory messages from the left side of the body
- Control voluntary movements on the left side of the body
- Spatial thinking
- Visual imagery
- Creative thinking
- Fantasise



jacaranda
A Wiley Brand

ACTIVITY 4.6

Summarising the cerebral cortex and its cortical lobes

1 Complete the passage about the cerebral cortex and the lobes using the words from the shaded panel. Each term may only be used once and not all terms need to be used.

cerebrum	sensory	visual	multiple	thinking
specific	learning	lobes	complex	frontal
voluntary	association	hemisphere	forehead	cortex
cerebral	temporal	voluntary	mental	motor
symbolic	brain	regulation	prefrontal	self-awareness
language	sensory	three	four	feel

The cerebral cortex is the outermost layer of the cerebrum and is involved with complex mental abilities such as perception, learning, memory, language, thinking and problem-solving. It also processes incoming sensory information and is involved with the planning and control of voluntary bodily movements. Some areas of the cerebral cortex have specific functions. For example, the primary visual cortex is mostly involved in receiving and processing visual information from the eyes. Most areas, however, do not have such specific functions. Instead, they perform multiple tasks that enable us to think, feel and behave. The areas of the cerebral cortex can be organised into three broad categories: sensory areas that receive and process sensory information, motor areas that initiate voluntary movements, and association areas that integrate information from different areas of the brain that are required when performing complex behaviours or cognitive functions, such as learning new strategies, problem-solving, using language or regulating emotions. Cortical lobes are areas of the cerebral cortex often associated with specific functions. Each cerebral hemisphere has four lobes: the frontal lobe, the parietal lobe, the occipital lobe and the temporal lobe. Each lobe has association areas as well as sensory and motor functions. The frontal lobe is the largest and is

ACTIVITY 4.6 *continued*

located just behind your forehead. It has an association area called the prefrontal cortex. This has numerous connections linking it to other brain areas, including the lobes. These interconnections allow the prefrontal cortex to receive and combine information, enabling us to perform sophisticated mental abilities such as reasoning, planning, problem-solving, decision-making and symbolic thinking. It is also involved with attention, the regulation of our emotions and behaviour, self-awareness and most aspects of our personality.

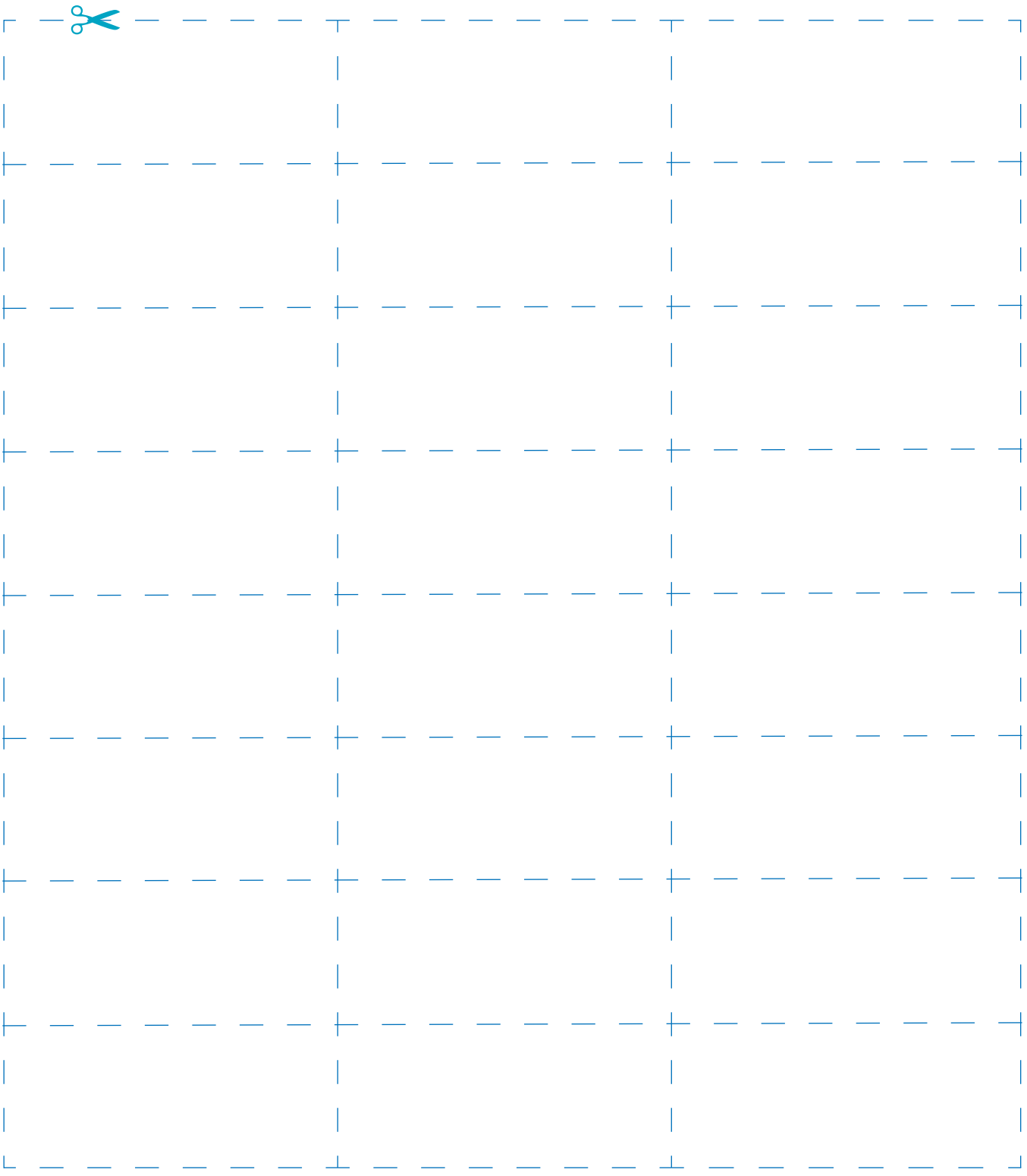
jacaranda
A Wiley Brand

ACTIVITY 4.7

Functions of the lobes

Cut out the different functions of the lobes of the brain and then rearrange them into the correct boxes. Once you have confirmed your responses, glue them under the correct lobe headings on pages 135–136.

Is exclusively devoted to processing visual information	Contains the primary auditory cortex specialised to respond to different features of sounds, such as pitch and tone	Plays a key role in paying attention and the regulation of our behaviour
Helps to coordinate the functions of other lobes	Involved in processing information visually when using short-term memory or imagining objects or places	Receives and processes bodily information, such as touch and temperature and muscle position
Contains Broca's area, which is critical for production of articulate, fluent speech	Has specialised association areas dedicated to processing information related to facial recognition	Contains the somatosensory cortex that receives and processes sensory information from the opposite sides of the body
Is largely responsible for spatial reasoning and judging distance	Involved in reasoning, planning, problem-solving and symbolic thinking	Plans and initiates voluntary body movements via the primary motor cortex
Influences the expression of our personality and regulates our emotions	Contains the primary visual cortex that first registers visual sensory memory sent from the eyes	Contains specialised neurons that respond to specific visual information such as orientation, colour and line
More of this cortex is devoted to parts of the body that have greater sensitivity, such as the lips and tongue	Contains association areas that are involved when integrating visual information with other information, such as sounds or language	Primarily involved in auditory perception – processing sounds
Plays a critical role in the formation of new memories via the hippocampus (inner temporal lobe)	Association cortex integrates information from other brain areas before coordinating a response	Plays a crucial role in the comprehension of speech via Wernicke's area
Enables us to recognise and respond to emotional signals from others, such as recognising happiness or sadness		



jacaranda
A Wiley Brand

Functions of lobes of the brain

Frontal

Association cortex integrates information from other brain areas before coordinating a response

Helps to coordinate the functions of other lobes

Contains Broca's area, which is critical for production of articulate, fluent speech

Involved in reasoning, planning, problem solving and symbolic thinking

Plans and initiates voluntary body movements via the primary motor cortex

Plays a key role in paying attention and the regulation of our behaviour

Influences the expression of our personality and regulates our emotions

Parietal

Contains the somatosensory cortex that receives and processes sensory information from the opposite sides of the body

Receives and processes bodily information, such as touch and temperature and muscle position

More of this cortex is devoted to parts of the body that have greater sensitivity, such as the lips and tongue

Is largely responsible for spatial reasoning and judging distance

Temporal

Primarily involved in auditory perception – processing sounds

Plays a crucial role in the comprehension of speech via Wernicke's area

Plays a critical role in the formation of new memories via the hippocampus (inner temporal lobe)

Has specialised association areas dedicated to processing information related to facial recognition

Contains the primary auditory cortex specialised to respond to different features of sounds, such as pitch and tone

Enables us to recognise and respond to emotional signals from others, such as recognising happiness or sadness

Occipital

Is exclusively devoted to processing visual information

Involved in processing information visually when using short term memory or imagining objects or places

Contains the primary visual cortex that first registers visual sensory memory sent from the eyes

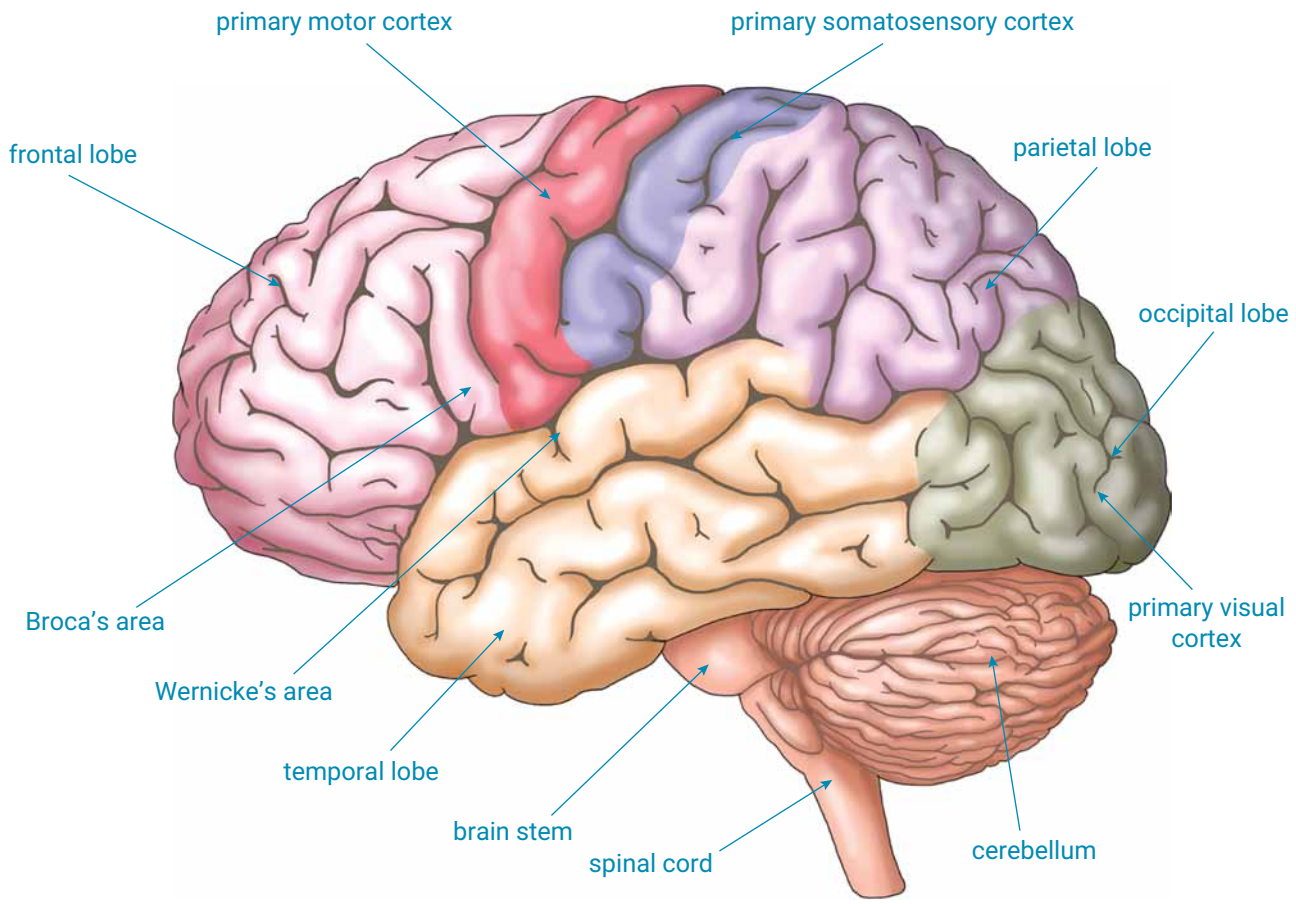
Contains association areas that are involved when integrating visual information with other information, such as sounds or language

Contains specialised neurons that respond to specific visual information such as orientation, colour and line

jacaranda
A Wiley Brand

Assembling a jigsaw of the brain

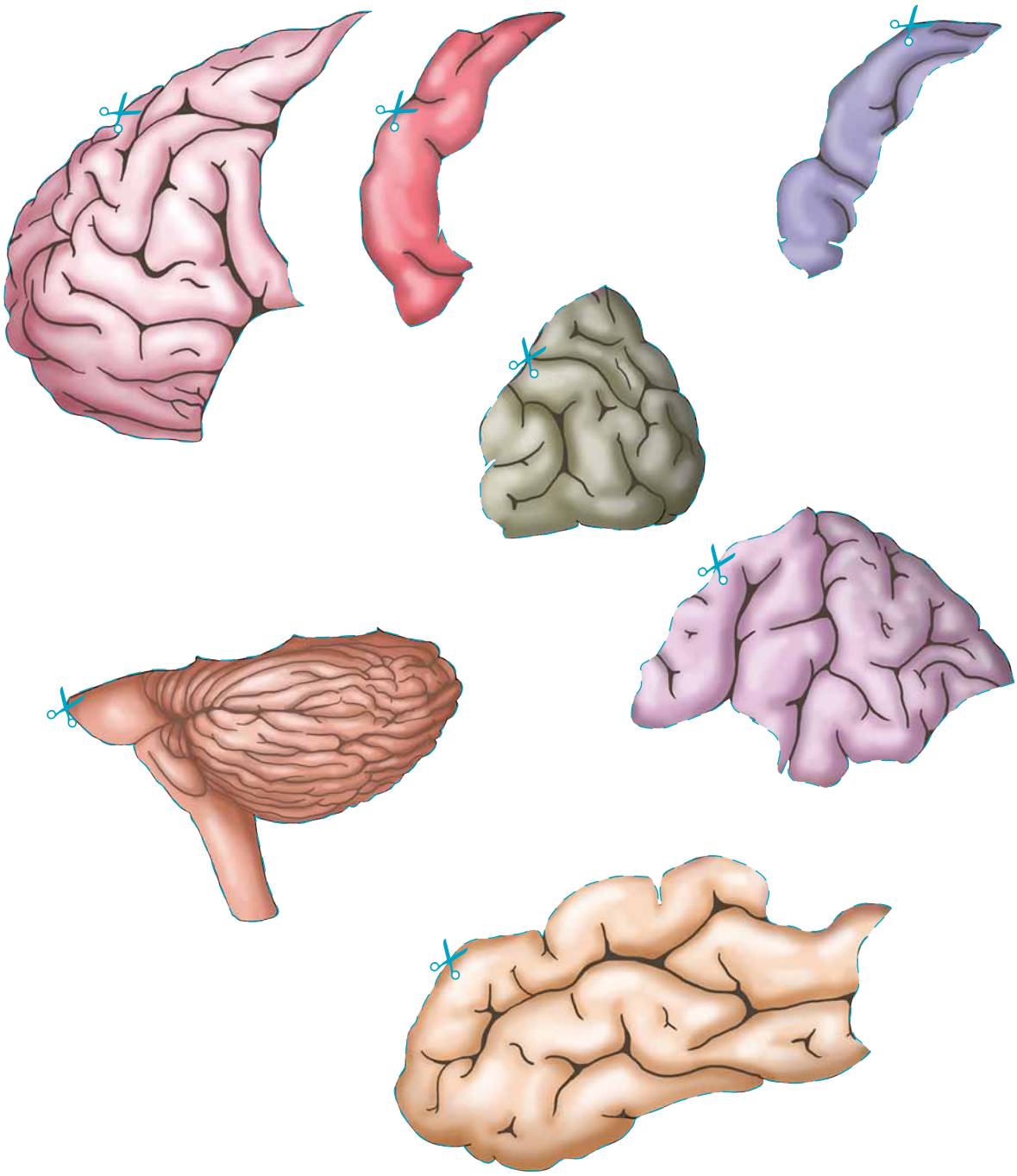
1 Cut out all of the pieces on the following page and use them to construct an image of the brain in the space provided below.



2 Mark and label the:

- locations of the four cortical lobes
- primary motor, somatosensory and visual cortices
- Broca's and Wernicke's areas
- cerebellum
- brain stem
- spinal cord

jacaranda
A Wiley Brand



jacaranda
A Wiley Brand

ACTIVITY 4.9

Evaluation of an experimental research design to test a new drug

A researcher is planning an experiment (a 'clinical trial') to test a new drug called OLIGO for treating motor symptoms of people with multiple sclerosis. Commonly called MS, multiple sclerosis is a central nervous system (CNS) disorder that interferes with neural impulses within the brain, spinal cord and optic nerves. It is characterised by myelin sheath damage that impairs neural transmission within the CNS and between the brain and the rest of the body. Symptoms vary widely from person to person, and depend on which part of the CNS is affected and how much damage has occurred. MS usually starts with mild symptoms that may or may not get worse over time. Common motor symptoms include problems with body control, coordination and balance. Other symptoms include vertigo, pins and needles, neuralgia (nerve pain) and visual impairments.

It is not known what causes MS, nor is there any cure. However, the researcher expects that OLIGO will help ease muscular spasms — the sudden stiffening of a muscle that may cause a limb to kick out or jerk towards the body. OLIGO was successfully trialled in animal studies and found to reduce the rate of spasms.

The researcher will conduct the experiment with 60 adults diagnosed with multiple sclerosis who respond to a newspaper advertisement. Informed consent will be obtained and participants will be randomly allocated to one of three groups:

- Group 1: no treatment
- Group 2: low dose treatment (2 tablets per day)
- Group 3: high dose treatment (3 tablets per day).

All participants will be instructed to stop using their prescribed MS medications to help isolate the effects of OLIGO. The double-blind procedure will be used and the drug trial will last for six months. Then, all participants will be assessed to measure if there is a reduction in the number of motor symptoms and also their severity.

1 Identify the population to be sampled for the experiment.

adults diagnosed with MS

2 Name the proposed sampling procedure.

convenience sampling

3 Identify the experimental design.

independent groups (between groups)

4 Explain the main advantage of using an 'experiment' for this research.

Using an experiment with random allocation means the researcher can fairly compare the treatment effects (due to the IV) between the groups because any participant-related variables, such as age when MS was first diagnosed etc, will be evenly distributed. Also, using a controlled experiment is the only way cause-effect testing (such as symptom reduction) of a drug can be established clearly.

5 Write a research hypothesis for this experiment.

Examples:

- People diagnosed with multiple sclerosis will have fewer and less severe muscular spasms when treated with a high dose of OLIGO than those who are treated with a low dose or have no treatment.
- Treatment with OLIGO will reduce the number and severity of muscular spasms associated with multiple sclerosis.

6 Identify the operationalised independent and dependent variables.

- independent variable: OLIGO dose
- dependent variable: number and severity of muscle spasms

7 Which group(s) will be exposed to the independent variable?

Groups 2 and 3

8 (a) Which group(s) should be given the placebo treatment?

Group 1

(b) Describe a suitable placebo treatment.

A tablet/capsule that looks like OLIGO and is presented and administered in the same way (e.g. in the same type of container with identical labelling and taken orally at the same times) but when taken is actually inert/inactive/has no active ingredient.

jacaranda
A Wiley Brand

(c) What is the purpose of using a placebo treatment in this particular experiment?

Using a placebo treatment will take account of and control any effects from exposure to the treatment that do not depend on the drug itself. Specifically, any reduction in the number and severity of muscular spasms among participants in either of the 2 treatment groups due to a belief/expectation that this will occur as a result of exposure to the specific treatment used in the trial. Without the Group 1 placebo treatment condition to compare against, it is difficult to isolate the true level of effect of OLIGO.

(d) Suggest a suitable name for the group(s) who will receive a placebo treatment.

placebo group; control group; placebo-control group

9 What is a double-blind procedure and what is its advantage in this experiment?

double-blind: neither the researchers nor the participants will know which participants are taking the real medication (OLIGO) or the placebo at any given time

advantage: helps control for experimenter effects and participant expectations (potential extraneous variables)

10 (a) What would be the role of an ethics committee for this particular experiment?

Primarily, to assess/review the research proposal to ensure all relevant ethical standards are adopted and followed, so that it is safe.

(b) Explain an important ethical consideration in this experiment.

All ethical standards are important in all research using human participants. However, the explanation should demonstrate understanding that safeguarding participant wellbeing is especially important in this experiment as it involves a trial of a new, yet-to-be-approved drug and requires all participants to stop using their prescribed MS medications — drugs that have been approved because they are known to be effective. This procedure will expose participants to potential harm through potential relapse of non-motor symptoms etc. In particular, the placebo control group will not use OLIGO so this group of people with MS will take no medication whatsoever for the prolonged period of six months. Note also that there is no pre-testing of participant symptoms nor any procedure in place to regularly monitor participant health and wellbeing throughout the course of the experiment and to follow up subsequently (for long-term effects, relapse etc). These are significant limitations that would prevent the experiment from obtaining ethics committee approval.

11 What are two limitations of the proposed research design?

Limitations include:

- No pre-testing/assessment of symptoms before the experiment/trial commences. Therefore, there is no 'baseline data' to compare change following treatment (including no treatment for the control group).
- No regular assessment of participants throughout the course of the experiment to monitor effects of the drug in relation to duration of usage
- No follow up of participants to determine longer-term effects of the drug
- Many people with MS take multiple drugs, each of which targets different types of symptoms. Any one of these medications could interfere with the expected effect of OLIGO. As the trial will require all participants to stop using all medications, the true effect of OLIGO in the real-world context may not be identified.
- No pre-selection/exclusion criteria (e.g. to ensure a sufficient number of participants in the sample who are experiencing the target symptoms and are more likely to be representative of the drug's target population; to exclude participants who do not experience muscle spasms)

jacaranda
A Wiley Brand

ACTIVITY 4.10

Crossword on the concepts and terms in the role of the brain in mental processes and behaviour

Across

3 Medical procedure involving severing the corpus callosum to reduce neural communication between the hemispheres.

10 Type of neuroimaging technique that uses powerful magnetic fields to image both structure and function of the brain

13 Upper level brain structures including the hypothalamus, thalamus and cerebrum that regulate complex cognitive processes such as thinking, learning, memory and perception

14 Research procedure where areas of the brain are removed or disabled in order to determine their specific function

16 Brain region (tissue) containing specialised neurons that receive and process sensory information located in the parietal lobe

17 Lobe almost exclusively involved in receiving and processing visual information

19 Brain tissue that is darker in colour because it is mostly comprised of nerve cell bodies

20 Term used to describe half of the cerebrum, usually labelled as left or right

21 Structure at the back of the brain that coordinates fine muscle movements, posture and balance, as well as being involved with procedural memory

Down

1 Collection of central brain structures involved in movement, information processing, sleep and arousal.

2 Largest of the four lobes, involved with many functions including reasoning, decision-making, planning, problem-solving and symbolic thinking.

4 Lobe that receives and processes somatosensory information, including information about temperature and pressure

5 Using technology such as X-rays to make images of the brain in a non-invasive way

6 Lower level brain structures including the medulla, pons and cerebellum that control vital autonomic responses such as breathing, heart rate and sleep

7 Lobe that is principally associated with processing auditory information but also plays a key role in memory formation and facial recognition

8 Outermost layer of the brain responsible for higher order thoughts and processes

9 Relatively small area of cortex located in the left temporal lobe that plays a critical role in comprehension of speech

11 Has a vital role in maintaining the body's internal environment, including regulating the release of hormones from various glands, and influences behaviour such as hunger, thirst and sleep

12 Brain region (tissue) containing neurons that initiate voluntary muscle movements located in the frontal lobe

15 Type of cortex found in all lobes that processes and integrates incoming sensory information and is also involved in coordinating a response

18 Process that involves observing or feeling skull contours to determine an individual's psychological attributes

22 Relatively small area of frontal lobe that plays a crucial role in the formation of clear and fluent speech

1 M I D B R A I N
2 F R O N T A L
3 S
4 P A R I E T A L
5 N E U R O I M A G I N G
6 H I N D B R A I N
7 T E M P O R A L
8 C E R E B R A L C O R T E X
9 W E R N I C K E
10 F M R I
11 H Y P O T H A L A M U S
12 M O T O R C O R T E X
13 F O R A M E N
14 L E S I O N
15 A
16 S O M A T O S E N S O R Y
17 O C C I P I T A L
18 P H R E N O L O G Y
19 G R E Y M A T T E R
20 H E M I S P H E R E
21 C E R E B E L L U M
22 B R O C A

ACTIVITY 4.11

True/False quiz on the role of the brain in mental processes

Indicate whether each statement is true or false by writing T or F in the column on the right.

.

Statement	T/F
1 All brain cells are alike.	F
2 It is scientifically accurate to refer to some people as being 'left-brained' or 'right-brained'.	F
3 If you touched the surface of an exposed brain of a living person they would not feel it.	T
4 The human brain contains more than 80 billion neurons forming trillions of connections.	T
5 The earliest brain research relying on autopsies informed us about the structure and function of different brain regions.	F
6 The largest part of the human brain is the cerebrum, which is divided into 2 hemispheres.	T
7 Some of our earliest understanding of brain area function was gained by observing brain injuries of gladiators in the first century CE.	T
8 Many complex cognitive processes occur in the forebrain.	T
9 MRI images are clearer and more detailed than CT images.	T
10 The left hemisphere controls voluntary movements on the left side of the body and the right hemisphere controls voluntary movements on the right side of the body.	F
11 Phrenology, which asserts that bumps on a person's skull can indicate certain behavioural or personality tendencies, has been validated by modern research.	F
12 Electrical stimulation of the brain is no longer used in modern medicine because it is considered too intrusive.	F
13 Wilder Penfield used ESB to map the cerebral cortex in the 1940s.	T
14 Split-brain experiments demonstrated that the brain's cerebral hemispheres tend to specialise in certain functions.	T
15 The right hemisphere tends to specialise in verbal and analytical functions, whereas the left hemisphere tends to specialise in non-verbal functions and holistic processing.	F
16 More of the primary somatosensory cortex is devoted to body parts involved in finely tuned movements than to other parts.	F
17 The brain versus heart debate was about whether our brain or heart is the source of our mental abilities.	T
18 An fMRI machine is able to show both structure and function by taking a rapid succession of images while a person performs a task.	T
19 The reticular formation is a network of neurons that is involved in alerting the brain and modifying muscle movements.	T

jacaranda
A Wiley Brand

ACTIVITY 4.11 *continued*

Statement	T/F
20 Damage to the cerebellum can affect our ability to walk or ride a bike.	T
21 The hindbrain is principally involved in maintaining body systems that keep us alive, such as breathing, blood pressure and arousal.	T
22 Association areas of cortex are only found in the frontal and parietal lobes.	F
23 The right hemisphere of the brain is specialised for verbal functions such as reading and language.	F
24 Damage to Wernicke's area in the left temporal lobe will affect a person's ability to comprehend speech.	T
25 The occipital lobe is involved in seeing but is not involved when thinking visually.	F

TOPIC 5

Brain plasticity and brain injury

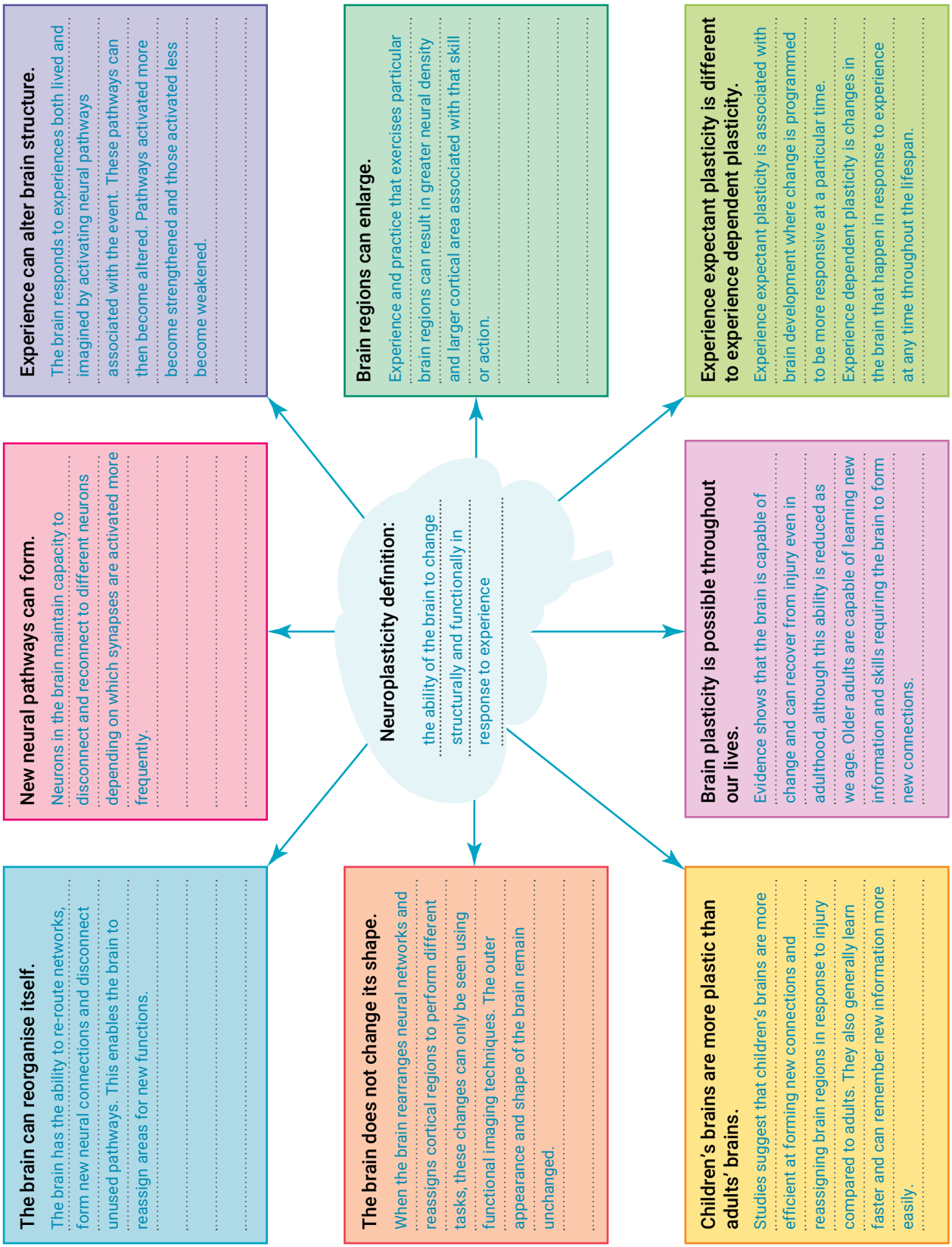
	Activities											
Key knowledge	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	5.10	5.11	5.12
• the capacity of the brain to change in response to experience and brain trauma, including factors influencing neuroplasticity and ways to maintain and/or maximise brain functioning	✔	✔	✔								✔	✔
• the impact of an acquired brain injury (ABI) on a person's biological, psychological, and social functioning				✔	✔						✔	✔
• the contribution of contemporary research to the understanding of neurological disorders						✔	✔	✔	✔		✔	✔
• chronic traumatic encephalopathy (CTE) as an example of emerging research into progressive and fatal brain disease										✔	✔	✔
Key science skills					✔			✔				

Source: © *VCAA, VCE Psychology Study Design: 2023–2027.* p. 25

ACTIVITY 5.1

Understanding neuroplasticity

Complete the diagram relating to neuroplasticity by explaining each statement in the panels provided.



jacaranda
A Wiley Brand

ACTIVITY 5.2

Comparing experience-expectant plasticity and experience-dependent plasticity

For each of the following, tick the column if the statement represents experience-expectant plasticity or experience-dependent plasticity. Tick only one column for each statement.

Statement	Experience-expectant plasticity	Experience-dependent plasticity
1 Most toddlers start to walk aged around twelve months.	✔	
2 Learning to play the piano from a very young age		✔
3 Developing the ability to talk as a toddler	✔	
4 An infant improves their ability to judge distance by crawling around their home.	✔	
5 Regaining the ability to speak after suffering a stroke in adulthood		✔
6 Improving your ability to write essays in high school		✔
7 Participating in basketball training to increase your skill		✔
8 Newly hatched ducklings identifying their parent by sight and then following them (imprinting)	✔	
9 A toddler improves their sense of balance by walking and running.	✔	
10 Becoming bi-lingual through exposure to two languages since birth	✔	
11 Learning to speak a second language as a teenager		✔
12 Fledgling birds practice flapping their wings, preparing to leave their nest.	✔	
13 Improving your ability in mathematics in primary school		✔
14 Learning to ride a bicycle in childhood		✔
15 Forming a close bond to your mother immediately after birth through touch and smell	✔	
16 Ability to grip and use a pen to write neatly		✔
17 Becoming more mobile as an infant first crawls then takes their first steps	✔	
18 A young infant is able to recognise a stranger and begins to cry	✔	
19 Learning how to perform first aid treatment		✔
20 Developing a sense of self identity, such as recognising your own face in a mirror		✔

ACTIVITY 5.3

Analysing and summarising neuroplasticity in response to brain injury

Answer the questions by using the terms in the shaded panel to complete the dot points. A term can only be used once and all terms are used.

neuroplasticity	function	lifespan	stronger	nervous system
hippocampus	adaptive	amputation	bypass	ventricles
cerebral cortex	brain	pathways	brainstem	grow
stem cells	activation	experience	repetitive	adulthood
connections	regaining	neurons	children	injury
younger	relearning	neurogenesis	plasticity	synapses

1 What is neuroplasticity?

- Neuroplasticity is the ability of the brain and other parts of the nervous system to change in response to experience.
- Adaptive plasticity is a specific type of neuroplasticity that describes changes in the brain that can occur in response to injury.

2 Where does change occur?

- Change occurs at the level of neurons as they form new connections to bypass damaged areas, but not all parts of the brain are capable of adaptive plasticity.
- Change is more likely to occur in the cerebral cortex and less likely to occur in deeper brain structures such as the brainstem.

3 When does change occur?

- Adaptive plasticity can happen throughout our lifespan but is more likely to restore increased brain function in children than adults following brain injury.
- The younger the individual, the greater the likelihood of successful relearning and subsequent new learning.

jacaranda A Wiley Brand

4 How does the brain make the changes?

- Neurons can forge new neural pathways by forming synapses with previously unconnected neurons.
- Neurons may grow new dendritic connections that enable them to form new neural pathways, bypassing older networks that have been lost.

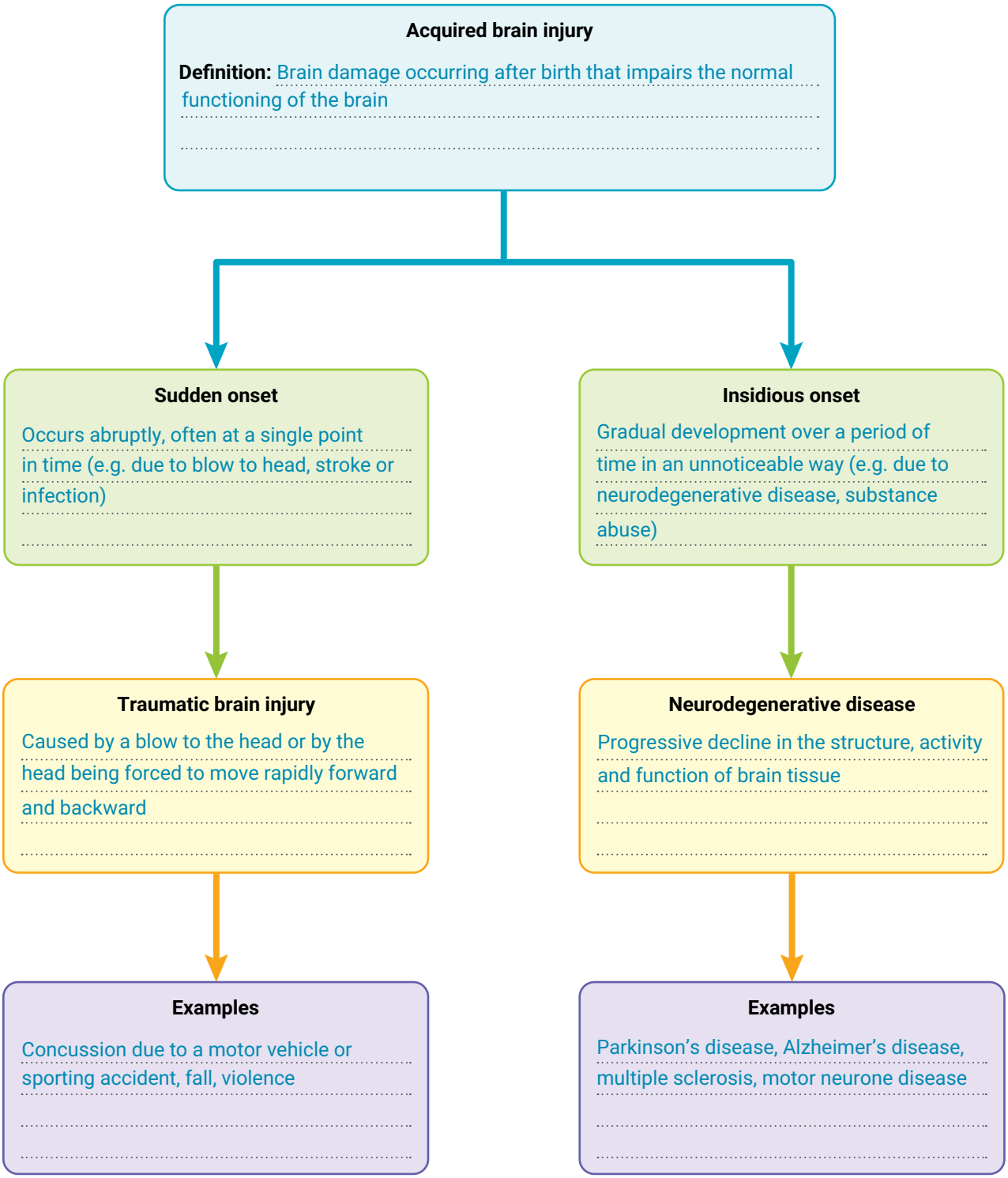
5 How does adaptive plasticity enable recovery from brain injury?

- Brain function that is lost through injury may be slowly regained as brain areas are reassigned to other functions through repetitive activity such as those experienced in rehabilitation.
- Rerouted neural circuits become stronger through repeated activation as synapses become strengthened through practice.
- Areas of cortex no longer used due to injury or amputation can be enlisted, providing new neural capacity for regaining brain function.
- Some areas of the brain such as the hippocampus, amygdala and ventricles are capable of growing new neurons known as neurogenesis due to an abundance of neural stem cells in these areas. This can occur even in late adulthood.

ACTIVITY 5.4

Analysing brain injury

1 Complete the flow chart on acquired brain injury by filling in the panels. In the bottom two panels, include examples of traumatic brain injury and of neurodegenerative disease.



jacaranda
A Wiley Brand

2 Select up to four terms from the shaded panel below that could be used to describe the brain injury most likely to be associated with each of the examples.

concussion	insidious onset	long-term	loss of function
neurodegenerative	short-term	stroke	sudden onset
trauma	toxin	substance abuse	disease

(a) A hospital patient is in a coma due to a serious car accident.

sudden onset, trauma, short-term or long-term, loss of function (e.g. due to loss of consciousness)

(b) A person is diagnosed with a type of motor neurone disease due to the gradual deterioration and death of motor neurons that control essential voluntary muscle activity such as speaking, walking, breathing and swallowing.

insidious onset, neurodegenerative, loss of function, long-term

(c) A person with a chronic dependency on alcohol has an alcohol-related brain disorder that is irreversible.

insidious onset, neurodegenerative, long-term, loss of function (e.g. memory loss)

(d) A football player is tackled, strikes their head on the ground and temporarily loses consciousness.

sudden onset, concussion, trauma, short-term, loss of function (e.g. due to loss of consciousness)

(e) An emergency department patient's slurred speech and numbness on the right side of the body is attributed to a blocked blood vessel in their brain.

sudden onset, stroke, loss of function (depending on severity and recovery), short- or long-term (depending on recovery)

ACTIVITY 5.5

Examining the case of Phineas Gage and other patients with acquired brain injury

1 Summarise the biological, psychological and social changes that may occur in people who experience an acquired brain injury, such as Phineas Gage or by using other more recent examples.

Biological	Psychological	Social
• brain tissue damage	• personality changes (e.g. Gage changed from friendly, considerate and quietly spoken to impatient, aggressive and irresponsible)	• hard to get along with • socially inappropriate behaviour • breakdown of personal relationships and loss of social support • difficulty establishing new social relationships • increased risk for unemployment, lack of affordable housing, homelessness and committing minor offences
• impairments to voluntary motor activity • impairments to facial expressions, reduced eye and head movements (due to motor cortex damage) • reappearance of early developmental reflexes	• emotional changes e.g. persistent apathy, lack of emotional responsiveness (but broken by bouts of euphoria) • impulsive behaviour • reduced responsiveness to pain • cognitive impairments e.g. attention difficulties, forgetfulness, difficulty with creative thinking and goal-directed behaviour (such as planning and problem-solving)	

jacaranda
A Wiley Brand

2 Explain why Gage was able to survive his accident despite acquiring a serious brain injury. Ensure you refer to brain areas or structures involved in vital life functions.

Explanation should demonstrate understanding that structures in the hindbrain that control vital bodily functions essential for survival were not damaged (e.g. the medulla controls functions such as swallowing, breathing, heart rate, blood pressure, vomiting, salivating, coughing and sneezing, all of which occur automatically and are essential for survival; the reticular formation and pons that play a vital role in arousal and consciousness are also located in the hindbrain area).

Gage was able to survive the accident as his hindbrain (which includes the brain stem) was not damaged, so his brain was able to maintain his vital life functions.

Frontal lobe injury can be life threatening but Gage did not sustain frontal lobe injury that could cause this (e.g. a stroke, tumour, disease etc.)

3 How can case studies of patients with brain injuries contribute to the understanding of the role of the brain in behaviour and mental processes?

Explanation should demonstrate understanding that such case studies provide a useful and ethically acceptable way of obtaining detailed information on changes in behaviour and mental processes associated with brain injury. For example, it would obviously be unethical to damage someone's brain in order to study the effects, so an ethically acceptable and practical alternative is to study someone with existing brain damage. Intensive study of individuals such as Phineas Gage makes it possible for researchers to gain detailed, valuable information about the roles of the brain in personality, emotion, voluntary movements, speech, memory, perception and so on.

In most case studies of brain injury, many aspects of a person's life are examined in detail to allow a full description of the person's problem, behaviour and mental capabilities, and to permit an evaluation of any treatment. Consequently, the information derived from these case studies is usually rich, providing considerable detail that enables a comprehensive understanding of the person, their specific injury and its impairments and non-impairments, and the potential relevance of what is found to others.

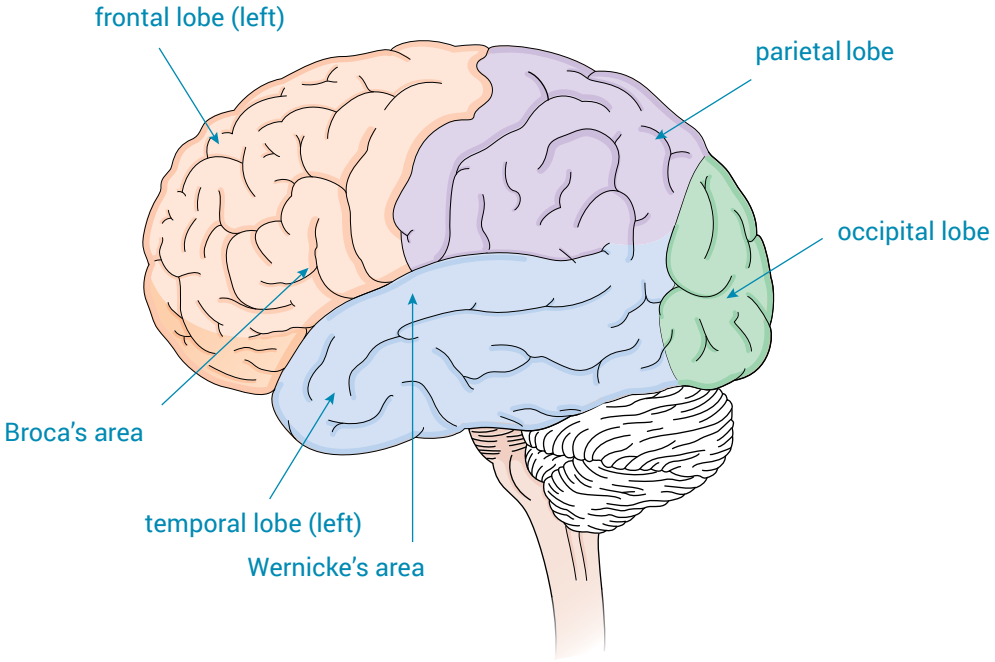
4 Describe two advantages and two limitations of using case studies in brain research.

Using case studies to research acquired brain injury	
Advantages	**Limitations**
Enables investigation into brain damage that would be otherwise unethical (although animal studies may involve intentional brain ablation, such a procedure could not proceed unless it was required for medical reasons)	Brain injuries are rarely localised in one specific part of the brain so it is difficult to draw conclusions regarding region/function.
By studying people with brain injuries, researchers can generate hypotheses about brain function linked to brain regions/structures.	Everyone's brain is different, not only in structure but also in the way it responds to injury, so it is difficult to generalise findings from a single case study.

jacaranda
A Wiley Brand

Comparing Broca's and Wernicke's aphasias

1 Name and label the four cortical lobes and indicate the location of Broca's and Wernicke's areas.



2 Select terms from the shaded panel to correctly complete the paragraph comparing Broca's and Wernicke's aphasias. Each term should be used only once.

neurodegenerative	nouns	production	complex	frontal
nonsensically	speech	fluently	comprehension	short
rhythm	language	aphasia	reading	temporal
mental	word salad	brain	conscious	acquired

Aphasia is a language disorder that results from an acquired brain injury to an area responsible for language production or processing. Aphasia can be severe or mild. It may affect a single aspect of language, such as the ability to retrieve the names of objects, or it may affect language production and comprehension more broadly. Aphasia is usually observed in victims of stroke but can also result from

a brain tumour, infection, head injury, or neurodegenerative disorder. Aphasia does not affect intelligence and it is not a mental disorder. Aphasia can usually be improved over time with speech and language therapies.

Damage to Broca's area in the left frontal lobe results in Broca's aphasia. A person with Broca's aphasia mostly has difficulty producing speech, however reading and writing can also be affected. Normal speech comprehension is usually good but there is more difficulty understanding complex sentences. Broca's aphasia results in speech that is laboured and hesitant. The speech typically consists only of short sentences of three or four words using nouns and verbs only.

In contrast, Wernicke's aphasia is associated with damage to Wernicke's area in the left temporal lobe. People with Wernicke's aphasia will speak fluently, but what is said is completely unintelligible. Their speech has correct rhythm but the content is odd, conveys little information and sounds jumbled, like a word salad. They show significantly impaired comprehension, reading and writing skills. Most people with Wernicke's aphasia have little or no conscious awareness of their condition. They talk nonsensically without realising their communication is completely unintelligible to others.

3 What is a possible effect of damage to these areas? Explain each answer.

Damage to Broca's area:

Effect: Difficulty with production of clear and fluent speech

Explanation: Difficulty coordinating movements of muscles involved in speech production and supply of this information to the appropriate areas of adjacent motor cortex

jacaranda
A Wiley Brand

Damage to Wernicke's area:

Effect: Difficulty with speech comprehension — speech lacks meaning and understanding; difficulty with speech production as Wernicke's area also has a role (but not as crucial as Broca's area)

Explanation: Difficulty interpreting the sounds of human speech after processing auditory information received from the nearby left auditory cortex

4 (a) Anna has recently suffered serious head injuries as a result of a car accident. Apparent effects of her injury are in her use of speech and her comprehension of speech. While she strings lengthy sentences together, they make little sense. Likewise, she seems to have great difficulty making sense of what others say.
Which brain area is likely to be damaged and therefore the probable cause of Anna's speech problems?

Wernicke's area

(b) Following a stroke, Jack's speech consists of very short sentences that are incoherent. For example, the sentences are often made up of a few nouns and verbs that aren't linked properly.
Which brain area is likely to be damaged and therefore the probable cause of Jack's speech problems?

Broca's area

ACTIVITY 5.7

Analysing different types of stroke

1 Fill in the table comparing two different types of stroke.

Ischaemic	Haemorrhagic
When blood supply is severely restricted or stopped due to blood clots or fatty deposits in blood vessels	When a blood vessel supplying the brain becomes weak and bursts, causing bleeding and therefore pressure inside the brain

2 Catagorise the following risk factors for stroke as either controllable or not controllable by ticking the column that best describes them.

Risk factor	Controllable	Not controllable
Age		✔
Cigarette smoker/vaper	✔	
Gender (being male)		✔
Bodyweight	✔	✔
Diet	✔	
Type 2 diabetes	✔	
Alcohol consumption	✔	
Genetics		✔
Previous history of stroke		✔
Level of exercise	✔	
Family history		✔
Preexisting heart disorder		✔
Blood pressure	✔	

jacaranda
A Wiley Brand

3 For each of the four stroke identification signs from the Australian Stroke Foundation, briefly explain what action the letter indicates and how it relates to stroke.

	Stands for	Action required	Explanation in relation to stroke
F	FACE	Look carefully at their face. Is it showing signs of muscle paralysis (e.g. droopy cheeks or inability to form a smile, etc)?	Stroke can cause muscle paralysis due to pressure on voluntary muscle control areas of the brain.
A	ARMS	Can they lift both arms?	Stroke can affect control of voluntary muscles due to pressure in the frontal lobe (primary motor cortex).
S	SPEECH	Is their speech slurred or slow? Are they confused?	Stroke can affect brain areas responsible for conscious awareness and speech production.
T	TIME	Call for help immediately.	Brain damage due to stroke can happen very quickly and can be fatal because neurons become starved of oxygen, leading to cell death.

4 For each of the following symptoms of stroke, indicate the brain region most likely to have been affected by placing the correct number in the left column.

Answer	Sign/symptom
6	Broca's aphasia
5	General confusion and loss of awareness
1	Muscle paralysis down right side of body
3	Loss of right field of vision
2	Detecting touch sensations in left hand even though it's not being touched
4	Wernicke's aphasia

Brain region most likely affected
1. Left hemisphere
2. Right parietal lobe
3. Left occipital lobe
4. Left temporal lobe
5. Frontal lobe
6. Left frontal lobe

5 Based on your understanding of neuroplasticity, explain how some people can make a full recovery from stroke.

Answers will vary but should highlight the ability of the brain to form new neural connections through practice.

Example response:

When a stroke occurs, an area of the brain becomes deprived of oxygen resulting in neural cell death. This often leaves that area of the brain permanently damaged. However, with sufficient rehabilitation involving intense practice of the lost function, the brain can re-route neural connections and build new connections effectively bypassing the damaged area. This can result in the slow but total regaining of lost function, such as the ability to speak or use a limb.

jacaranda
A Wiley Brand

ACTIVITY 5.8

Evaluation of research using animals to study brain damage

A stroke occurs when there is an interruption to the blood supply to the brain. Blood vessels called arteries carry blood, containing oxygen and important nutrients for the neurons and glia to the brain. The flow of blood through the artery may be interrupted or stopped, because the artery is blocked (ischaemic stroke) or bursts (haemorrhagic stroke). A lack of adequate oxygen or nutrients flowing to brain cells can cause them to die (Stroke Foundation Australia, 2019).

A researcher conducted an experiment to find out if brain damage due to an ischaemic stroke is affected by the length of time an artery is blocked. One hundred healthy laboratory rats were used. Their middle cerebral arteries were restricted for a specific period of time and then the blood flow was allowed to resume.

There were four groups in the experiment. Each rat was randomly allocated to one of the groups:

Group A: No restriction to the artery
Group B: 60 seconds of restriction to the artery
Group C: 300 seconds of restriction to the artery
Group D: 600 seconds of restriction to the artery.

After the artery restriction procedure, a tiny area of the cerebral cortex to which the blood flows was observed. This area consisted of about 1 000 000 neurons and the number of dead neurons was estimated and recorded. The results are shown in the middle column of the table below.

Group	Estimated number of dead neurons (mean)	Per cent of neuronal death
A	0	0
B	50 000	5
C	300 000	30
D	800 000	80

1 Calculate the percentage of neuronal death for each group and write your answers in the right column of the table.

2 Name the experimental research design used in this study.

independent groups (between groups design)

3 Identify the operationalised independent and dependent variables.

independent variable: length of time the middle cerebral artery is restricted

dependent variable: estimated number of dead neurons in the cortical area to which the blood flows

4 Identify the experimental and control groups.

experimental group(s): Groups B, C, D

control group(s): Group A

5 Write a research hypothesis for the experiment.

Examples:

- Brain damage due to an ischaemic stroke is adversely affected by the length of time an artery is blocked.
- The longer the period of artery restriction in the brain, the greater the number of dead neurons.

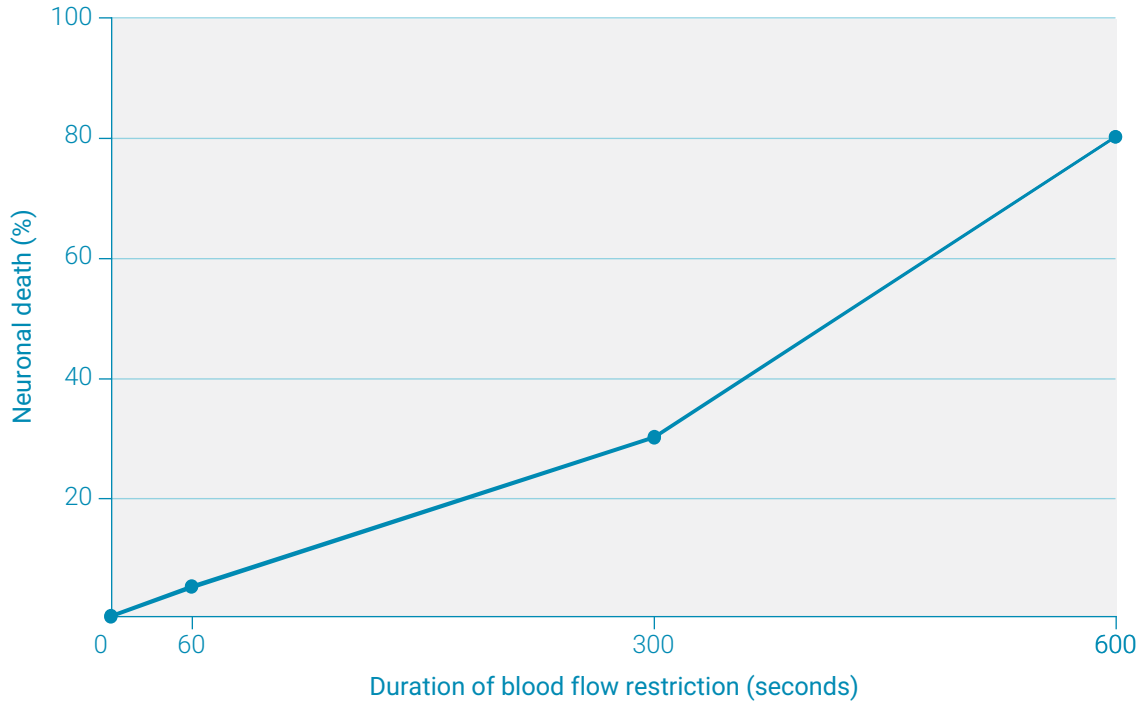
6 Tick the type of data that was collected.

- [x] quantitative
- [ ] qualitative

7 Describe one advantage of using this type of data.

Advantages include: easier and quicker to manipulate, summarise, interpret and report results (e.g. apply descriptive and inferential statistics; increases objectivity and precision of results).

8 Use the results in the table to construct a graph that best shows the relationship between the length of time a cerebral artery is restricted and the percentage of neuronal death. Ensure you label each axis.



jacaranda
A Wiley Brand

9 Draw a valid conclusion based on the results.

The results show that the longer the period of cerebral artery restriction, the greater the number of neurons that died. Therefore, brain damage due to an ischaemic stroke is adversely affected by the length of time a cerebral artery is blocked.

10 Describe the main advantage and main limitation of using rats for this particular experiment.

Main advantage: Overcome ethical constraints that prohibit this type of research from being conducted with humans.

Main limitation: Generalising the results from research with rats to humans (even though rats are also mammals and there are nervous system similarities).

Source: Stroke Foundation Australia (2019). About stroke. Retrieved from https://strokefoundation.org.au/About-Stroke

ACTIVITY 5.9

Discovering more about epilepsy

Explain the meaning of each of the following statements about epilepsy.

1 Epilepsy is a neurological disorder.

Explanation: Epilepsy causes abnormal bursts of electrical activity in clusters of neurons that quickly spread inside the brain. This affects behaviour and consciousness.

2 Experiencing seizures does not necessarily mean a person is suffering from epilepsy.

Explanation: Seizures can also happen in people due to high fever, low or high blood sugar, or from some types of acquired brain injury.

3 Seizures can be provoked and unprovoked.

Explanation: Provoked seizures are caused by environmental stimuli such as flashing lights or stress, whereas unprovoked seizures are triggered internally within the brain itself.

4 Seizures can vary in many ways.

Explanation: Seizures can be short or long; they can be mild or severe; they can result in loss of consciousness but not always; they can include muscle convulsions but not always; they can cause confusion but not always, etc.

5 Epilepsy is a spectrum disorder.

Explanation: Epilepsy is considered a spectrum disorder because of its different causes, different seizure types, its ability to vary in severity and its impact from person to person.

6 There is a difference between focal and generalised seizures.

Explanation: Focal seizures tend to affect only one specific area of the brain and subsequently also affect the function or body part controlled by that brain region. Generalised seizures originate in both brain hemispheres simultaneously and therefore tend to involve the whole body and usually involve complete loss of consciousness.

jacaranda
A Wiley Brand

7 Epilepsy can result from many different types of acquired brain injury.

Explanation: Possible causes of epilepsy include:

- traumatic brain injury
- lack of oxygen to the brain for a long period (e.g. due to a stroke, birth trauma, cardiac arrest, drowning, drug overdose)
- brain infection (e.g. meningitis, encephalitis)
- brain tumour
- neurodegenerative disease (e.g. Alzheimer's disease)
- genetic factors (e.g. abnormalities or genetic conditions with associated brain malformations)

8 Epileptic seizures have many common triggers.

Explanation: Possible common triggers of epileptic seizures include:

- missed medication
- sleep deprivation
- stress
- infection or illness
- hormonal changes
- dehydration
- low blood sugar
- alcohol or illicit drug use
- use of certain medications
- bright, flashing or flickering lights.

9 Epilepsy is an incurable but treatable condition.

Explanation: Epilepsy remains an incurable condition but two-thirds of people become seizure free with medication and other interventions, which sometimes include surgery or electrical implants.

ACTIVITY 5.10

Summarising chronic traumatic encephalopathy

Select terms from the shaded panel to correctly complete the paragraph about chronic traumatic encephalopathy (CTE). Each term should be used only once and all terms are used.

progress	head	disorder	autopsy	football
disease	brain	speech	memory	motor
history	sports	scans	impacts	risk
aggression	reduced	cure	treatments	tau
tissue	neurons	confusion	progressive	repeated
contact	current	concussion	diagnosed	symptoms

Chronic traumatic encephalopathy (CTE) is a progressive and fatal brain disease believed to be caused by repeated blows to the head or from repeated exposure to concussion. It is mostly associated with high-impact contact sports such as football and boxing. CTE is a rare and newly identified disorder and is the focus of current research. Generally, CTE symptoms start mild but progress to become much more severe. Often, CTE symptoms do not present until years after sustaining a brain injury. Symptoms vary significantly between people but may include loss of memory, changing moods, depression, anxiety, increased aggression, personality change, increased impulsivity, confusion, disorientation, cognitive difficulties, reduced decision-making ability, impaired motor control, tremor, speech difficulties and impaired judgement. Diagnosis is usually based on prior history of participating in contact sports and using brain scans. CTE can only be properly diagnosed in an autopsy by examining sections of the brain. The brain of an individual who has CTE shows areas of brain tissue that have gradually wasted away. There is also an abnormal build-up of tau protein that interferes with the functioning of neurons similar to Parkinson's disease. Researchers still do not know the number and types of head impacts that increase an individual's risk for CTE and not all athletes who experience repeated concussions will go on to develop CTE. There is currently no cure for CTE and treatments are based around offering care and support.

jacaranda
A Wiley Brand

ACTIVITY 5.11

Crossword on concepts and terms in brain plasticity and brain injury

Across

3 A type of aphasia characterised by speech that flows freely and sounds fluent but the sentences make little or no sense

7 An adjective used to describe conditions relating to the nervous system or neurons

12 These genetic, lifestyle, age-related and historical threats may increase the likelihood of suffering a stroke

14 Another name for experience-dependent plasticity

15 Describes the ability of the brain to change in response to experience or recover from injury

16 Abbreviation used for chronic traumatic encephalopathy

18 A type of epileptic seizure that simultaneously originates from both brain hemispheres

19 The most common type of stroke, where blood supply to the brain is temporarily interrupted; also known as a mini stroke

20 A general term for an acquired brain injury caused when blood supply to the brain is interrupted

Down

1 Individual cells that synapse with other cells, collectively forming the nervous system

2 A type of aphasia characterised by difficulty speaking clearly and usually only using short, simplified sentences

4 A type of stroke caused when a blood vessel supplying the brain becomes weak and bursts, often caused by high blood pressure

5 A type of acquired brain injury that occurs when an external force, such as a car accident, causes damage to the brain

6 Brain injury sustained after birth and not due to a neurodevelopmental disorder

8 Production of new neurons in the nervous system even into late adulthood

9 A spectrum brain disorder that can cause seizures and loss of consciousness

10 A type of traumatic brain injury caused by a blow to the head or a force that causes the brain to move rapidly back and forth inside the skull

11 A general label given to the effects of an acquired brain injury that include memory problems, cognitive difficulties and personality changes

13 Loss of language function due to brain injury

17 A description for half of the brain when four lobes of the brain area are considered on one side only

1 NEUROLOGICAL
2 NONFLUENT
3 FLUENT
4 HEMORRHAGIC
5 TRAUMATIC
6 ACQUIRED
7 NEUROGENIC
8 NEUROGENIC
9 EPILEPTIC
10 CONCUSSION
11 PSYCHOLOGICAL
12 RISKFACTOR
13 APHASIA
14 ADAPTIVE
15 NEUROPLASTICITY
16 CTE
17 HEMISPHERECTOMY
18 GENERALISED
19 ISCHAEMIC
20 STROKE

ACTIVITY 5.12

True/False quiz on brain plasticity and brain injury

Indicate whether each item is true or false by writing T or F in the column on the right.

Statement	T/F
1 No two human brains are identical in structure or form.	T
2 The entire mammalian nervous system is comprised of neurons.	T
3 The brain is incapable of repairing itself completely when damaged.	F
4 The timing of certain experiences can influence the level of change within the brain.	T
5 Changes in the brain due to learning throughout life is also known as adaptive plasticity.	T
6 Adults can generally recover from brain injury as quickly as young children.	F
7 Disused regions of brain cortex can be enlisted to enable completely different functions to occur, such as a sensory area becoming a motor area.	T
8 The entire brain is incapable of generating new brain cells after birth.	F
9 An acquired brain injury is the same as a neurodevelopmental disorder.	F
10 Brain injuries are best described as a sudden onset of loss of function due to impact.	F
11 Most acquired brain injuries occur in people aged under 25.	T
12 Traumatic brain injury is caused by a loss of oxygen to a certain region of the brain, usually due to impact or force.	T
13 Aphasia only refers to any loss of language function due to an acquired brain injury.	T
14 Broca's aphasia usually results in an individual who can make fluent speech but it is completely unintelligible.	F
15 People suffering with Wernicke's aphasia remain acutely aware of their language difficulties.	F
16 The cause of stroke is always from restricted blood flow caused by break-away blood clots.	F
17 Being older and biologically male increases the likelihood of suffering a stroke.	T
18 Experiencing muscle paralysis on the left side of the body can indicate a stroke occurring in the right-side hemisphere of the brain.	T

jacaranda
A Wiley Brand

Statement	T/F
19 Epilepsy is one of the most common neurological disorders worldwide.	T
20 Epileptic seizures usually start on one area of the brain and then quickly spread and affect other areas.	T
21 Low blood sugar can be a trigger for an epileptic seizure.	T
22 Like autism, epilepsy is also considered to be a spectrum disorder.	T
23 It is impossible to experience an epileptic seizure while asleep.	F
24 Epilepsy cannot be cured but can often be successfully treated.	T
25 Epilepsy is not considered a life-threatening condition.	F

UNIT 2

HOW DO INTERNAL AND EXTERNAL FACTORS INFLUENCE BEHAVIOUR AND MENTAL PROCESSES?

TOPIC 6

Social cognition

	Activities																			
Key knowledge	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	6.10	6.11	6.12	6.13	6.14	6.15	6.16	6.17	6.18	6.19	6.20
• the role of person perception, attributions, attitudes and stereotypes in interpreting, analysing, remembering and using information about the social world, including decision-making and interpersonal interactions	✔	✔	✔	✔	✔	✔	✔	✔	✔											✔
• the avoidance of cognitive dissonance using cognitive biases										✔	✔	✔	✔							✔
• the positive and negative influences of heuristics as mechanisms for decision-making and problem-solving													✔	✔	✔					✔
• the influence of prejudice, discrimination and stigma within society on a person's and/or group's mental wellbeing and ways to reduce it																✔	✔	✔	✔	✔
Key science skills									✔									✔		

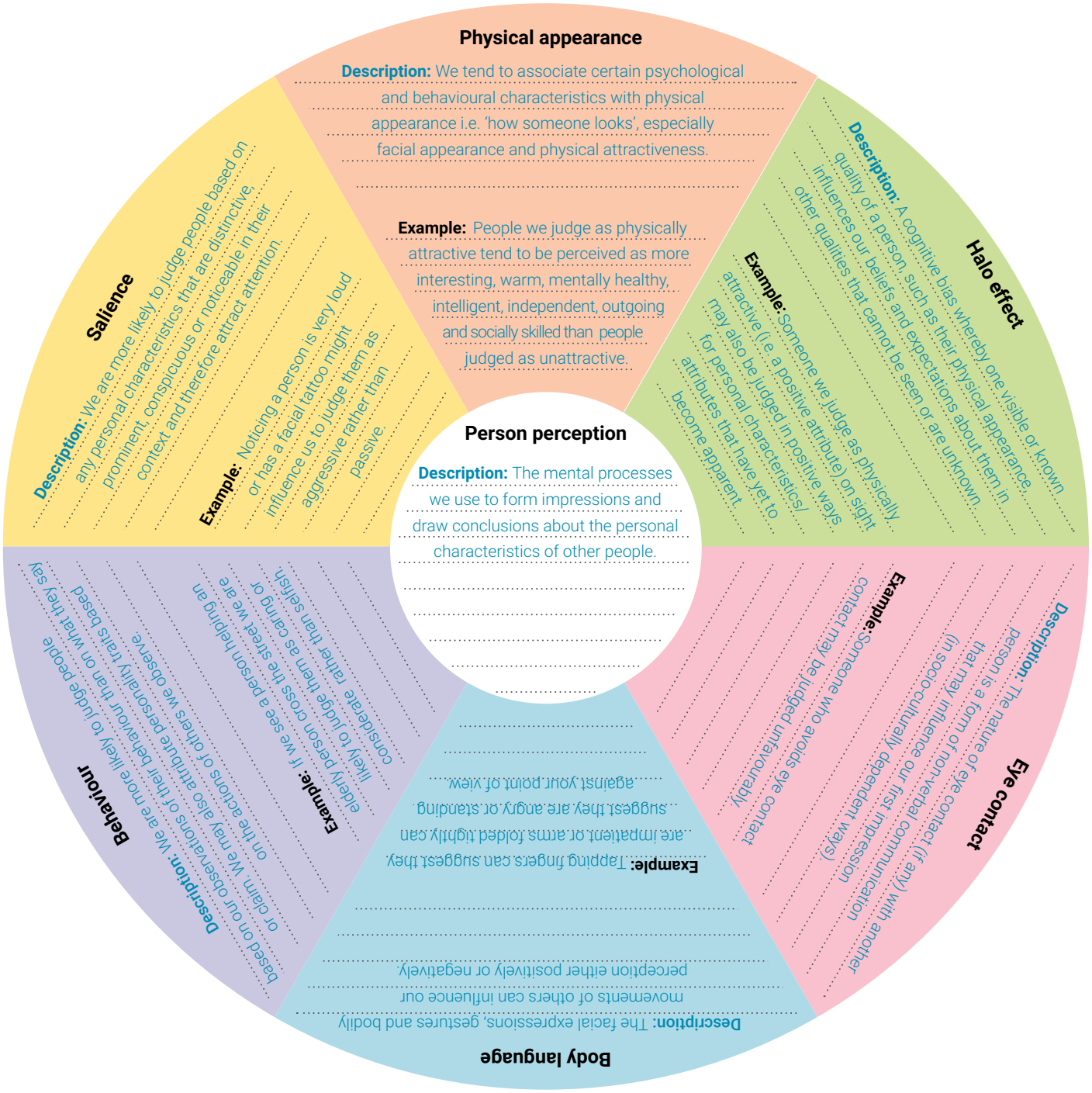
Source: © VCAA, *VCE Psychology Study Design: 2023–2027.* p. 29

ACTIVITY 6.1

Analysing person perception

Complete the colour wheel on factors that influence person perception by writing a brief description of each factor and an example of how it may affect person perception.

Include a description of the factor that most influences your person perception in a positive way when seeing and/or meeting someone for the first time. This may be a specific part or factor described elsewhere in the diagram, or an additional factor.



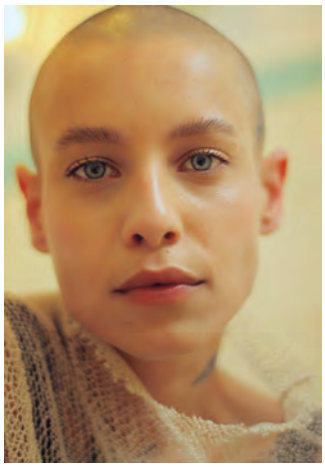
jacaranda
A Wiley Brand

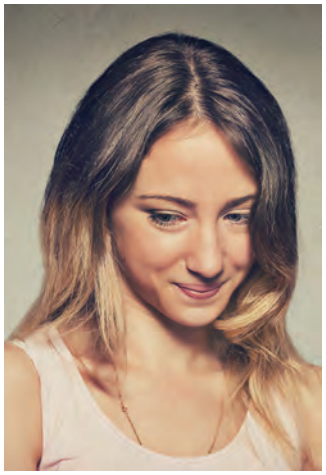
ACTIVITY 6.2

Forming person perceptions based on appearance

Part A Ratings

Consider each photo and rate the person based on each personality characteristic. Under each photo try to describe your main first impression of that person. For example, 'friendly'.

Person	Personality characteristics
1  Serious	• Open to new experiences 0 1 2 3 4 5 6 7 8 9 10 • Conscientious 0 1 2 3 4 5 6 7 8 9 10 • Outgoing 0 1 2 3 4 5 6 7 8 9 10 • Agreeable 0 1 2 3 4 5 6 7 8 9 10 • Emotionally stable 0 1 2 3 4 5 6 7 8 9 10
2  Aggressive	• Open to new experiences 0 1 2 3 4 5 6 7 8 9 10 • Conscientious 0 1 2 3 4 5 6 7 8 9 10 • Outgoing 0 1 2 3 4 5 6 7 8 9 10 • Agreeable 0 1 2 3 4 5 6 7 8 9 10 • Emotionally stable 0 1 2 3 4 5 6 7 8 9 10
3  Gentle	• Open to new experiences 0 1 2 3 4 5 6 7 8 9 10 • Conscientious 0 1 2 3 4 5 6 7 8 9 10 • Outgoing 0 1 2 3 4 5 6 7 8 9 10 • Agreeable 0 1 2 3 4 5 6 7 8 9 10 • Emotionally stable 0 1 2 3 4 5 6 7 8 9 10

Person	Personality characteristics
4  Friendly	• Open to new experiences 0 1 2 3 4 5 6 7 8 9 10 • Conscientious 0 1 2 3 4 5 6 7 8 9 10 • Outgoing 0 1 2 3 4 5 6 7 8 9 10 • Agreeable 0 1 2 3 4 5 6 7 8 9 10 • Emotionally stable 0 1 2 3 4 5 6 7 8 9 10
5  Shy	• Open to new experiences 0 1 2 3 4 5 6 7 8 9 10 • Conscientious 0 1 2 3 4 5 6 7 8 9 10 • Outgoing 0 1 2 3 4 5 6 7 8 9 10 • Agreeable 0 1 2 3 4 5 6 7 8 9 10 • Emotionally stable 0 1 2 3 4 5 6 7 8 9 10
6  Disgusted	• Open to new experiences 0 1 2 3 4 5 6 7 8 9 10 • Conscientious 0 1 2 3 4 5 6 7 8 9 10 • Outgoing 0 1 2 3 4 5 6 7 8 9 10 • Agreeable 0 1 2 3 4 5 6 7 8 9 10 • Emotionally stable 0 1 2 3 4 5 6 7 8 9 10

jacaranda
A Wiley Brand

Part B Data analysis

The personality characteristics used in this activity are based on the Five Factor Model of Personality by Robert McCrae and Paul Costa.

For each person, work out the average score for all five traits and enter it in the table below. If the mean score is above five, then you have formed a positive perception of that individual. If the mean score is below five, then you have formed a negative perception of that individual. Tick the box that applies.

Person	Mean score calculation	Overall positive or negative impression
1	There is no single correct answer.	☐ positive ☐ negative
2		☐ positive ☐ negative
3		☐ positive ☐ negative
4		☐ positive ☐ negative
5		☐ positive ☐ negative
6		☐ positive ☐ negative

Part C Discussion

What does your data suggest about the level of influence initial impressions can have on our perception of an individual's personality? Did you observe any patterns or trends? Was it difficult to rate personality characteristics based on a single picture? Explain why.

Students answers will vary. Responses should show that the data supported the finding that physical appearance can affect person perception positively and negatively. Students will also recognise that it is difficult to form a complete person perception based on one photo.

ACTIVITY 6.3

Matching exercise on the role of attributions in interpreting the social world

Match each description with the most appropriate term on the right. Write the letter of the term you select on the line to the left of each description. Each term can be used only once.

(i)	**1** An explanation of someone else's behaviour that focuses on factors external to the individual, such as the task, other people, or luck.	**(a)** attribution
(f)	**2** A belief that the world is a fair place where people tend to get what they deserve and deserve what they get.	**(b)** fundamental attribution error
(e)	**3** Classifying people as belonging to particular groups based on our perception of them having common characteristics.	**(c)** actor–observer bias
(g)	**4** An explanation of someone else's behaviour that focuses on internal characteristics of the person, such as their personality, mood, ability, or effort.	**(d)** salience bias
(h)	**5** Explaining our successful outcomes and other good events as due to personal factors and our failures, and other bad events as due to external circumstances.	**(e)** social categorisation
(b)	**6** Occurs when we focus on the role of personal factors and underestimate the impact of situational factors in explaining other people's behaviour.	**(f)** just-world hypothesis
(d)	**7** The tendency to focus on characteristics that are more noteworthy, conspicuous or unusual for a given context when forming first impressions or understanding a person's behaviour.	**(g)** personal (internal) attribution
(c)	**8** The tendency to explain own behaviour as due to external, situational factors and the behaviour of others as due to their internal, personal factors.	**(h)** self-serving bias
(a)	**9** A causal explanation of behaviour, either one's own or someone else's.	**(i)** situational (external) attribution

jacaranda
A Wiley Brand

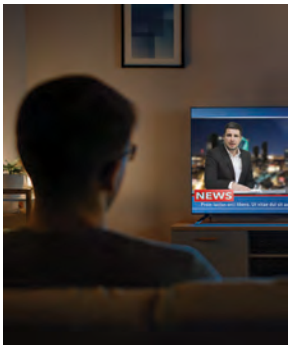
ACTIVITY 6.4

Identifying and applying attribution theory

For each of the following situational contexts, identify possible attributions being applied by observers from the shaded panel. More than one might apply to each.

internal attribution	situational attribution	fundamental attribution error	saliency bias
just-world hypothesis	actor-observer bias	self-serving bias	social categorisation

Situational context	Possible attributions applied from observers
 Abigail performs poorly in a test and then when asked about her low performance she explains to her parents that the reason was because the test was too hard and the room was too noisy for her to do her best.	Situational attribution
 Sheira was very upset with her netball team when they lost the semi-final but when she missed a number of goal shots in the final the following week, she explained that the reason was she had a sore elbow that affected her throw.	Actor-observer bias Self-serving bias
 Gina is at her mother's funeral and is understandably very upset. After the funeral has finished she observes two strangers who attended laughing quite loudly. She thinks they must be very rude and insincere.	Saliency bias

Situational context		Possible attributions applied from observers
	Freddy and his family are walking their dog in a new area they have not visited before. When they come to a fork in the road, Freddy argues with his partner about which direction they should take to return to their car. After walking for another 30 minutes, they find their car and Freddy boasts about how he 'just knew' that was the right way to go back because he has natural navigation skills.	Self-serving bias
	Shahzad watches the nightly news and hears some elderly people complaining that the government pension payments are not generous enough. He comments to his wife that the pensioners only have themselves to blame for not saving enough money when they were working.	Just-world hypothesis Fundamental attribution error
	David attends an inter-school athletics carnival and notices how much stronger the athletic performances of his own school are compared to all of the other schools, even though the scoreboard shows only a marginal winning performance at that point in time.	Social categorisation
	Paul and his friend Imran have both just received their Semester One examination scores. Paul's results are lower than Imran's. Paul has a habit of not finishing his homework. Imran tells Paul that its because he did not study enough, which upsets Paul. It turned out Paul did study just as much but was under a lot of personal stress.	Fundamental attribution error Just-world hypothesis

jacaranda
A Wiley Brand

ACTIVITY 6.5

Summarising the tri-component model of attitudes

Complete the following chart to summarise the tri-component model of attitudes. The example for each component should be original and relate to a single attitude target.

Attitude

An attitude is a relatively consistent and lasting evaluation an individual makes about an object, person, group, event or issue. Attitudes are formed through learning.

Tri-component model

Proposes that any attitude has three related components — affective, behavioural and cognitive.

Affective component

This part is our emotional reactions or feelings about the attitude target i.e. what we feel.

e.g. Climate change. Feeling sad that the future habitability of the planet is in jeopardy

Cognitive component

This part is our beliefs about the attitude target i.e. what we think.

e.g. Climate change. Believing that climate change is real, based on scientific evidence and due to human causes

Behavioural component

This part is our actions about the attitude target i.e. what we do.

e.g. Climate change. Attending protest marches and signing petitions calling for more action towards preventing climate change

Limitations of the model

- There can be inconsistency between two or more of the components.
- There can be inconsistency between attitudes and behaviour (e.g. an expressed attitude does not necessarily predict behaviour and vice versa).
- Overlooks factors that can influence attitude–behaviour consistency (e.g. attitude strength, accessibility, social context)

ACTIVITY 6.6

Understanding your attitudes

Our attitudes involve judgments we make and hold about anyone and anything, including ourselves, others, objects, events and issues.

Complete the following table by writing a thought and feeling you have and an action you may have taken about each item listed in the column on the left. An example is given in the first row. In the last two rows, include two of your own examples.

Attitude target	What I think	How I feel	What I do
animal experiments	Know a fair bit about why they are done and think they can be cruel, especially if performed for cosmetic research	Mixed feelings about them but mostly feel bad	Have not done anything to support or oppose them
social media	There is no single correct answer for any part of this table. Teachers should check that student responses reflect clear differentiation between cognitive, affective and behavioural components.		
climate change			
yoghurt			

jacaranda
A Wiley Brand

Attitude target	What I think	How I feel	What I do
The prime minister	.....	.....	.....
Melbourne Cup	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

ACTIVITY 6.7

Analysing the ABCs of attitudes

Consider the following attitude statements and identify the affective, behavioural and cognitive components that may form the attitude of each statement.

1 All employees working in this restaurant must ensure they cover any tattoos because they can be offensive to some customers.

A affective feeling concern about potentially offending customers

B behavioural instructing employees to cover their tattoos

C cognitive believing that exposed tattoos are offensive to customers

2 I will vote for any party that promises/will provide more financial support to returned soldiers. My father represented Australia in the 'war on terror' and the government forgot about him after he returned.

A affective feeling compassion/kindness/empathy for returned soldiers/war veterans

B behavioural voting for the political party that promises/will provide more financial support to returned soldiers

C cognitive believing that returned soldiers deserve more financial support

3 I am so scared of the threat of home invasion after watching reports on the nightly news that I have installed a security door and a surveillance camera at my house.

A affective feeling scared/fearful of the threat of a home invasion

B behavioural buying and installing a metal security door and a surveillance camera

C cognitive believing there is a risk of a home invasion

jacaranda
A Wiley Brand

4 I have become a member of the World Wide Fund for Nature since hearing an alarming report that so many animals are threatened with extinction.

A affective feeling alarmed/upset about animal extinction

B behavioural becoming a WWF member

C cognitive believing that many animals are threatened with extinction and that WWF membership may help fund appropriate action

5 I work hard at school because going to university and earning a degree will help me to secure a better paying job in the future.

A affective worry about not getting a well-paying job; feeling optimistic about the future with a degree

B behavioural working hard at school to achieve good grades

C cognitive believing that people with a degree get better paying jobs

6 LEGO bricks aren't just for kids' play. I really enjoy buying advanced models and building them after work. It helps me to unwind and relax.

A affective feeling enjoyment and less stress from playing with LEGO bricks

B behavioural buying and building LEGO models/building LEGO models

C cognitive believing LEGO bricks aren't just for kids' play/that it is okay for adults to play/build with LEGO

7 I recently bought a pet puppy for my children. I had a dog when I was younger and I have very fond memories of taking it for walks. I hope it will encourage my children to get more exercise.

A affective feeling affection towards a dog/memories of affection

B behavioural buying a pet puppy for the children

C cognitive believing that owning a pet dog is a healthy experience for children

8 The cost of public transport should be reduced to encourage more people to use it instead of driving their cars. I am sick and tired of being constantly stuck in city traffic.

A affective feeling irritated/sick and tired when stuck in traffic/annoyed with traffic congestion

B behavioural use public transport if there is cost reduction; possibly promote reduced transport cost reduction (e.g. contact MP)

C cognitive believing that reduced cost will increase public transport use and reduce traffic congestion

9 Pill testing should never be allowed at music festivals because it encourages young people to experiment with drugs. No illegal drug is ever safe and the law must never be changed so young people are kept out of harm.

A affective feeling concerned about/fearful of drugs/drug use

B behavioural supporting prohibition of pill testing at music festivals

C cognitive believing that pill testing at music festivals encourages drug use/experimentation

jacaranda
A Wiley Brand

10 There is no substitute for attending an AFL football game in person. There is so much atmosphere and excitement at the game that simply cannot be captured by television.

A affective feeling excited when attending a live football game

B behavioural attending AFL football matches

C cognitive believing that watching AFL football on TV is not as exciting as seeing it in person

ACTIVITY 6.8

Thinking about stereotypes

Part A

Complete the following table explaining some of the psychology of stereotypes.

What is a stereotype?	A generalisation or over-simplified belief about the personal characteristics of the members of a particular social group.
Why do we form stereotypes?	They provide a mental short-cut that reduces the amount of thinking we need to apply when processing information about a new person we meet.
Why are stereotypes often inaccurate?	Most stereotypes beliefs are based on inadequate levels of information and do not take into account the individual differences of each group member.
How do they lead to prejudice?	When stereotypes involve an 'us and them' type belief, this can provide a foundation from which prejudice develops. We categorise ourselves and others into 'ingroups' and 'outgroups'. We are more likely to be prejudiced towards members of outgroups and give preferential treatment to members of our ingroup when the opportunity arises.

jacaranda
A Wiley Brand

Part B

Complete the following table based on your understanding of common stereotypes associated with the groups listed.

Group	Common stereotyped characteristics
Knitting group of senior citizens	All have grey hair, wear cardigans, have glasses, are female, wear pearl earrings and matching necklaces, have hearing aids, etc
Members of a community book-club	Nerdy, smart and sociable, often female and have wine and a cheese board
Australians	Wear thongs, have a pet kangaroo, passionate about sport, all love Vegemite, everyone surfs, all drink beer, etc
Social media influencers	Confident, social, over-sharers and attention seekers; can be into their looks
Politicians	Wear suits, typically are male, opinionated and outspoken

ACTIVITY 6.9

Media analysis

Read the following media article on gender stereotypes then respond to the questions given.

Caring or killing: harmful gender stereotypes kick in early — and may be keeping girls away from STEM

Source: Caring or killing: harmful gender stereotypes kick in early -- and may be keeping girls away from STEM, Laura Scholes and Sarah McDonald, ***The Conversation***, 15.10.2021

Gender stereotypes begin in early childhood. Bright pink "toys for girls" and blue "toys for boys" are sold on store shelves around the world.

In the boys' section you'll find science, construction and warfare toys perhaps a motorised robot, or a telescope. In the girls' lane you'll get toys related to cleaning, prams, dolls, kitchens, makeup, jewellery and crafts.

Our research, published this week shows by the early years of primary school, gender stereotypes from a variety of sources have already influenced children — leading them to aspire to "traditional" male and female vocations.

This flows into lower numbers of girls taking STEM (science, technology, engineering and mathematics) subjects at school. In turn, this means fewer women are going on to work in the sciences. Women make up only 28% of the STEM workforce.

The gender gap is particularly high in the fastest-growing and highest-paid jobs of the future, such as computer science and engineering.

Gender-related aspirations are concerning

We spoke with 332 students (176 girls and 156 boys) from 14 schools and found 7- and 8-year-old children have already made up their minds about what jobs they want in the future. Girls overwhelmingly aspire to traditionally "feminine" jobs, while boys are attracted to "masculine" pursuits.

For example, the top three choices for boys include careers in professional sports, STEM-related jobs, and policing or defence. Meanwhile, girls either want to be teachers, work with animals, or pursue a career in the arts.

There are obvious patterns in girls' and boys' career choices which can be linked to gender stereotypes. Many girls talked about "feminine" ideas such as caring or helping others. They told us:

I want to work in a zoo because I want to take care of the animals — ***Sophie***

I want to be a nurse because I want to help people if they are hurt and take care of my Dad, and other people — ***Kate***

They also talked about love, another traditionally "feminine" ideal.

I want to be a mother because I love babies — ***Maddi***

I want to be a teacher because I love little kids — ***Sara***

jacaranda
A Wiley Brand

On the other hand, the boys' reasoning for their career choices heavily featured "masculine" themes, such as making money and having power over others. For instance, they wanted to work in the police force because:

I get to arrest people — ***Dan***

I want to shoot guns — ***Harry***

I can put people under arrest — ***Josh***

Or they wanted jobs that highlighted traditionally masculine attributes such as strength, dominance and physicality.

I want to be an assassin so I can kill people — ***Matt***

I want to be an army commando because you can shoot tanks — ***Ben***

Clearly, boys' and girls' career aspirations are very different, even at this young age. And young people's career aspirations are a good indication of job trajectories as they transition to adulthood.

But it's not just about gender

We also found differences in opinion that seemed to correlate with social class Boys from affluent school communities (30%) aspired to STEM careers more than boys from disadvantaged school communities (8%), while girls from disadvantaged school communities had a greater desire to "help" and "care".

These values can be more important for female students whose families have more traditional work- and family-related gender beliefs. If these girls go into STEM, they may go into the medical and life sciences, rather than fields such as physics or engineering, which are viewed by society as masculine.

Our findings help explain how gender-related trends continue to be visible in workplaces and industries, and why men from more socioeconomically advantaged communities are more likely to become employed in STEM jobs.

Challenging old and outdated ideas

We have to challenge problematic beliefs about the roles of men and women in society. And we have to challenge them early. One way to do this is to end the sale of gendered and stereotypical toys, which research has shown can give young children the wrong ideas about gender roles.

Some stores and toy companies are finally under pressure to make this change. Due to a law passed last month, department stores in California are now required to display childrens' products in a designated gender-neutral section.

Although the law stopped short of entirely outlawing separate sections for "boys" and "girls", it makes California the first US state to work against reinforcing harmful gender stereotypes.

If you're thinking there are plenty of gender-neutral toys available already — hello, LEGO? — think again. One study found 76% of parents said they would encourage their son to play with LEGO, but only 24% would recommend it to a daughter.

LEGO, the world's largest toy-maker, this week announced its future products and marketing will be free of gender bias and harmful stereotypes.

The company's recently launched Ready for Girls campaign will celebrate girls who rebuild the world through creative problem-solving. This is a start. Hopefully more companies will follow suit.

We should stop telling children that what constitutes acceptable play depends on their gender. Let's let girls be scientist and boys be carers, if that's what they want.

While LEGO is often touted as a gender-neutral toy for kids, the reality is many people still associate it with play for boys. Ryan Quintal/Unsplash

Answer the following questions based on the article.

1 What does the article suggest about where and when gender stereotypes may form?

In early childhood and in the primary school years, from parental expectations and choice of toys, clothing and other influences.

2 What stereotypes does the article suggest are implied by toys?

Female stereotype – girls like the colour pink, and toys related to cleaning, prams, dolls, kitchens, makeup, jewellery and crafts.

Male stereotype – boys like the colour blue, robots, a telescope, cars and trucks, LEGO and model-building toys.

3 What are the implications for girl's career choices?

Fewer girls choosing STEM-related fields compared to boys. They are more likely to choose 'care' roles, teaching and the arts.

4 What other factor, beyond gender stereotyping, is suggested by the article as influencing career choice?

Socioeconomic background – Boys from lower income backgrounds are less likely to choose STEM-related fields and girls are even more likely to choose health and care roles, compared to children from more wealthy backgrounds.

jacaranda
A Wiley Brand

ACTIVITY 6.9 *continued*

5 How can toys also be considered an influence in forming gender-based stereotypes? What could be done to reduce its effect on perceived behavioural norms?

The colour and intended affordance of the toy (what it does in play) can influence the beliefs of children in what boys and girls are like and should like, etc. Allowing both genders to play with all types of toys – dolls, blocks, trucks, cars, dress-ups, etc – can reduce gender bias in play. This approach is being used more in early learning centres and kindergartens.

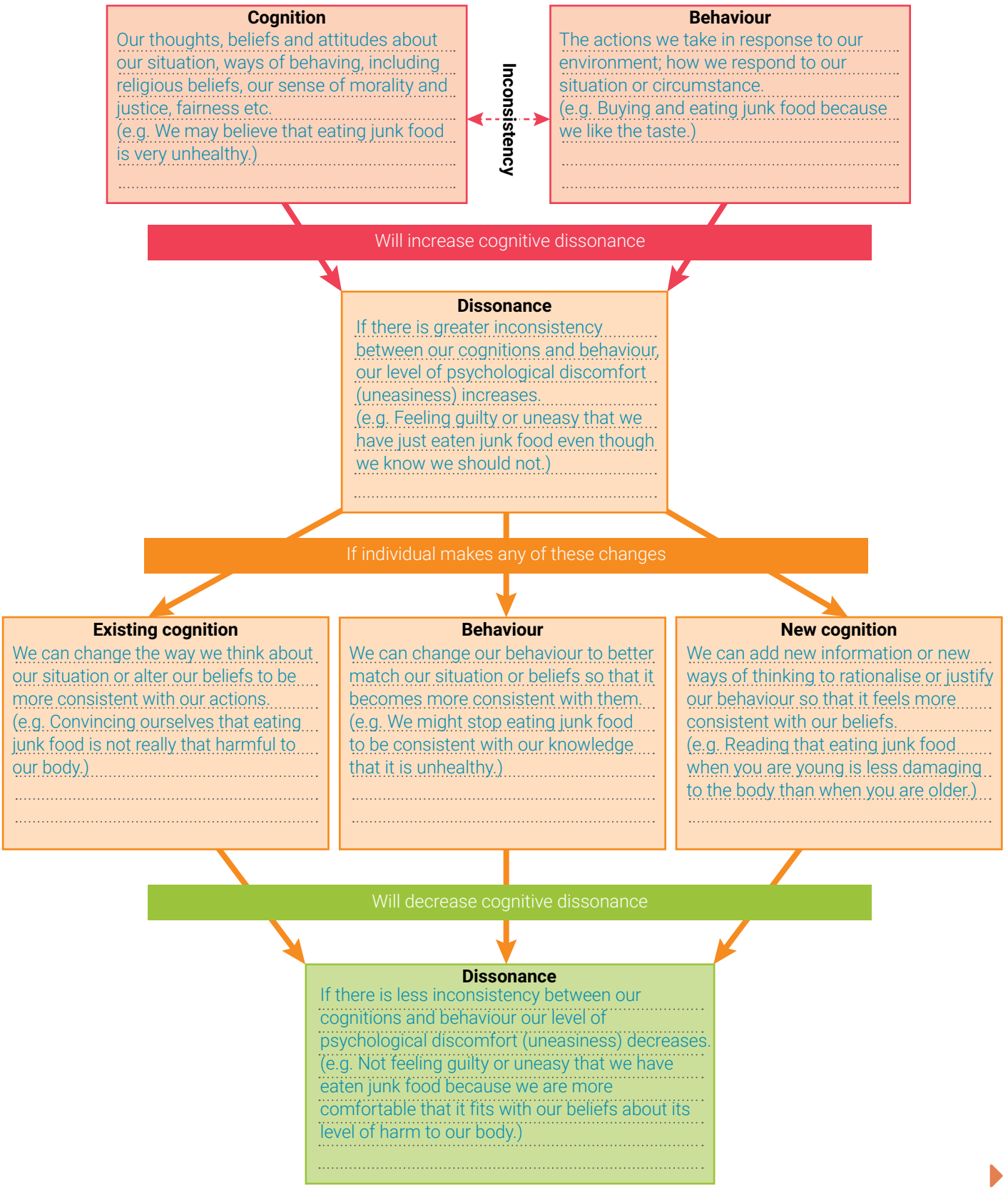
ACTIVITY 6.10

Flow chart explaining cognitive dissonance

1 Define 'cognitive dissonance'.

An unpleasant psychological state during which a person becomes aware that there is inconsistency between their beliefs, attitudes and cognitions, or that their behaviour conflicts with these beliefs or cognitions.

2 Fill in each box in the following flow chart to explain cognitive dissonance. In each box, briefly explain the heading and use an example to help illustrate your response.



jacaranda
A Wiley Brand

3 (a) Describe an example from your own experience of when you experienced cognitive dissonance.

Many answers possible.

(b) Did you attempt to reduce your cognitive dissonance? If so, how?

Many answers possible. Student answers should highlight behavioural inconsistency with beliefs. Reduction in cognitive dissonance could be illustrated by showing changes in existing cognition, changes in behaviour or forming new cognitions.

ACTIVITY 6.11

Applying cognitive dissonance theory

For each of the following statements, tick the box that indicates whether cognitive dissonance would be increased or decreased and then indicate the factor that most likely affected the change.

Statement	Cognitive dissonance likely to increase or decrease?	Factor(s) affecting level of cognitive dissonance
A child feels guilty for shoplifting a chocolate bar because they know stealing is morally wrong.	☑ increase ☐ decrease	☐ cognition ☑ change behaviour ☐ add new cognition
An adult runs a red light because he is late and narrowly misses a pedestrian. It gives him such a fright that he vows never to do it again.	☐ increase ☑ decrease	☐ cognition ☑ change behaviour ☐ add new cognition
A smoker decides that vaping is safer than cigarettes.	☐ increase ☑ decrease	☐ cognition ☐ change behaviour ☑ add new cognition
A teenager posts a racist comment online but later feels deep regret when they hear how much hurt it caused.	☑ increase ☐ decrease	☐ cognition ☑ change behaviour ☐ add new cognition
A male business executive decides to stop using sexist language after participating in a gender equality awareness program and realises how inappropriately he has behaved in the past.	☐ increase ☑ decrease	☑ cognition ☐ change behaviour ☐ add new cognition

A vegetarian decides to eat meat while on an overseas holiday because the hotel only had meat options available on the menu and she was quite hungry.	☑ increase ☐ decrease	☐ cognition ☑ change behaviour ☐ add new cognition
A student decides to post a rumor online about another student to gain popularity even though they know it is very wrong to do so.	☑ increase ☐ decrease	☐ cognition ☑ change behaviour ☐ add new cognition
A wildlife ranger accidentally strikes and kills a kangaroo while patrolling a state forest park and feels uneasy when loading the dead animal into the back of his truck.	☑ increase ☐ decrease	☑ cognition ☐ change behaviour ☐ add new cognition
A woman realises she has been handed extra change at a department store and decides not to alert the assistant, but later feels guilty about her actions. Her friend tells her that the store has made plenty of profit from her previous purchases so she should not feel too bad about it.	☐ increase ☑ decrease	☐ cognition ☐ change behaviour ☑ add new cognition
A homeowner decides to install solar panels on their roof to reduce their carbon footprint to feel less guilt when using air-conditioning in summer because they have recently read about how much energy it saves.	☐ increase ☑ decrease	☐ cognition ☐ change behaviour ☑ add new cognition

ACTIVITY 6.12

What am I? Exploring cognitive bias

For each of the following statements, identify the type of cognitive bias described. These can be found in the shaded panel below. Then provide an example of each type of cognitive bias in the space provided.

anchoring bias	attentional bias	confirmational bias
false consensus bias	functional fixedness	hindsight bias
misinformation effect	optimism bias	Dunning-Kruger effect

jacaranda
A Wiley Brand

Statement – What am I?	Type of bias and example
I am the tendency to believe I can predict the outcome of an event before it happens, even though the information needed to do so only becomes apparent after the event.	Type of bias: hindsight bias Example: A teenager bets $10 on a football game and wins. After the game they tell their friend that they 'just knew their team was going to win' even though their team had not won any game in the last three rounds.
I am the tendency to rely mostly on the first piece of information I receive when I form an opinion or make a decision regardless of what other information I get.	Type of bias: anchoring bias Example: A person watches a YouTube video showing how to trim the coat of a dog. They then watch a few more videos that show other techniques but are convinced the first video is the best because it had the most views.
I am the tendency to believe an object can only be used in a particular way or that people can only perform in narrowly defined roles.	Type of bias: functional fixedness Example: A café owner refuses to allow a young worker who was employed as a barista to manage the shop while he is away because he does not believe she is capable, even though she has demonstrated an ability to handle responsibility.
I am the tendency to overestimate my ability and skill to succeed, particularly when I am faced with unfamiliar challenges.	Type of bias: Dunning-Kruger effect Example: A teenage boy decides to swim across a fast-flowing river, even though he has never swum in a river like that before.
I am the tendency to focus on certain information when making a decision but ignore other important information that might inform that decision.	Type of bias: attentional bias Example: A young driver purchases a red sports car because they like the style and shape but ignore the fact that it has already done many kilometres and is not very good value for money.

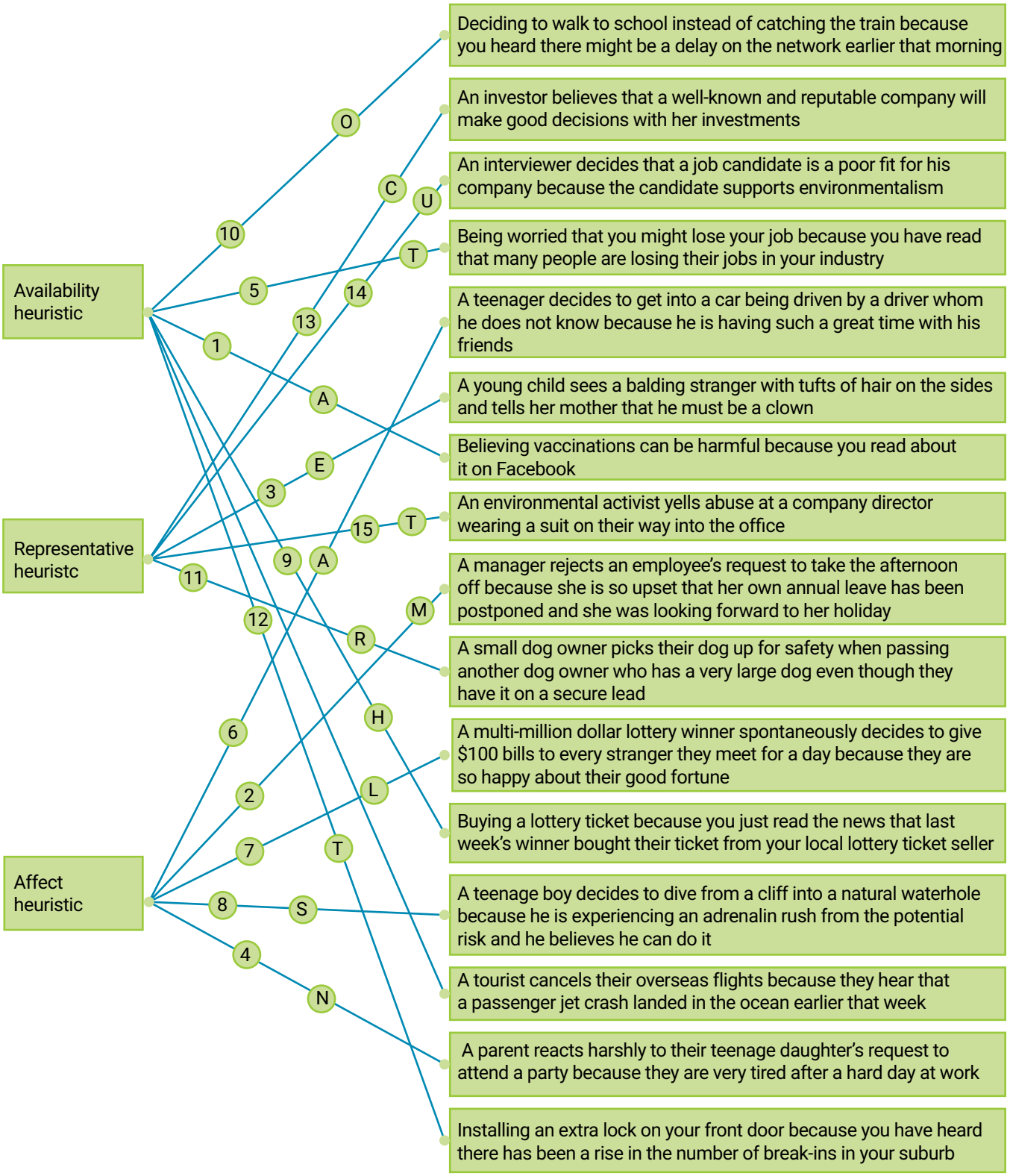
Statement – What am I?	Type of bias and example
I am the tendency to believe that the most positive outcome will result while simultaneously minimising my belief that a negative outcome will happen.	Type of bias: optimism bias Example: A teenager takes up vaping believing that it will not harm them and convinces themselves that it is safe.
I am the tendency to believe that other people share my beliefs, attitudes, views, characteristics, likes and dislikes.	Type of bias: false-consensus bias Example: A rock singer sings a politically loaded song at a concert, assuming that their audience, who like their songs, will also support their strong political views.
I am the tendency to only seek, recall or accept incoming information that is consistent with my existing beliefs, expectations and attitudes. I tend to ignore information that is inconsistent or opposes them.	Type of bias: confirmational bias Example: A teenager logs onto and reads countless webpages that all express similar racist views to them while ignoring any webpages expressing different viewpoints that challenge them.
I am the tendency to include more information in my memory of an event than what was originally encoded. This can include changing the details of the event or including other information I receive.	Type of bias: misinformation effect Example: A person is vaccinated against COVID-19 with no side-effects. They later read on Facebook that most people who get vaccinated feel very sick. When asked by a friend how their vaccination went, they tell them that they felt quite sick.

ACTIVITY 6.13

Identifying different types of heuristics

Match each statement with the type of heuristic that best describes it by drawing a straight line. Then use the numbers and letters to decode the hidden words at the bottom of the page.

jacaranda
A Wiley Brand



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
A	M	E	N	T	A	L	S	H	O	R	T	C	U	T

ACTIVITY 6.14

Matching exercise on stereotypes, prejudice and discrimination

Match each description with the most appropriate term on the right. Write the letter of the term you select on the line to the left of each description. Each term can be used only once.

(j)	**1** A negative attitude towards others based solely on their membership of a group.	**(a)** indirect discrimination
(e)	**2** Prejudice is expressed in socially acceptable ways.	**(b)** ingroup
(b)	**3** Any group to which an individual belongs or identifies with.	**(c)** outgroup
(g)	**4** Prejudice is expressed in open and obvious ways.	**(e)** stereotypes
(i)	**5** Prejudice that is consciously held and known.	**(f)** modern prejudice
(h)	**6** Treating or planning to treat another person unfavourably because of a personal characteristic protected by the law.	**(g)** implicit prejudice
(d)	**7** Beliefs that certain characteristics are typical of members of particular groups.	**(g)** old-fashioned prejudice
(f)	**8** Prejudice that is unconsciously held so the individual may be unaware of it.	**(h)** direct discrimination
(a)	**9** When treating everybody the same way disadvantages someone because of a personal characteristic.	**(i)** explicit prejudice
(c)	**10** Any group to which an individual does not belong or identify with.	**(j)** prejudice

jacaranda
A Wiley Brand

ACTIVITY 6.15

Take the Implicit Association Test — You be the participant

The Implicit Association Test (IAT) was developed by a team of American psychologists in the 1990s to investigate subtle, unconscious stereotypes and attitudes. Implicit stereotypes and attitudes are relatively inaccessible to our conscious awareness and/or control.

The IAT consists of a series of words and/or pictures that are presented one at a time on a computer screen. The participant is required to press a key with the left or right hand in response to each word or picture, depending on what is being assessed. Different versions of the IAT have been devised to measure implicit stereotypes and attitudes held towards various groups, including groups who differ in age, sex, sexuality, race, religion and weight.

You can try a non-computerised version of the test below. Before doing so, minimise distractions in your environment.

Implicit Association Test

Step 1. Read each word in the column below. As you do so, tap your left pointer (index) finger if it is either a female name or a 'weak' word, and tap your right pointer finger if it is either a male name or a 'strong' word.

Emma
Powerful
Jack
Fine
William
Mighty
Sophia
Delicate
Jane
Ribbon
George
Vigorous
Mathew
Small
Kate
Iron
Charlotte
Slight
Thomas
Flower
Olivia
Firm
Evie
Tough

Step 2. Repeat Step 1, but this time, as you read each word, tap your left pointer finger if it is either a female name or a 'strong' word, and tap your right pointer finger if it either a male name or a 'weak' word.

Did you tap faster as you read words the first time or the second time? The main idea underlying the IAT is that making a response is easier when closely related items share the same response key. The more closely associated the items, the more rapidly a person should be able to respond. Therefore, easier pairings (faster responses) are interpreted as more strongly associated in memory than difficult pairings (slower responses).

Researchers have found that participants tend to be faster to press one key for members of a particular group and words stereotypically associated with that group than to press the same key for members of that group and words that contradict the stereotype associated with that group. It's easier to respond quickly when the category members and the attributes associated with the group are signalled with the same hand, rather than signalled with different hands.

On which of the two trials do you think you tapped faster as you read the words?

There is no single correct answer, but participants tend to respond faster in trial 1 (Step 1).

Write a conclusion on whether your results for this activity support the theory of implicit associations involving stereotypes and attitudes.

When completed under controlled conditions, results for this activity tend to support implicit associations theory.

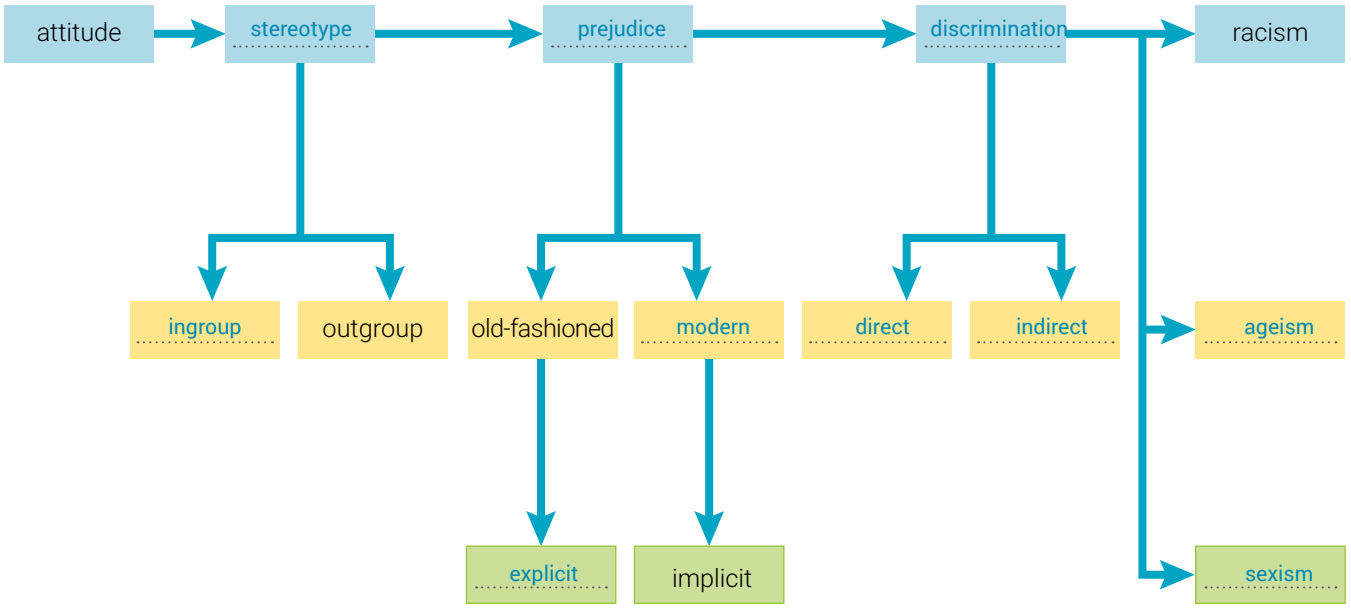
jacaranda
A Wiley Brand

ACTIVITY 6.16

Linking stereotype, prejudice and discrimination

Use the terms in the shaded panel to complete the following flow chart to show the relationship between different types of stereotypes, prejudice and discrimination. Each term is used only once and all terms are used.

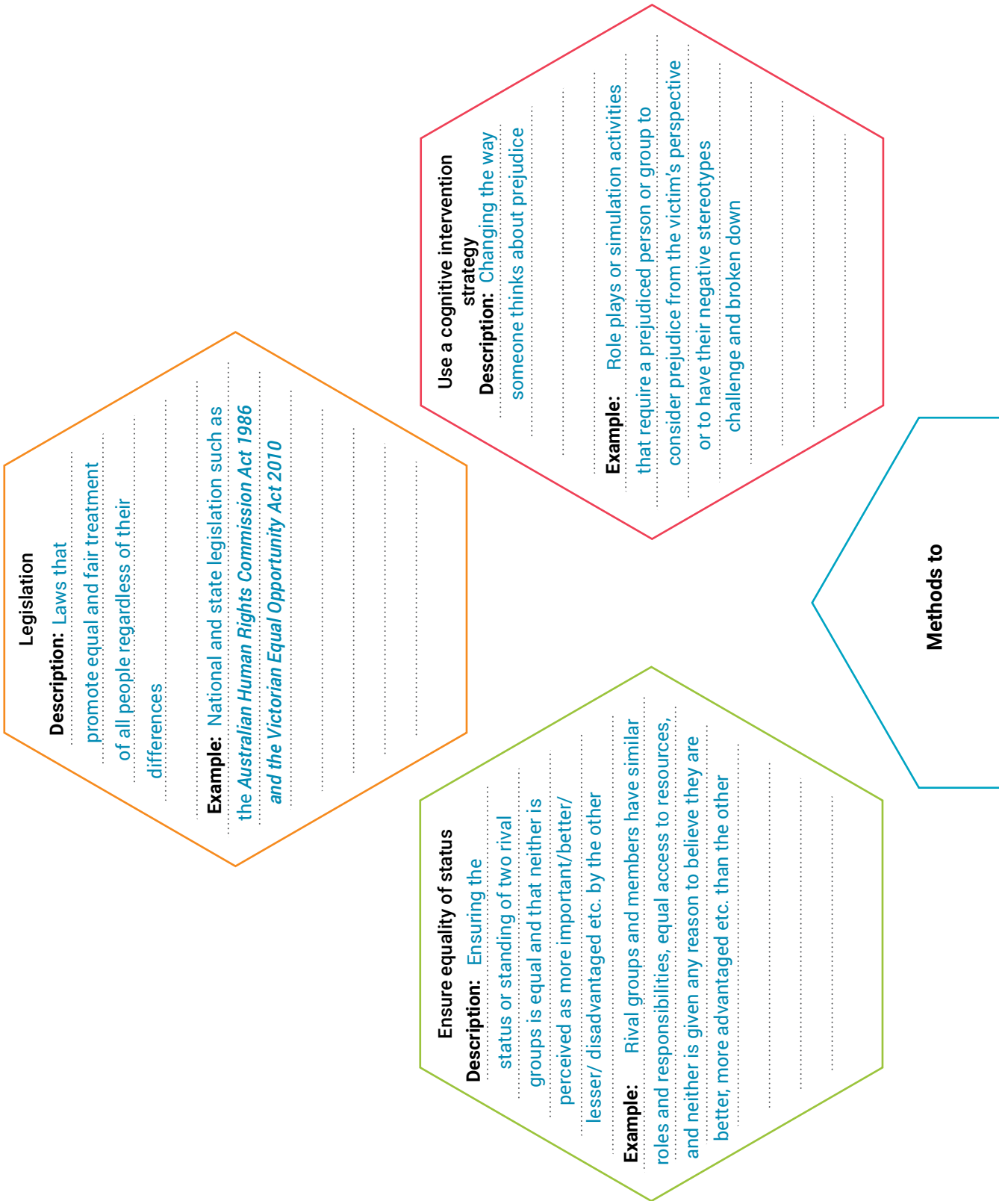
ageism	direct	discrimination	explicit
indirect	ingroup	modern	prejudice
sexism	stereotype		



ACTIVITY 6.17

Summarising strategies for reducing prejudice

Complete the following diagram to summarise ways of reducing prejudice.



jacaranda
A Wiley Brand


reduce prejudice
Sustained intergroup contact
Description: Increasing contact time between the groups prejudiced against each other, but ensuring mutual independence and equal status
Example: Asking two rival groups to spend time together working/interacting on a common project (e.g. work, sport) and to collaborate on goal setting, roles etc.
Set a superordinate goal
Description: Set a goal that cannot be achieved by any one group alone and overrides other existing goals
Example: Asking two rival groups to work/interact on a common project (work problem, sportparticipation outcome) to which they agree and that requires both team's knowledge, skills etc. in order to successfully complete
Education
Description: Teaching and learning about equal and fair treatment of all people regardless of their differences
Example: School and workplace resources and activities, media campaigns

ACTIVITY 6.18

Media response on attitudes, prejudice and discrimination

Read the following newspaper article and then use information in the article to answer the questions.

St Kilda beach rally: far-right and anti-racism groups face off in Melbourne

Tensions reached boiling point at St Kilda beach in Melbourne as hundreds of far-right wing extremists and anti-racism campaigners faced off in a screaming match and minor scuffles broke out.

Scores of police including some with riot shields and on horseback were on hand to keep the groups apart. A police boat kept watch from the water and two helicopters circled overhead.

Blair Cottrell and Neil Erikson, the organisers of the far-right rally, said they had called it in order to 'discuss' Melbourne's youth crime and alleged African gang problems.

'Our country is under attack', Cottrell said over a megaphone. 'Africans are 77 times more likely to commit home invasion. That's not racism, that's a fact!'

Independent senator Fraser Anning flew down from Queensland to attend the event and Erikson thanked him for his presence.

'The left-wing media likes to hang tags on us like neo-nazis, racists and facists, they are just ordinary hard-working Australians who pay their taxes', Anning told reporters.

'Australia has had enough. I think this is the start of something bigger. The revolution will eventually start. People have had enough of these people and they have got to be sent back to where they came from.'

In August, Anning's 'final solution' speech to parliament attracted condemnation from all sides of politics.

Some right-wing protesters wore Australian and Eureka flags as capes around their necks and chanted 'Aussie, Aussie, Aussie, Oi, Oi, Oi', and 'rise without fear'.

Counter-protesters shouted 'nazi scum not welcome here'.

jacaranda
A Wiley Brand

A man in a ute equipped with speakers and a megaphone drove down the Esplanade in St Kilda chanting 'Sudanese are welcome, racists are not'. Right-wing protesters surrounded his vehicle, broke the speakers and ran off with the generator.

Later the two protest groups and police lines left the foreshore area and spilled out onto the road and walked towards the Luna Park.

In one heated confrontation a right-wing protester broke through police lines and tried to grab a banner from three anti-racism campaigners.

Police sprayed capsicum spray and used rubber pellets before arresting the right-wing protester.

Paramedics were helping to treat two women who were sprayed in the eyes.

The Guardian Australia saw at least six people being led away by police.

Source: Martin, L. (2019, January 5). *The Guardian*, Australian edition (Online). Retrieved from https://www.theguardian.com/australia-news/2019/jan/05/far-right-and-anti-racism-groups-face-off-in-melbourne-flashpoint

1 Identify the rival groups, their respective attitudes, and describe the cognitive, affective and behavioural components of each attitude.

- Right-wing protester/extremists
  - Attitude (e.g. There is an increase in youth crime and gang problems due to African youth/refugees.)
  - Components: cognitive — belief that African youth/refugees commit home invasions and other crimes and acts of violence; affective — feeling scared, threatened; behavioural — attending the protest/rally, displaying Australian identity/nationalist items (e.g. flag), verbalising beliefs (e.g. solutions to the problem).
- Anti-racism counter protesters
  - Attitude (e.g. right-wing protesters are extremists, racists and/or Nazis and their racist attitudes towards African youth/refugees are unacceptable.)
  - Components: cognitive — beliefs that right-wing protesters are extremists, racists and/or Nazis and that African youth/refugees should be welcomed; affective — feeling empathy and concern for refugees; behavioural — attending the protest/rally, verbalising beliefs.

2 **(a)** What forms of prejudice are evident in the article?

☑ old-fashioned or ☐ modern ☐ implicit or ☑ explicit

(b) Explain your choice(s) in **(a)** above.

Explanation should demonstrate understanding that both these forms of prejudice involve conscious awareness of their prejudice and open, intentional expression of their prejudice and associated thoughts, beliefs, etc. These features are evident in the behavioural activities reported in the article for each rival group.

3 Based on your understanding of factors influencing attitude formation, explain how the attitudes of either rival group attitudes may have developed.

Examples:

- social learning — learning through observation of parents and other models, peer interaction, education, electronic media exposure, social media use, etc.
- repeated exposure — watching multiple news stories or engaging with social media platforms and being constantly exposed to positive and/or negative stories about African youth violence (and possibly with minimal exposure to counterbalancing opposite views).

4 Who are the ingroup and outgroup members, as perceived by the organisers of the rally and their supporters?

- ingroup: right-wing protesters/ordinary, hardworking non-African Australian residents who are proud of their Australian heritage
- outgroups: African youth or refugees, anti-racism counter protesters

jacaranda
A Wiley Brand

5 Identify a stereotype likely to be held by each of the rival groups.

- Right-wing protester/extremists: e.g. all African youths/refugees commit home invasions and other crimes and acts of violence
- anti-racism counter protesters: e.g. right-wing protesters are extremists, racists and/or Nazis.

6 Describe an intervention that might reduce the prejudice between the rival groups in this article.

The intervention should take account of methods described in the text (e.g. cognitive strategy involving education that promotes empathy, understanding and acceptance; a program involving superordinate goals, mutual interdependence, equal status and sustained intergroup contact).

ACTIVITY 6.19

Crossword on concepts and terms in social cognition

Across

4 A type of non-verbal communication involving gestures

6 A predisposition to take the credit for our successes and blame the situation for failures when judging ourselves

7 A strategy for solving a problem, forming a judgement or making a decision that is based on experience with similar types of problems

9 A collective term that describes how we perceive, think about and use information about ourselves and others to make judgements

12 Prejudice involving conscious awareness and intent

13 This type of bias refers to our tendency to attribute our own behaviour to external or situational factors, yet attribute others' behaviour to internal factors

17 An enduring positive or negative evaluation of someone or something

18 A contemporary form of prejudice against members of other racial groups that is expressed indirectly and covertly rather than publicly

19 The process by which we explain the cause of our own or another person's behaviour

20 The process of making a judgement about someone and forming an impression

21 A systematic error of judgment and faulty decision-making that usually leads to inaccurate or unreasonable conclusions

Down

1 Bias in which our favourable or unfavourable impression of a person affects our assumptions about our future expectations of that person

2 The tendency to prioritise certain information over other information when forming an opinion or making a decision

3 An unpleasant psychological state that occurs when we become aware that there is inconsistency between our beliefs, attitudes, cognitions and behaviour

5 A behavioural expression of prejudice

8 In relation to person perception, this is any personal characteristic that stands out or is noticeable or attracts attention

10 The group to which an individual identifies and feels he or she or they belong to

11 A method of reducing prejudice by increasing the time of contact between two groups who are prejudiced against each other

14 A generalisation or simplified belief about the personal characteristics of the members of a social group

15 A type of prejudice that is unconscious and not usually within the control of the person holding them

16 A negative attitude towards the members of a group, based solely on their membership of that group.

ACTIVITY 6.20

True/False quiz on social cognition

Indicate whether each item is true or false by writing T or F in the column on the right.

Statement	T/F
1 Social cognition is concerned with how we make sense of our social world.	T
2 Psychologists may refer to a causal explanation of someone's behaviour as an attribution.	T
3 Attitudes that come to mind quickly are more likely to influence behaviour than those that do not.	T
4 Actor–observer bias is the tendency to think well of actors who play appealing roles.	F
5 Attitudes may predispose a person to act in a particular way.	T
6 Attitudes are excellent predictors of behaviour.	F
7 When explaining another person's behaviour, we tend to underestimate situational influences.	T
8 When explaining our own behaviour, we tend to underestimate situational influences.	F
9 First impressions of people are mostly influenced by the way they look and the way they act.	T
10 In most situations, establishing contact between two rival groups is sufficient to resolve their differences.	F
11 Increasing intergroup contact time can decrease prejudice between groups	T
12 People can become fixed in the way they think about another person that inhibits their ability to imagine them is a different role.	T
13 There is a tendency for people to seek out information that confirms their beliefs.	T
14 The Dunning-Kruger effect is when people overestimate their knowledge and ability.	T
15 Blaming others when we make a mistake is an example of self-serving bias.	T
16 The affective, behavioural and cognitive components of an attitude are often consistent.	T
17 If we are rewarded or praised for expressing a particular attitude then the attitude is likely to be strengthened.	T
18 Stereotypes are misleading, unfair, over-generalised beliefs about identifiable groups of people that do not serve any useful purpose.	F
19 Stereotyping can lead to prejudice.	T
20 Old-fashioned prejudice tends to be more explicit than modern prejudice.	T
21 Prejudice is a behaviour, whereas discrimination is an attitude.	F

jacaranda
A Wiley Brand

ACTIVITY 6.20 *continued*

Statement	T/F
22 Person perception can be influenced through both verbal and non-verbal communication.	T
23 Cognitive bias can reduce cognitive dissonance.	F
24 The halo effect is a strategy for reducing prejudice when people have minimal information about each other.	F
25 The halo effect can happen in reverse, meaning we can associate negative characteristics with a person displaying positive characteristics.	T

TOPIC 7

Factors that influence individual and group behaviour

	Activities																
Key knowledge	7.1	7.2	7.3	7.4	7.5	7.6	7.7	7.8	7.9	7.10	7.11	7.12	7.13	7.14	7.15	7.16	7.17
• the influence of social groups and culture on individual behaviour	✔	✔	✔													✔	✔
• the concepts of obedience and conformity and their relative influence on individual behaviour				✔	✔	✔	✔		✔	✔	✔	✔	✔			✔	✔
• positive and negative influences of different media sources on individual and group behaviour, such as changing nature of social connections, social comparison, addictive behaviours and information access							✔	✔			✔	✔	✔	✔		✔	✔
• the development of independence and anti-conformity to empower individual decision-making when in groups															✔	✔	✔
Key science skills									✔	✔		✔					

Source: © VCAA, *VCE Psychology Study Design: 2023–2027*. p. 29

Note: Although the Zimbardo, Milgram and Asch experiments are not specified in the 2023–2027 Psychology Study Design, they have been included in this topic to help inform students. Their experiments are key examples of studies on conformity, obedience, status and power.

ACTIVITY 7.1

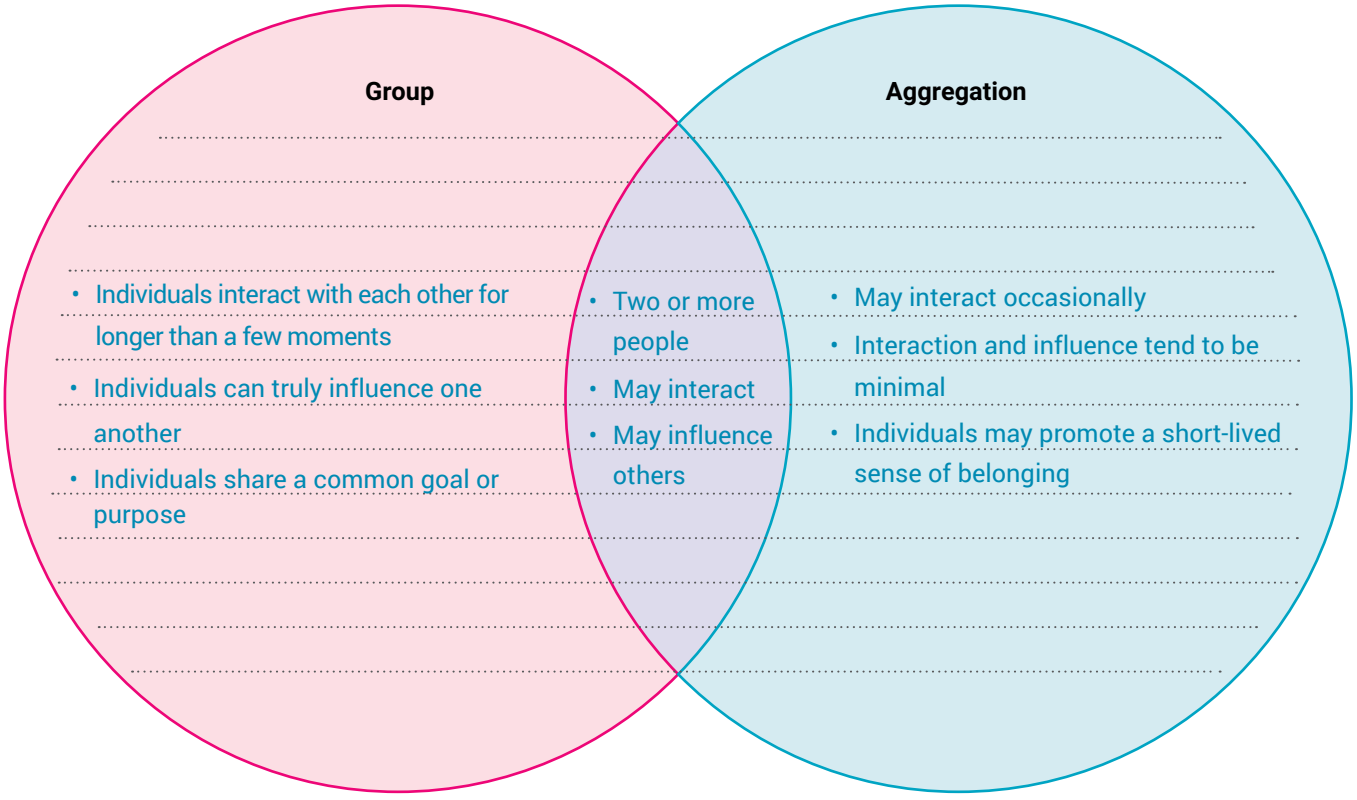
Differentiating between a group and an aggregation

1 Complete the following sentences.

A group is any collection of people who interact and influence one another and share a common purpose.

An aggregation is any collection of people in one location who have no obvious social structure and have only a minimal, shared common purpose.

2 Complete the Venn diagram below to compare and contrast a group and an aggregation.



jacaranda
A Wiley Brand

Thinking about social influence

For each of the following factors relating to social influence, write a brief explanation and give an example.

ACTIVITY 7.3

Sources of social power

1 Explain the difference between status and power.

Status refers to the importance of an individual's position in a group as perceived by the members of that group, whereas power refers to an individual's (or group's) ability to control or influence other people or groups. Higher status is usually associated with more power to influence.

2 Fill in the table by describing the source of each type of social power and give an example. Try to use examples from your own life experiences.

Type of social power	Source of power	Example
Reward	Ability to give positive consequences or remove negative consequences in response to specific behaviour.	An employer has the power to give a pay rise or promotion; a teacher can reward students with grades, praise and privileges, and dismiss a student early from detention.
Coercive	Ability to give negative consequences or remove positive consequences in response to specific behaviour.	An employer can dismiss an employee; a teacher can give detention or not allow a student to attend a school excursion or function.

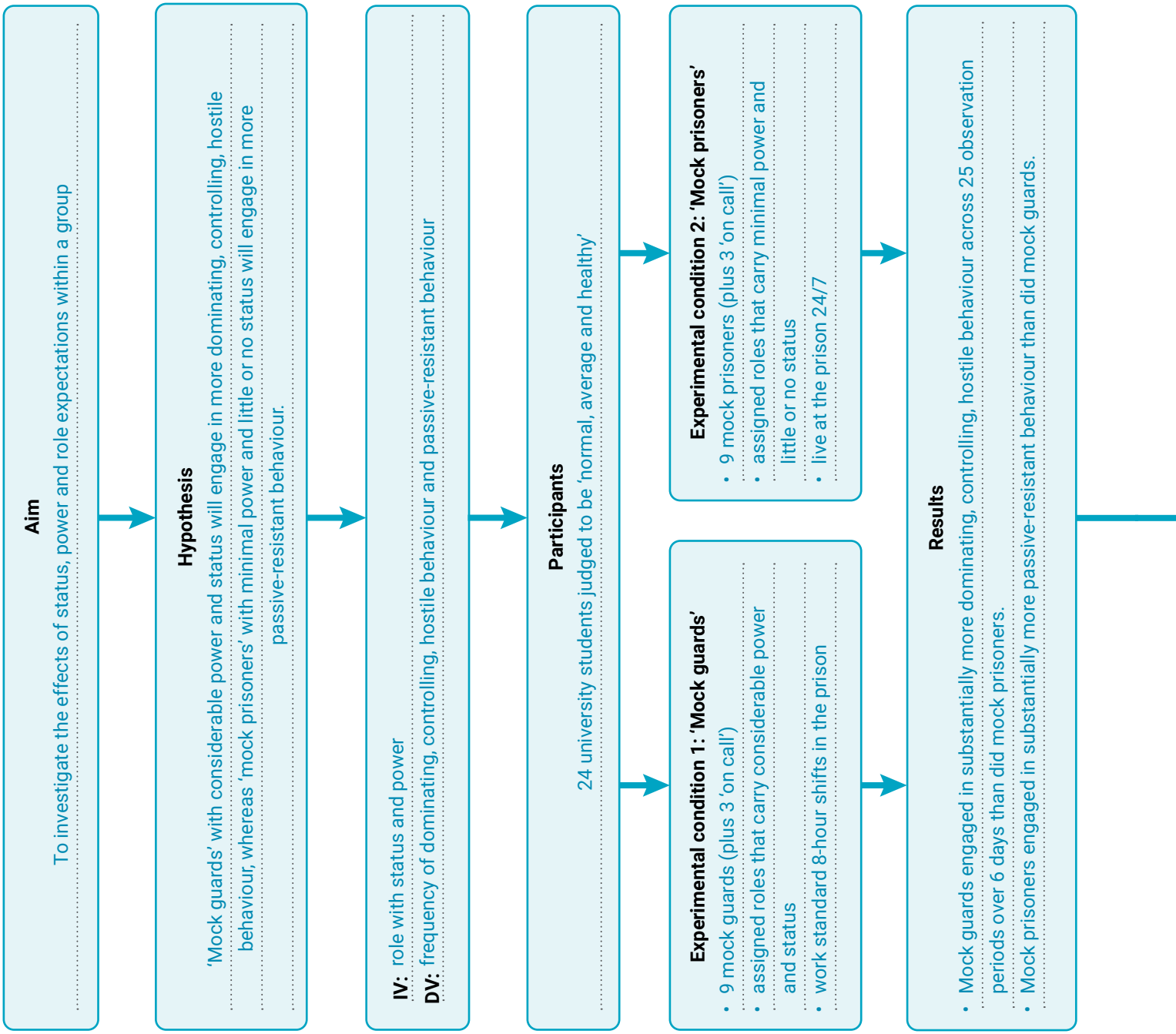
jacaranda
A Wiley Brand

Type of social power	Source of power	Example
Legitimate	An individual's status or position in a group, institution or society in general gives them the right (authority) to exercise power over those with a lower status or less authority.	A group leader, manager, captain of a team, classroom teacher, police officer
Referent	Individuals are attracted to, respect, identify with or want to be like or be liked by this person	A social influencer, celebrity you respect and want to be like, or a friend who you want to be liked by
Informational	Having access to resources or information that are relevant to a situation and are not available elsewhere	Someone who knows exactly what needs to be done to meet an important team goal within a strict deadline; someone who has had a specific experience that someone else wants to know about
Expert	Having special knowledge and skills that are desirable or needed	A classroom teacher perceived to be knowledgeable in their subject; a supervisor of a workplace trainee or new employee is assumed to be highly skilled

ACTIVITY 7.4

Flow chart summary of Zimbardo's (1971) Stanford prison experiment

Use the flow chart below to summarise Zimbardo's Stanford prison experiment.



jacaranda
A Wiley Brand

Conclusion

The results support the hypothesis that mock guards with considerable power and status will engage in more dominating, controlling, hostile behaviour, whereas mock prisoners with minimal power and little or no status will engage in more passive-resistant behaviour.

Limitations/Criticisms

- Biased/non-representative sample (e.g. same sex, similar age, ethnicity and educational backgrounds)
- No participant had personal experience of prison and their roles may have been played in accordance with their social perceptions of how prison life should be
- Some simulations were unlike actual prisoner life or treatment (e.g. khaki uniforms are military, symbolic shaving, snatched arbitrarily from homes (rather than led from a court)).
- Prison environment is realistic, but it is an artificial environment created for an experiment so participants may be responding to personal and/or experimental expectations.

Generalisations/External validity

- The behaviour of normal, well-educated men can be significantly affected when a role they are given involves considerable status and power.
- Harsh and sometimes inhumane tr eatment of prisoners in real life may be due to guards having too much power and status and prisoners having little or no power or status.

Ethical issues

Breaches of ethical standards and practices:

- Serious psychological and/or physical harm to participants
- Not ending the study as soon as this was evident
- Not supporting participant withdrawal rights

ACTIVITY 7.5

Constructing a model of groupthink

Complete the model of groupthink by filling in the boxes below. Try to add at least three key summary points into each box.

Group conditions
(factors that inspire the likelihood of groupthink)

- The group has a high level of cohesiveness.
- The group has a strong leader who takes charge and asserts their authority.
- The group lacks procedures to search for and carefully consider or debate the pros and cons of alternative options.
- The group is isolated from outside influences with little hope of finding a better solution than the one at hand.
- The group is under stress to make a difficult or important decision within a strict timeline.

Desire for consensus

Symptoms of groupthink

- Illusion of invulnerability (e.g. an overestimation of the group's ability to make a good decision due to a distorted belief that 'everything is going to work out all right because we are a special group')
- Moral correctness (e.g. a belief that the group will make the morally 'right' decision as a matter of course so there is no need to consider moral and ethical issues that may be relevant)
- Collective rationalisation (e.g. the group spends more time on justifying its decisions than reflecting on possible oversights or seeking information about alternatives)
- Outgroup stereotypes (e.g. looking down at ideas sourced from outside the group and the possibility that another group could come up with a better decision)
- Self-censorship (e.g. individuals withholding their personal concerns or dissenting opinions so that disagreement isn't expressed)
- Direct pressure on dissenters (e.g. pressure on doubters to conform (agree) with others in the group)
- Illusion of unanimity (e.g. a distorted belief that everyone is in agreement)
- Self-appointed mind guards (e.g. group members who protect the group from information that may challenge its decision (so they may actually withhold important information from the group))

Negative consequences

- Closed minded decision making
- Rationalisation of decision making based on the self-belief that by the group agreeing it must be correct
- Dismissal of other courses of action that may lead to better outcomes
- Decisions made that do not account for all of the factors that can affect the outcomes
- Potentially risky strategies being adopted
- Others answers possible.

Reduced likelihood of successful decisions

jacaranda
A Wiley Brand

ACTIVITY 7.6

Preventing groupthink – Designing a community park

Imagine you have been asked to lead a group of ten people to advise the local council on a design for a new community park. For each point below, briefly describe how you could prevent groupthink from affecting decision making.

Ways to prevent groupthink	Applied to group designing new park
Awareness of groupthink	Before the discussions begin, ensure that all members of the group are provided with information about the psychology of groupthink and its potential risks.
Impartial leader	Install a leader of the group who can demonstrate that they are not biased towards any particular design and are willing to listen and consider all suggestions.
Encourage objections	Ensure that all members of the park advisory group are encouraged to offer constructive criticism and alternative points of view.
Use subgroups	Engage other stakeholder groups who will also benefit from using the park to offer suggestions and to comment on ideas put forward by the main group.
Invite external experts to give opinions	Engage experts in park design and planning to help educate the group on best practice designs, etc.
Allow time to raise doubts	Ensure there is plenty of time (weeks rather than days) for members of the park advisory group to reflect on the designs put forward. This can allow opportunity for ideas that may not have surfaced yet.

ACTIVITY 7.7

Summarising the theory of group polarisation

Use the terms in the shaded panel below to complete the sentences about group behaviour involving group polarisation.

attitudes	polarisation	individual	views	whole
social	like-minded	adopting	extreme	adopt
shift	discuss	factors	group	position
arguments	confirming	combined	compare	more

Research shows that when members of a group with like-minded opinions and beliefs meet to discuss their ideas, their opinions and beliefs often become more extreme. This means they can shift their attitudes to more extreme positions. This is known as group polarisation. As a result, the group as a whole tends to respond in more extreme ways than any individual would without polarisation.

An example of group polarisation would be individuals adopting more extreme views by engaging with social media sites that use forums to discuss issues or topics that they are interested in. These might focus on topics such as football, film, religion, immigration or politics, etc.

The best explanation for group polarisation is that it results from the combined effect of a number of factors that occur during group discussions. These include exposure to new arguments that support our view, which we then adopt as our own; exposure to others who adopt the same arguments as ourselves confirming our position; and social comparison, whereby we compare ourselves to others. When we compare our views to like-minded others, we can adopt a more extreme position so that when other people discover we share their views we are perceived more favourably by them.

jacaranda A Wiley Brand

A model to understand deindividuation

1 Complete the following diagram summarising factors that affect deindividuation. In each box write a brief explanation and then include an example.

Deindividuation

Explanation: Reduced self-consciousness, inhibition, feelings of personal responsibility and inner restraint that can occur when in a group or crowd.

Example: A person screaming hysterically at a rock-concert because their emotions are highly charged.

Factors that contribute...

Anonymity

Explanation: When an individual feels invisible and less accountable when in a group or crowd. As a result, they are more likely to conform to the expectations and behaviour of the majority around them.

Example: Many of the protestors who stormed the White House during the USA elections in 2021 behaved violently and aggressively because they felt anonymous within the group.

Shift in attention

Explanation: When individuals within a group become focused on the group's activity or aims at the expense of self-reflection about the potential consequences of their actions. This shift in attention is intensified when the group members act as a single unit.

Example: A group of football supporters decide to vent their frustration about their team's loss by behaving badly in public after the game, yelling abuse and damaging property.

ACTIVITY 7.8 *continued*

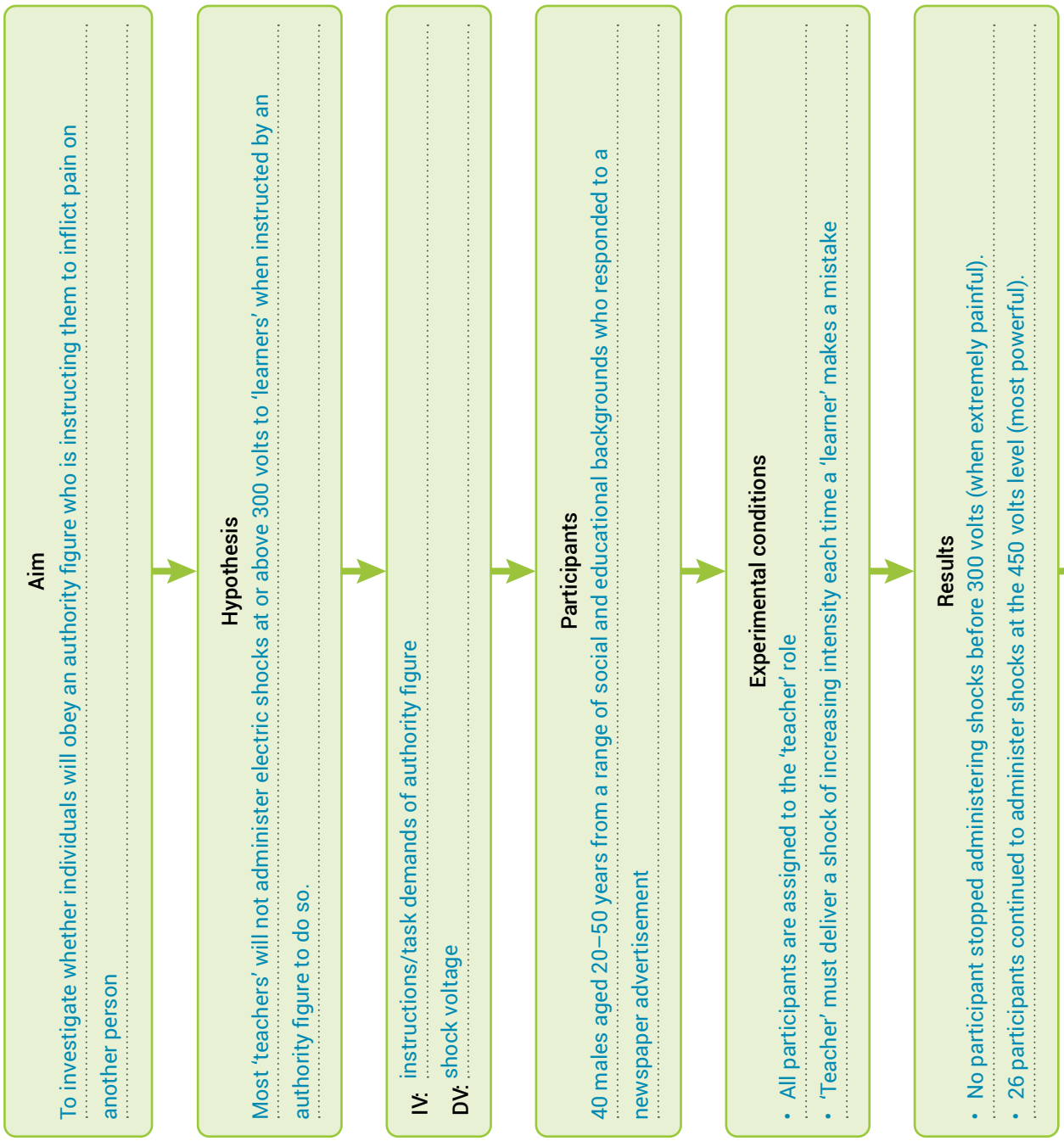
2 Explain how group norms determine whether deindividuation will lead to positive or negative behaviours.

The norms of a group are the explicit and implied rules and expectations that influence how members of the group should think, feel and behave. If the group's norms are based on positive thoughts and behaviours, then deindividuation will encourage group members to conform positively. An example would be members of an animal rescue group working with other members of the public who join in to save a beached dolphin. However, if the groups norms are negatively focused, the subsequent behaviour of individuals could be negative. An example would be an individual becoming violent at a protest because other protesters around them are acting violently.

jacaranda
A Wiley Brand

Flow chart summary of Milgram's (1963) experiment on obedience to authority

Use the flow chart below to summarise Milgram's experiment.



jacaranda
A Wiley Brand

Conclusion

People have a tendency to obey any command that comes from a legitimate authority figure.

Limitations/Criticisms

- Participants may have been responding to personal and/or experimenter expectations, especially as they were paid.
- Use of an unusual activity in an unusual situation may have produced unusual rather than 'true' behaviour. Results may apply to that situation only.

Generalisation/External validity

A possible generalisation may relate to obedience to an authority figure by ordinary, everyday people. However, the experiment involved an unusual activity in an unusual environment that may limit the extent to which the results can be applied to real-life situations.

Ethical issues

- Potential for serious psychological and/or physical harm to participants; not ending the study as soon as this was evident (participants weren't screened in any way to check vulnerability)
- Not supporting participant withdrawal rights

ACTIVITY 7.10

Evaluation of an Australian variation of Milgram's (1963) experiment

Milgram's experiments attracted a great deal of interest among psychologists as well as the community in general. Many variations of his standard experiment were subsequently conducted in other countries and cultures, including Australia, Austria, England, Germany, Italy, Jordan, Spain and the Netherlands. These studies produced a range of results, with the level of obedience found to be higher in some studies and lower in other studies than that in Milgram's original experiment, but nonetheless still occurring at a significant level.

The first Australian replication was conducted at the University of Sydney by Wesley Kilham and Leon Mann (1974), using 63 male and 62 female first-year psychology students. Kilham and Mann varied Milgram's experiment so that the orders to administer a shock did not come directly from the experimenter, but from another person called 'the transmitter'. Participants given the role of the transmitter received the instructions to administer a shock from an authority figure (the experimenter) and relayed them to the person who had to carry them out. This person was called 'the executant'. Neither the transmitter nor the executant were allowed to talk to each other (or the experimenter), except when the transmitter relayed the commands of the experimenter to the executant.

Kilham and Mann hypothesised that the person in a transmitter role would be more obedient than the person in the executant role. This was based on their belief that a person in the transmitter role is 'more detached from the destructive act' and will therefore feel less responsible for the consequences of their actions.

Kilham and Mann found that significantly more participants were fully obedient in the transmitter role (54 per cent) than the executant role (28 per cent). There were also sex differences. More male transmitters (68 per cent) were fully obedient than female transmitters (40 per cent) or male executants (40 per cent), and more female transmitters (40 per cent) and male executants (40 per cent) were fully obedient than female executants (16 per cent).

1 What were Kilham and Mann interested in finding out in relation to obedience?

Explanation may refer to either the extent to which participants would be obedient to someone who relayed orders from the authority figure, or whether a person who is in a role that is 'more detached from the destructive act' would be more obedient than a person actually executing orders (because they may feel less responsible for the consequences of their actions).

2 In what two key ways did the Kilham and Mann procedures differ from those of the Milgram (1963) experiment?

Variations include:

- orders to shock did not come directly from an authority figure, but from another person who relayed them (the 'transmitter')
- both male and female participants.

jacaranda
A Wiley Brand

3 (a) List three main results obtained by Kilham and Mann.

Results include:

- more participants were fully obedient in the transmitter role (54 per cent) than the executant role (28 per cent)
- more male transmitters (68 per cent) were fully obedient than female transmitters (40 per cent) or male executants (40 per cent)
- more female transmitters (40 per cent) and male executants (40 per cent) were fully obedient than female executants (16 per cent).

(b) Draw a conclusion about sex differences in obedience based on the results obtained by Kilham and Mann.

Example: Across conditions, female participants were less obedient than males, especially in the executant condition.

(c) How does the general level of obedience in the Kilham and Mann experiment compare with that in Milgram's?

The general level of obedience in the executant condition was lower than that found by Milgram.

4 On the basis of the Kilham and Mann (1974) findings, how likely is it that female participants would respond as did the male participants in the Milgram (1963) experiment?

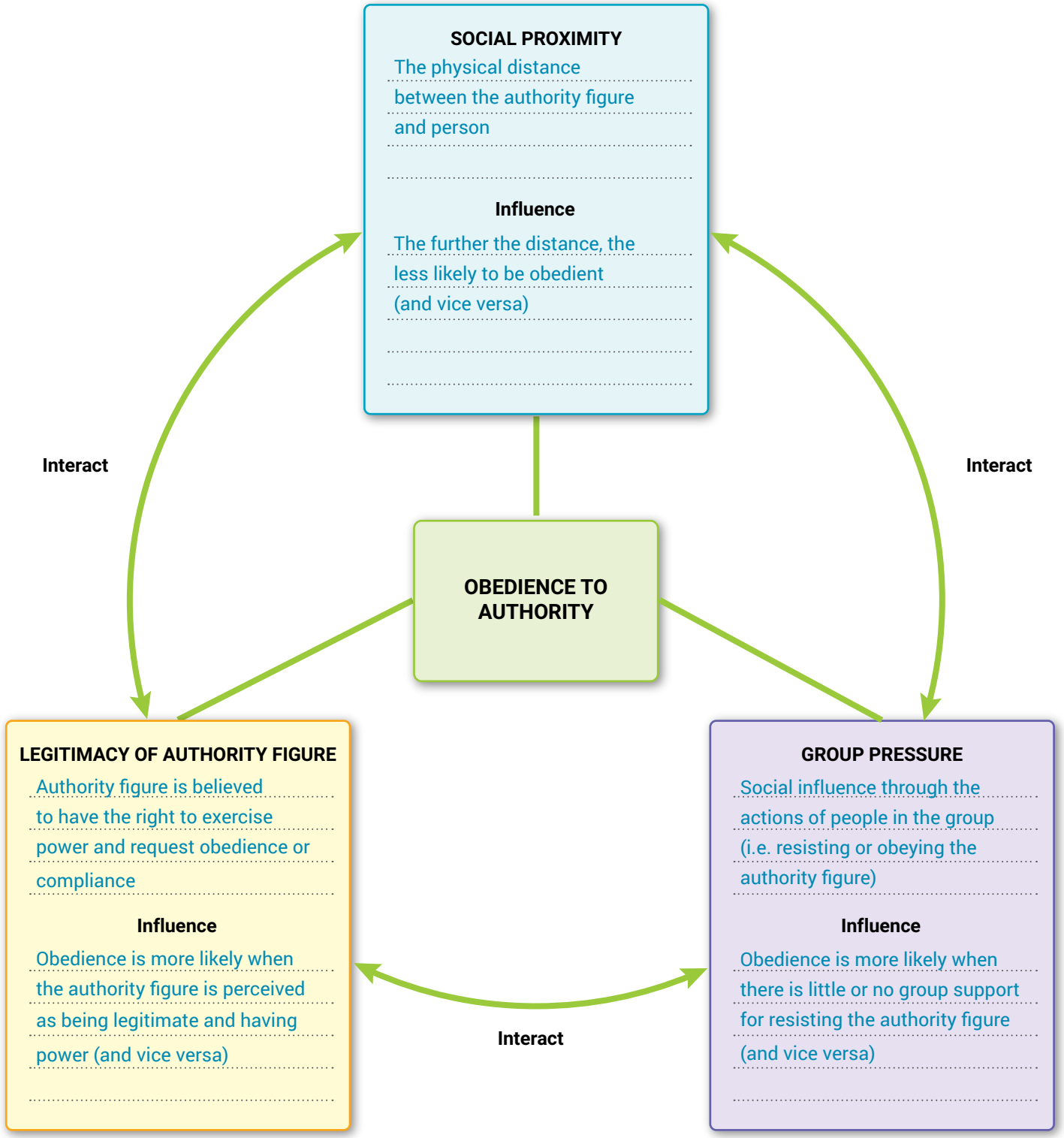
Research findings indicate that it is very likely, but possibly not as high a proportion.

Source: Kilham, W., & Mann, L. (1974). *Level of destructive obedience as a function of transmitter and executant roles in the Milgram obedience paradigm.* Journal of Personality and Social Psychology, 29(5), 696–702.

ACTIVITY 7.11

Comparing factors affecting obedience

Milgram followed up his original experiment (1963) with 18 variations over time to test factors that would influence obedience to authority, either by promoting or inhibiting it. He found that several factors interact in influencing someone to obey an authority figure. These include social proximity, the perceived legitimacy of the authority figure and group pressure. Their relationship is shown in the following diagram. Describe each factor and its influence.

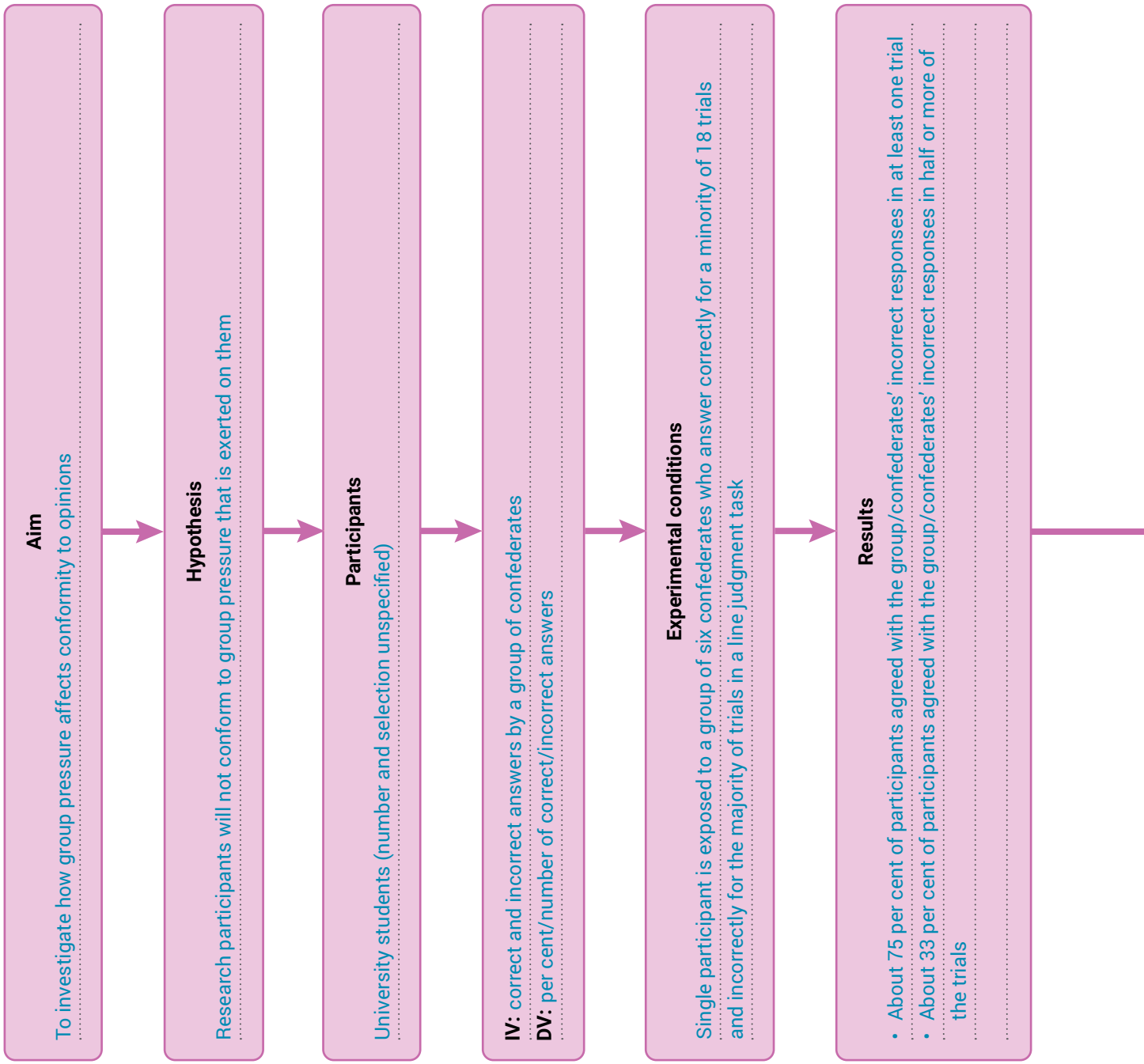


jacaranda A Wiley Brand

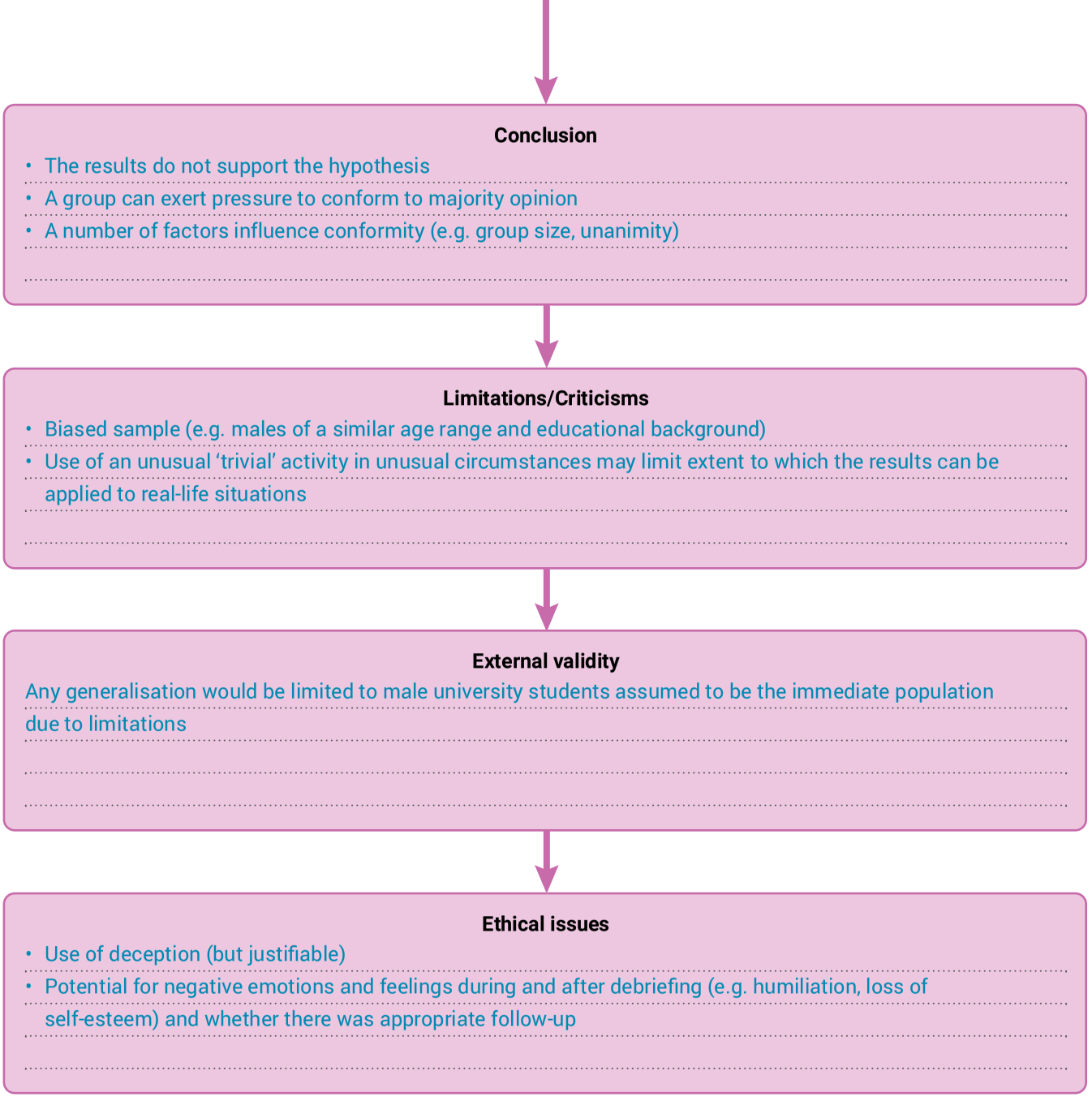
ACTIVITY 7.12

Flow chart summary of Asch's (1951) experiment on conformity

Use the flow chart below to summarise Asch's experiment on conformity.



jacaranda
A Wiley Brand


Conclusion
• The results do not support the hypothesis
• A group can exert pressure to conform to majority opinion
• A number of factors influence conformity (e.g. group size, unanimity)
Limitations/Criticisms
• Biased sample (e.g. males of a similar age range and educational background)
• Use of an unusual 'trivial' activity in unusual circumstances may limit extent to which the results can be applied to real-life situations
External validity
Any generalisation would be limited to male university students assumed to be the immediate population due to limitations
Ethical issues
• Use of deception (but justifiable)
• Potential for negative emotions and feelings during and after debriefing (e.g. humiliation, loss of self-esteem) and whether there was appropriate follow-up

Comparing influences on conformity

Complete the following diagram showing factors that make conformity more likely. Include a single point description in each external circle to describe and/or explain the type of influence the factor may have.

Factors that tend to make conformity more likely

jacaranda
A Wiley Brand

ACTIVITY 7.14

Positive and negative influences of different media

Describe some of the positive and negative influences of the following media types.

Television	Video games
Positive influence: e.g. educational shows and/or documentaries have expanded my knowledge of various topics **Negative influence:** e.g. watching reality TV shows has distracted me from finishing homework	**Positive influence:** e.g. strategic games have improved my approach to real-life problem solving **Negative influence:** e.g. I sometimes think about using the aggressive behaviours I use in games
Social media	**Advertising**
Positive influence: e.g. I am able to stay in contact with family members when I travel overseas **Negative influence:** e.g. seeing what other people have posted can make me less appreciative of what I do or have in my own life	**Positive influence:** e.g. I have learned about new products that I want to try or buy **Negative influence:** e.g. images of perceived beauty and ideal features makes me feel different

ACTIVITY 7.15

Thinking about anti-conformity and independence

Greta Thunberg is a Swedish climate activist who began skipping school when she was 15 in order to pressure the Swedish government to reduce carbon emissions. Her protests have encouraged young people all over the world to stand against governments that are not acting against climate change. Between 20 and 27 September 2019, a series of climate change protests inspired by Thunberg took place in 150 countries. It is estimated that 6–8 million people were involved, making this the largest climate change protest in history.

Explain how Greta Thunberg's lobbying for climate action represents both anti-conformity and independence.

Answers will vary. Thoughtful responses should include the following points applied to Greta Thunberg's actions.

- Definition of anti-conformity as the deliberate refusal to comply with accepted standards in a society
- Thunberg refused to attend school even though it is mandated by most Western societies
- Anti-conformity is often accompanied by expression of ideas, beliefs or judgements that challenge existing standards
- Thunberg publicly expresses her outrage at governments not doing enough to curb climate change and she supports her augments with scientific data
- Anti-conformity is often associated with stubbornness
- Thunberg has remained steadfast in her objections to the world continuing with the status quo on limited action towards climate change
- Definition of independence as the freedom experienced when we are not under the control or influence of others
- Thunberg has established herself on the world stage as a free and independent thinker and activist. She is not affiliated with any organisation or government
- Thunberg strives to exert her influence and has succeeded in gaining support of millions of students around the globe without compromising her independence by not actively seeking financial sponsorship, etc.

jacaranda
A Wiley Brand

ACTIVITY 7.16

True/False quiz on social influences on behaviour

Indicate whether each item is true or false by writing T or F in the column on the right.

Statement	T/F
1 Humans are social beings.	T
2 Social influence can be constructive or destructive but never neutral.	F
3 Two people waiting for a bus would be considered a social group.	F
4 The food people eat would not be considered culture.	F
5 For Aboriginal communities, culture is the foundation upon which everything else is built.	T
6 Status within a group will determine the amount of power an individual wields.	T
7 Expert power is derived from respect.	F
8 Zimbardo's Stanford prison experiment demonstrates the effects of status and power on individual behaviour.	T
9 Groupthink can only occur in groups that have high levels of cohesiveness.	F
10 Group decision making will generally result in better quality decisions when the group encourages a diverse range of opinions.	T
11 People in crowds can behave in extreme ways because they experience reduced self-consciousness and inhibition.	T
12 Milgram's experiment on obedience has been replicated in many countries with different sets of results.	T
13 The closer a learner is to a teacher (social proximity) the less likely they are to inflict harm in Milgram's experiment.	T
14 Conformity to a group increases as the group size is enlarged.	F
15 The presence of an ally (someone who agrees with you) will result in significantly reduced likelihood of conforming.	T
16 People generally contribute less effort when they are involved in group activities.	T
17 Exposure to television violence is likely to increase aggressive behaviours in children.	T
18 People who engage in photo-based social media are less likely to engage in social comparison.	F
19 It is impossible to become addicted to engaging with social media platforms.	F
20 Young children can experience difficulty differentiating fact from fantasy, making them more vulnerable to advertising.	T
21 Conforming when we think we should not can cause the negative psychological state of cognitive dissonance.	T
22 Anti-conformity can happen unconsciously when a person feels they do not agree with the opinions or actions of others around them.	F
23 People feel better when they view themselves as unique.	T
24 Individuals engaging with chat groups on social media platforms can shift their beliefs to become more or less extreme depending on the messaging they hear.	T

ACTIVITY 7.17

Crossword on concepts and terms associated with social influences on individuals and groups

Across

1 When influence is exerted via a social interaction
4 The level of perceived importance of an individual's position within a group
10 A way of life for a particular society including beliefs, customs and language
11 The tendency to adjust one's thoughts, feelings or behaviour so they are more consistent with others
12 A sense of feeling invisible or less accountable for personal actions when behaving in a group or crowd
13 Reduced self-consciousness, inhibition and feelings of personal responsibility when acting in a group or crowd
15 When an individual follows the commands of another person or authority
16 A collection of people in one location without social structure and minimal shared purpose

Down

1 The real or imagined influence of others or their actions on an individual
2 The deliberate refusal to comply with accepted standards in a society
3 The tendency of an individual within a group to shift their views to a more extreme position consistent with the group's beliefs
5 Two or more people who interact and influence each other and share a common purpose
6 The tendency to seek agreement in a group at the expense of consideration of alternative ideas or options
7 The behaviour adopted by an individual or assigned to them that influences the way in which they function in different situations
8 When an individual is free from the influence or control of other individuals or groups
9 When an individual asserts their independence by taking the opposite stance to what is being asked of them
14 An individual's or group's ability to control or influence others

1 SOCIALPOWER
2 ANTICONFORMITY
3 GROUPTHINK
4 STATUS
5 SOCIALGROUP
6 GROUPTHINK
7 ROLE
8 INDEPENDENCE
9 REACTANCE
10 CULTURE
11 CONFORMITY
12 ANONYMITY
13 DEINDIVIDUATION
14 POWER
15 OBEDIENCE
16 AGGREGATION

TOPIC 8

Perception

	Activities														
Key knowledge	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	8.10	8.11	8.12	8.13	8.14	8.15
• the role of attention (sustained, divided, selective) in making sense of the world around us	✔	✔	✔											✔	✔
• the role of perception in the processing and interpretation of sensory information, as demonstrated through top-down and bottom-up processing				✔	✔					✔	✔	✔	✔	✔	✔
• the influence of biological, psychological and social factors on visual perception and gustatory perception						✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
Key science skills								✔							

Source: © VCAA, *VCE Psychology Study Design: 2023–2027.* p. 30

ACTIVITY 8.1

Distinguishing between processes involved in sensation and perception

Complete the boxes comparing sensation to perception.

Part A Sensation vs perception

Sensation is: the process by which our sensory receptors and sense organs detect and respond to sensory information that stimulates them. The sensory information is: ☑ raw ☐ changed	Perception is: the process by which meaning is given to incoming sensory information. The sensory information is: ☐ raw ☑ changed
Sensation is a passive process because… it occurs automatically and mostly without conscious awareness at a sensory receptor level.	Sensation is an active process because… our interpretation of what we see, hear, taste and touch is the result of active and conscious processing as we construct our understanding of reality.

Part B Identifying human sensory capabilities

Fill in the table below describing different human senses. For each, indicate the type of energy detected and the sensory receptors involved.

Sense	Type of physical energy detected	Sensory receptors/organ(s) involved
Vision	Light (photons)	Eyes (retinal cells)
Taste	Chemical molecules	Tongue (taste buds)
Hearing	Vibration of air molecules	Ears (ear drum and inner ear)
Smell	Chemical molecules (airborne)	Nose (nasal membranes)
Touch	Pressure (applied force)	Skin (sensory receptors)
Pain	Pressure, heat, cold, cellular distress	Pain receptors throughout the body
Kinaesthesia	Tension (force) in muscles	Sensory receptors in muscle tissue

jacaranda A Wiley Brand

ACTIVITY 8.2

Thinking about three different types of attention

Select terms from the shaded panel below to correctly complete the passage about different types of attention. Some terms may be used more than once.

attention	sustained	external	complex	remember
filtering	change	stimulus	focus	important
intense	selective	three	distribute	extended
consciously	ignoring	spotlight	divided	internal

Attention is when we focus on specific stimuli so that we become consciously aware of it. Being able to pay attention enables us to live out our daily life. It helps us to learn, remember, have relationships, stay safe and complete tasks. Attention is like a mental spotlight that we can direct on an internal stimulus, such as breathing, or an external stimulus, such as looking ahead when walking. When we pay attention to something we become perceptually selective. This means we focus on important things while ignoring others. An example could be focusing on traffic lights when driving. Although attention can be categorised under three different types, usually more than one type is involved when we perform tasks. Sustained attention is when we remain focused on a stimulus or task for an extended period of time. An example could be when completing an examination. Divided attention is when we distribute our focus across two or more simultaneous tasks. An example could be listening to music while we compose a text message. Divided attention is easier to do when the tasks are less complex or are well-rehearsed. Selective attention is when we choose to focus on specific stimuli while ignoring all others. This is a type of mental filtering and is more likely to happen if the stimulus is important or meaningful to us. An example could be looking at your phone when a text message arrives because it is from your best friend. It can also happen when stimuli change in our environment, such as becoming brighter or more intense, or when someone turns the volume up on an iPod.

ACTIVITY 8.3

Distinguishing between three different types of attention

Complete the following table to distinguish between different types of attention.

Sustained attention	Divided attention	Selective attention
Definition: Maintaining attention on a specific stimulus or task for a continuous period of time without being distracted.	**Definition:** Distributing attention across two or stimuli or tasks so that they can all be focused on or completed simultaneously.	**Definition:** Choosing to focus on one specific stimulus while ignoring others.
Mostly affected by: How engaging or arousing the task is to the person Personal characteristics (cognitive ability and aptitude) Task complexity Potential for reward (motivation) Level of fatigue Expectations about outcome Emotional state	**Mostly affected by:** How much cognitive (conscious) effort is required for each task Similarity of different tasks Complexity or difficulty of tasks performed Familiarity of tasks (how well rehearsed)	**Mostly affected by:** How important or meaningful the stimulus is to us If the stimulus personally relates to us How novel or unusual the stimulus is If stimulus is changing (louder, brighter, size, etc.) Motivation Past experience
Purpose: Enables concentration over an extended period of time to complete more complex tasks	**Purpose:** Enables our ability to complete more than one task simultaneously	**Purpose:** Enables our ability to heighten or attenuate our awareness on one particular stimulus
Example: Writing an essay	**Example:** Singing along to music while preparing and cooking a meal	**Example:** Focusing on traffic in front of a vehicle when driving

jacaranda
A Wiley Brand

ACTIVITY 8.4

Thinking about top-down and bottom-up processing

Part A

Complete the diagram on page 257 comparing top-down to bottom-up processing by cutting and pasting the statements below in the spaces provided. Some statements are repeated deliberately.

Statements

Context, prior knowledge, past experience (cognitive processes) used to form initial perceptual hypothesis rather than sensory information

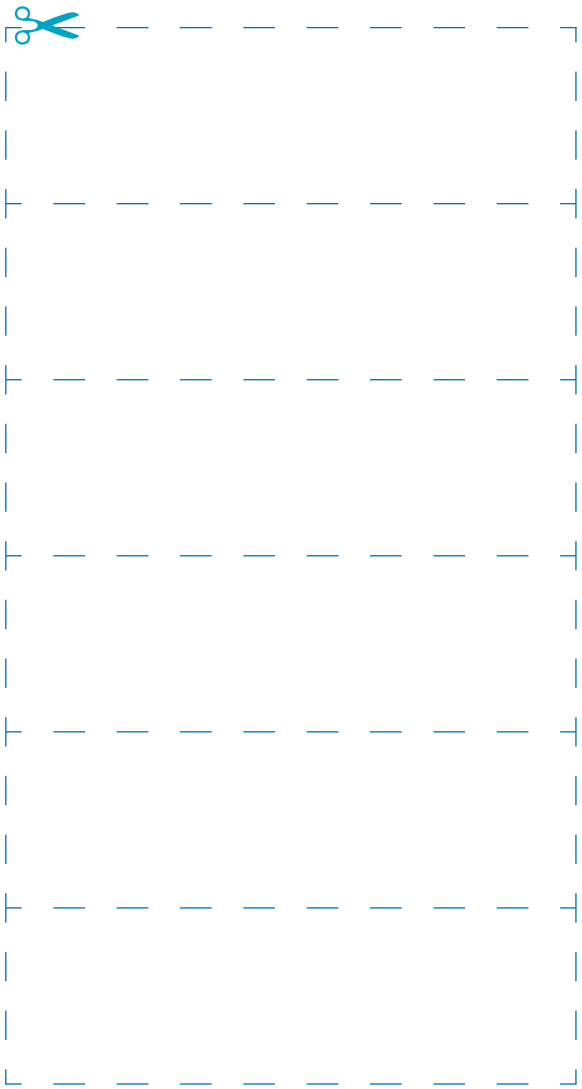
Minimal sensory information detected/ required by the brain to form initial perceptual hypothesis

Sufficient information gathered to confirm perceptual hypothesis

Sensory information processed by the brain to construct initial perceptual hypothesis

Maximum sensory information gathered by sensory receptors (sensory processes) rather than prior experience or knowledge used to form initial perceptual hypothesis

Sufficient information gathered to confirm perceptual hypothesis



jacaranda
A Wiley Brand

Part B

In your own words, explain the difference between top-down and bottom-up processing.

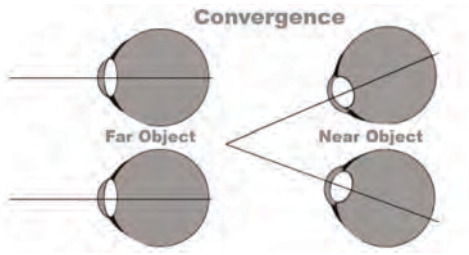
Top-down processing is driven by mental processes such as the individual's knowledge, past experience and expectations rather than just relying on sensory input. Bottom-up processing is stimulus driven and relies entirely on sensory information in order to form a perception.

Comparing binocular depth cues

1 Define 'binocular depth perception'.

When both eyes work together to provide sensory information to the brain about depth and distance, particularly when viewing very close objects.

2 Fill in the following table comparing convergence and retinal disparity as examples of binocular depth perception.

Binocular depth cues	
Convergence	**Retinal disparity**
	
Explanation of how this enables depth perception The brain detects and interprets depth or distance from changes in tension in muscles that rotate the eyes inwards to focus on an object that is close. The brain interprets greater tension in the muscles as an object gets closer and less tension as an object gets further away.	**Explanation of how this enables depth perception** Our eyes are spaced apart by around 5 to 10 cm. This means each eye has a slightly different view (line of sight) of an object. When the two different retinal images are fused (combined) in the brain, the images received from each eye are compared. The difference between the two images provides the brain information about the distance of the object from the viewer.
Explain the difference. The main difference between these two processes is where the source of depth information originates. Convergence relies on the brain detecting tension in the muscles used to turn the eyes inwards to form the depth perception whereas retinal disparity relies on the brain processing the different visual information from each eye when it fuses the different retinal images together.	

jacaranda
A Wiley Brand

Summarising monocular depth cues

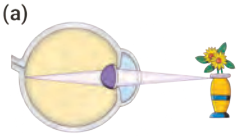
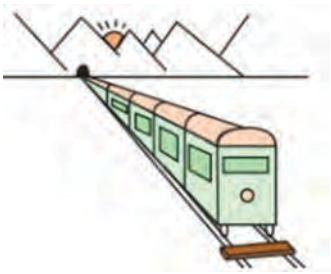
1 Why are many monocular depth cues also known as pictorial depth cues?

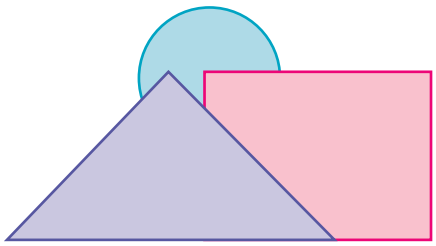
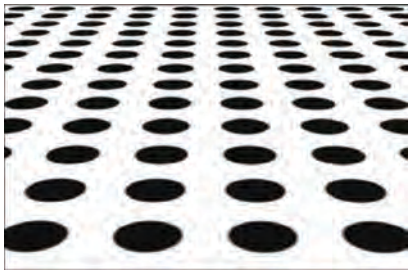
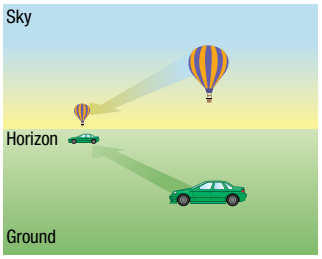
Many monocular depth cues do not rely on physiological information from muscles within or used to control the eyes. Instead, they use visual information within the image itself to provide cues about depth or distance in a two-dimensional image or artwork.

2 Explain why accommodation is different to all of the other monocular depth cues.

Unlike most monocular depth cues that use pictorial cues, accommodation relies on physiological information from muscles within the eye itself to facilitate depth perception. Therefore, the key difference is where the information is sourced.

3 For each of the following images, name and explain the monocular depth cue applied.

Depth cue	Name and explanation
(a)  (b) 	**Name:** Accommodation **Explanation:** Interpreting depth through changes in the tension of the eye's ciliary muscles (within the eye) that adjust the shape of the lens to maintain focus on the retina
	**Name:** Linear perspective **Explanation:** Interpreting the apparent convergence of parallel lines as indicating they are receding and therefore further away

Depth cue	Name and explanation
	**Name:** Interposition **Explanation:** Interpreting a partially obscured object as being further away than the object that appears to obscure it and vice versa
	**Name:** Texture gradient **Explanation:** Interpreting the gradual reduction of detail that occurs in a surface/image as receding into the distance, compared with a surface that is perceived as closer because it has more detail shown
	**Name:** Relative size **Explanation:** When two or more objects are in the visual field, interpreting the object that produces the largest image on the retina as being closer and the object that produces the smallest image on the retina as being further away
	**Name:** Height in the visual field **Explanation:** Interpreting objects that are located closer to the perceived horizon as being more distant than objects located further from the perceived horizon

jacaranda
A Wiley Brand

ACTIVITY 8.7

Applying pictorial depth cues to influence perception of depth in a 2D sketch

In the space provided below, draw a line sketch of a simple scene in which you use each of the five pictorial depth cues in a way that enables depth perception by the viewer. Explain your use of each cue in the panels under the sketch.

Scene

A variety of answers possible.

Linear perspective has been applied by

.....

.....

Interposition has been applied by

.....

.....

Texture gradient has been applied by

.....

.....

Relative size has been applied by

.....

.....

Height in the visual field has been applied by

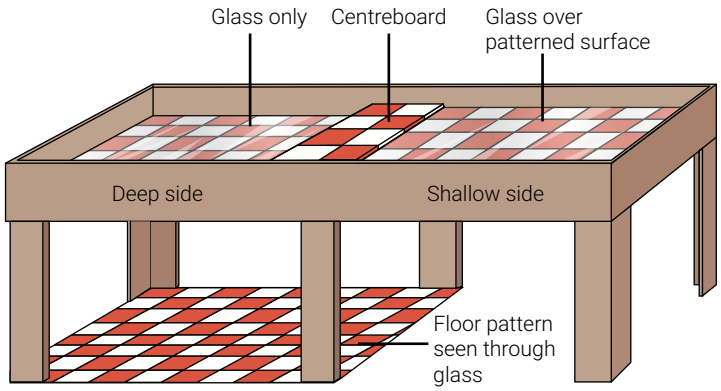
.....

.....

Evaluation of research on the development of depth perception

American psychologists Eleanor Gibson and Richard Walk (1960) were concerned about young infants at the crawling and toddler stages of development who were prone to falling from high places around the house and hurting themselves (e.g. from furniture, cots and stairways). They wondered if young infants needed to learn to avoid high places through experience (e.g. by falling and hurting themselves), or if the ability to perceive depth and avoid potentially harmful high places is innate.

Gibson and Walk devised an apparatus that they called a visual cliff. As shown on the right, this consists of two surfaces, both displaying the same check pattern and both of which are covered by the same sheet of thick glass. One surface is directly under the glass, giving the appearance of a solid surface. This is called the 'shallow' side. The other surface is dropped about a metre or so. This is called the 'deep', visual cliff side. There is also a board with the same check pattern resting on the sheet of glass. This 'centre board' divides the apparatus into two halves. The 'deep', visual cliff is on one side and on the other is the 'shallow' side. An infant is placed on the centre board and the experimenters observe how the infant responds when called by their mother from the deep side and the shallow side successively. Gibson and Walk used this apparatus in experiments with humans and animals.



In what is commonly described in psychology as a 'classic' experiment, 36 human infants ranging in age from six to 14 months were tested on the visual cliff. All of the 27 infants who moved off the board crawled out on the shallow side at least once; only three of them crept onto the glass suspended above the pattern on the floor (i.e. over the cliff side). Many of the infants crawled away from the mother when she called to them from the cliff side; others cried when she stood there, because they could not come to her without crossing an apparent crevasse (cliff).

1 What problem led Gibson and Walk to study depth perception abilities of young infants?

Concern about young infants at the crawling and toddler stages of development who were prone to falling from high places around the house and hurting themselves; for example, from furniture, cots and stairways.

jacaranda
A Wiley Brand

2 Briefly describe the specific procedure used to assess depth perception in infancy.

Example: An infant is placed on the centreboard of the visual cliff apparatus and the researchers observe how the infant responds when called by their mother from the deep side and the shallow side successively.

3 Identify the sample used for this experiment.

36 human infants ranging in age from six to 14 months

4 Identify the operationalised independent and dependent variables.

independent variable: whether the infant was called by its mother from the deep side or the shallow side (of the visual cliff apparatus)/being placed on the deep or shallow side then called by the mother

dependent variable: whether or not the infant crawled to its mother when called

5 Write a research hypothesis that may have been tested by Gibson and Walk in their experiment.

Examples:

- If an infant crawls out onto the shallow side but refuses to crawl out onto the deep side of the apparatus, then the infant can perceive depth.
- Infants who lack depth perception will crawl across the visual cliff deep side to their mothers.

6 (a) Name the experimental research design used in this investigation.

Repeated measures

(b) Explain your choice of experimental design.

Explanation should demonstrate understanding that:

- each infant's response is measured twice, once after the condition of shallow/no depth and once after the condition of depth
- the same infant participants are in both the experimental group/condition (i.e. being placed on the deep side then called by mother) and the control group/condition (i.e. being placed on the shallow side then called by mother), which is used for comparison purposes.

7 Tick the type of data that was collected.

- [x] primary
- [ ] secondary
- [x] quantitative
- [ ] qualitative

8 What conclusion about whether infants have depth perception can be drawn on the basis of these results?

Gibson and Walk commented that 'our experiment does not prove that the human infants' perception of depth and avoidance of the cliff are innate'.

9 Comment on whether the results provide evidence for depth perception being innate or learnt through environmental experience.

Gibson and Walk concluded that 'the experiment demonstrated that most human infants can discriminate depth as soon as they can crawl'.

10 What is a limitation of the procedure used to assess depth perception in infancy and how does this limit understanding of the development of depth perception?

Although Gibson and Walk's experiment showed that infants of crawling age have depth perception, their results do not provide an understanding of how this perceptual ability develops or when it first appears in the human infant. The main limitation of the procedure is that depth perception could only be studied with infants who were mobile (e.g. can crawl). Consequently, it cannot be ascertained whether depth perception develops *before* infants are capable of mobility and the approximate age when this occurs.

11 Give two examples of extraneous or confounding variables that may have influenced the results in a misleading way and explain its potential influence.

Potential extraneous or confounding variables include:

- Although procedures were standardised, expression on the mother's face when calling from the deep side as compared to when calling from the shallow side (e.g. mother may have maintained an expression of fear or anxiety when calling from the deep side, making the infant reluctant to cross, rather than for reasons relating to discrimination/perception of depth).

jacaranda
A Wiley Brand

- Although procedures were standardised, verbal cues in the mother's voice when calling from the deep side as compared to when calling from the shallow side (e.g. mother may have called in a subtly but detectably different way from the deep side, making the infant reluctant to cross, rather than for reasons relating to discrimination/perception of depth).
- Level of trust an infant has in the mother (e.g. some infants may not have crawled onto the deep side due to low level of trust in the mother).
- Sample entirely comprised American infants and potential cultural differences may have been missed.

Source: Gibson, E. J., & Walk, R. D. (1960, April). The visual cliff. *Scientific American, 202*(4), 67–71.

ACTIVITY 8.9

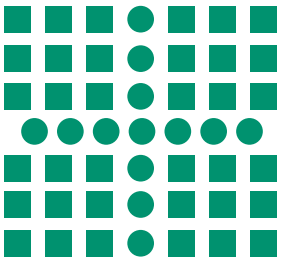
Exploring Gestalt principles as a psychological process that enables visual perception

1 'The whole is more than the sum of its parts'. Explain this statement in relation to Gestalt principles applied to visual perception.

Gestalt principles apply a type of perceptual 'shortcut' so we require less visual information to form a full and complete perception. Instead, we rely more heavily on our prior experiences or knowledge to form our perceptions. In this sense, our perception ('whole') is based on more than just the incoming visual information ('parts').

2 Complete the table by identifying the Gestalt principle most likely applied when forming each visual perception. Briefly explain how each principle enables the perception of each stimulus.

Visual stimulus	Gestalt principle applied	Explanation of perception
	Figure-ground	By focusing on the white space as the figure and the black space as the ground, we perceive a woman facing left. If we reverse this and instead focus on the black space as the figure, then we perceive a city skyline with a sky. Our perception is altered based on what we decide to be the figure compared to the ground.

Visual stimulus	Gestalt principle applied	Explanation of perception
	Closure	By mentally imagining an outline around this pattern of black dots, we perceive an image of a dog. Our brain fills in the missing information based on our prior experience of that stimulus, either real or imagined.
	Similarity	By mentally associating elements of a visual stimulus that have similar features (in this case circles or squares), we perceive a cross located within a grid of squares.
	Proximity	By mentally grouping parts of a visual image that are positioned closer together as belonging together, we form a perception of three rectangles rather than a homogenous single group of 36 dots.

3 Is the application of Gestalt principles applied to visual perception an example of top-down or bottom-up processing? Explain.

Applying Gestalt principles to visual perception is an example of top-down processing because our prior experience and knowledge enable faster processing of the visual information with significantly reduced incoming visual information. This enables us to interpret the world around us more quickly.

jacaranda
A Wiley Brand

Thinking about perceptual set

1 Select terms from the shaded panel below to complete the paragraph about observational learning. Each term should be used only once and all terms are used.

motivation	expect	object	temporary	social
stimulus	feeling	perceptual set	psychological	interpret
predisposed	expectancy	factors	perceptions	taste
context	perceive	vision	experience	more

Perceptual set is a temporary readiness to perceive something in accordance with what we expect it to be. There are many factors that affect perceptual set, including context, motivation, emotional state and past experience. Our expectations of what an object or event may be will make us more likely to interpret it in a predetermined way. For example, if I am feeling scared because I am home alone I may be more likely to interpret a noise outside as being an intruder rather than something more likely, such as a stray cat, because that is what I am expecting. Perceptual set is also referred to as expectancy because psychological and social factors can make us more mentally predisposed to perceive a stimulus in a particular expected way. Perceptual set can affect perceptions associated with all of our senses including vision, hearing, taste, smell and touch. Many people can recall feeling itchy when listening to conversations about lice or being more scared when watching a horror movie if they anticipate a fright scene.

2 Complete the following diagram to summarise four influences of perceptual set.

Perceptual set

Context

Description: Where the visual perception occurs

Example: When inspecting cars at a used car yard, perceiving a well-dressed person walking towards you as a car salesperson

Motivation

Description: Our internal motivational state when the visual perception occurs

Example: As a spectator at an AFL match, perceiving an opposing team member's play as overly aggressive

Emotional state

Description: How we are feeling when the visual perception occurs

Example: Mistaking another animal for a lost pet running into a neighbour's front yard when searching for your pet in a distressed state

Past experience

Description: Personal experience before the visual perception occurs

Example: Expecting an approaching train to increase in size (but not actually change in size) as you wait at the train station

3 Describe a situation from your life in which perceptual set influenced your perception. Then compare your example with others in your class. In each case, try to identify the type of influence/s involved.

My example:

Influence on perception illustrated:

jacaranda
A Wiley Brand

ACTIVITY 8.11

Analysing taste perception

Part A Distinguishing between basic tastes

1 Complete the table summarising the five basic human tastes. Include at least two food examples not described in the text.

Taste perception	Produced by these chemicals in foods	Food examples
sweet	Sugar and its derivatives (glucose, sucrose, fructose, etc)	fruits, fruit juices (i.e. contain fructose even if 'no added sugar'), soft drinks, flavoured drinks, cakes, manufactured chocolate
sour	Acidity in foods	lemons, lemon juice, limes, vinegar, sauerkraut, sour milk products (e.g. yoghurt, sour cream, various cheeses), tamarind, fermented foods
salty	Mineral salts such as sodium chloride	table salt, baking soda, salted popcorn, salted nuts, crisps, pretzels, kelp
bitter	Various substances often considered undesirable that can be associated with spoilt food	beer, various red wines, various ciders, tea and coffee without milk or sweeteners, various cheeses, olives, citrus fruit peel, ginger, broccoli, various dark leafy greens (e.g. edible weeds)
umami	Glutamate	human milk, various meats (e.g. cured, matured), tomatoes (e.g. ripe, sundried), cheeses (e.g. aged, parmesan), soy sauce, mushrooms, Vegemite, stocks, protein-rich foods

2 Explain why we can experience thousands of different taste sensations when our receptors can detect only five basic tastes.

Explanation should demonstrate understanding that most taste experiences are complex and result from the activation of different combinations of more or less of the five tastes from different receptor fields.

Part B Steps in the process of taste perception

Order the following steps relating to the process of taste perception by writing the correct number of the step in the column on the right.

Steps in taste perception process	Sequence
The molecules stimulate sensory receptors located within the taste buds of the tongue.	2
The signals are relayed to gustatory cortex located mostly in the frontal lobe.	6
Electrical signals are transmitted from the receptive fields to the brain via the facial nerve and other neural pathways.	4
The brain integrates the gustatory information with other sensory inputs and relevant information to create a perception of taste.	7
Sensory receptors transduce the chemical signals into electrical signals.	3
The signal is first received in the thalamus, which plays a role in arousal and attention.	5
When we taste food, chemical molecules combine with saliva.	1

jacaranda
A Wiley Brand

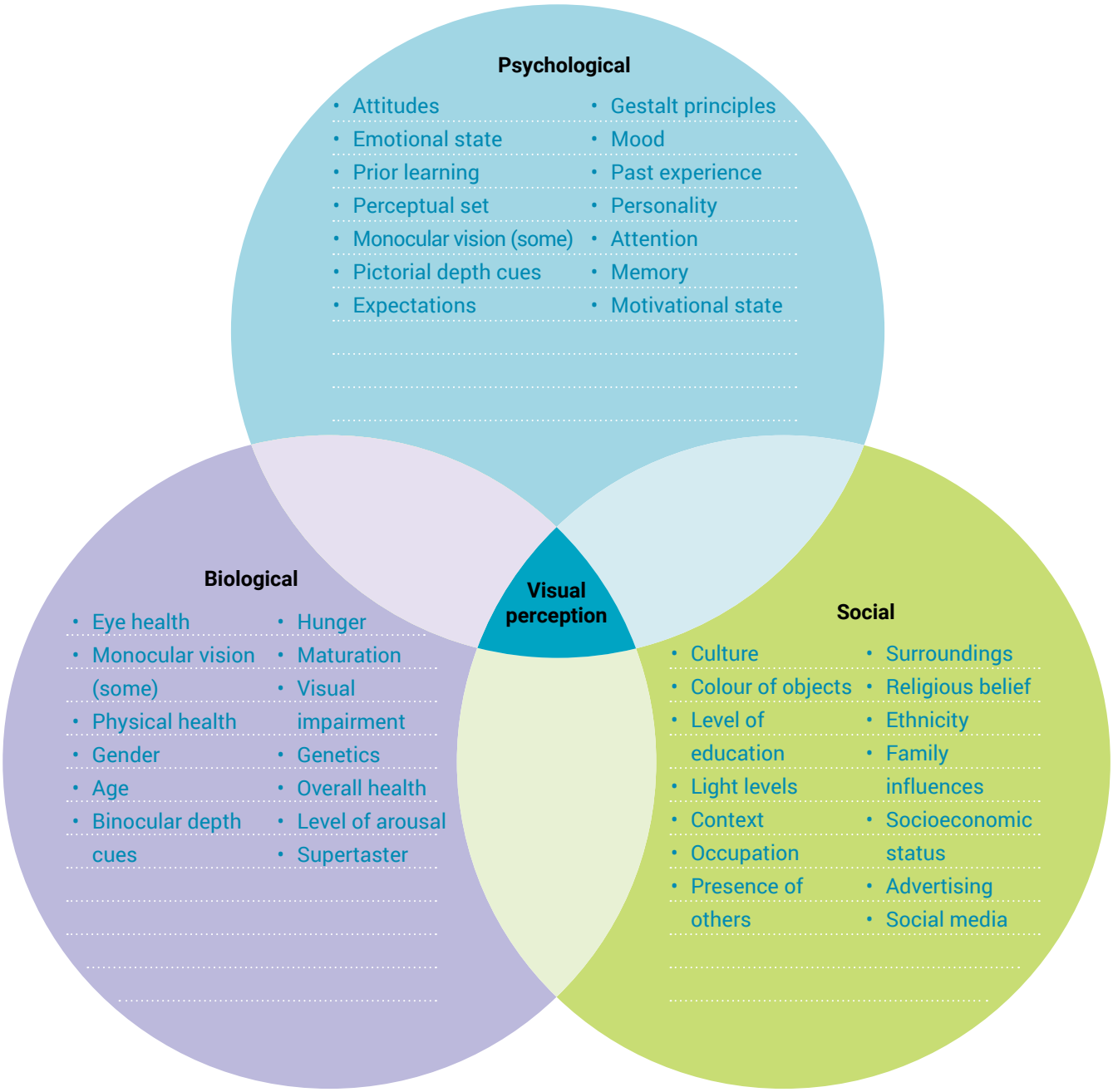
ACTIVITY 8.12

Applying the biopsychosocial model to visual perception

Biological, psychological and social factors that influence visual and gustatory perception do not operate independently of each other. Factors from within each domain combine and interact during the visual and gustatory perception process to influence the perceptual outcome.

Categorise each of the factors in the shaded panel below as biological, psychological or social by writing them in the correct area of the diagram on the next page. Then, write two of your own examples in each area.

attitudes	culture	emotional state	eye health
prior learning	monocular depth cues	perceptual set	physical health
gender	age	binocular depth cues	colour of objects
pictorial depth cues	expectations	Gestalt principles	level of education
mood	maturation	past experience	personality
attention	light levels	context	memory
motivational state	occupation	presence of others	surroundings
visual impairment	religious belief	genetics	overall health
hunger	level of arousal	ethnicity	family influences
socioeconomic status	advertising	social media	supertaster



jacaranda
A Wiley Brand

ACTIVITY 8.13

Distinguishing biological, psychological and social factors affecting taste perception

For each of the following potential influences affecting taste perception, indicate if it is a biological, psychological or social factor or a combination of factors.

Potential influence	Biological	Psychological	Social
Some people are more sensitive to certain tastes than others	✔		
Pregnancy	✔		
Moving abroad (living in a different culture)			✔
Appearance of food (colour)		✔	
Genetic inheritance	✔		
Familiarity with food source			✔
Being exposed to a certain flavor over time			✔
Religious beliefs			✔
Texture of food (feel in the mouth)		✔	
Age (maturation)	✔		
Feeling nausea	✔	✔	
Being a 'supertaster' (high density of taste buds on tongue)	✔		
Cultural upbringing			✔
Social learning (watching others react to a certain flavour)			✔
Memory of eating that food in the past		✔	
Level of hunger	✔		
Branding of food		✔	✔
Balance of fat and sugar in a food	✔		
Suffering from a cold with a blocked nose	✔		
Exposure to certain foods at very young ages (as young toddlers)			✔
Price of food			✔
Perceptual set		✔	
Peer influences			✔
Socioeconomic status			✔

ACTIVITY 8.14

True/False quiz on taste perception

Indicate whether each item is true or false by writing T or F in the column on the right.

Statement	T/F
1 People vary in their ability to taste.	T
2 Detecting bitterness is not considered a survival advantage.	F
3 The appearance of food does not influence our perception of taste.	F
4 Premature babies show the same taste preferences as full-term babies, suggesting some taste perception is innate.	T
5 Prior memory of eating certain food can influence future taste perception of the same food.	T
6 Associating nausea with a particular food can be linked to survival.	T
7 Our genes can influence our sensitivity to certain flavour molecules.	T
8 Changing the colour of food cannot alter a person's perception of flavour.	F
9 Humans can only experience five different tastes.	F
10 Enjoying bitter tastes is natural for humans.	F
11 Older people are more likely to prefer healthier food than younger people.	T
12 Two different people can experience different perceptions of flavour even when eating the same food.	T
13 Adult tongues are larger and therefore contain more taste receptors than children.	F
14 We are more likely to enjoy foods we grow up eating than foods we experience later in life.	T
15 The number and density of taste buds does not influence our ability to perceive flavours.	F
16 Socioeconomic status can affect a person's taste perception of food.	T
17 Children are likely to reject bitter tastes more than adults.	T
18 Genes do not play a role in determining if a person enjoys drinking coffee or tea.	F
19 Flavour perception can be altered by changing the shape of food.	T
20 Taste perception is linked to smell.	T
21 A single experience of becoming nauseous when eating a certain food can prevent a person from ever eating that food in the future.	T
22 Our experience of taste is fixed at birth.	F
23 Adults are more responsive to taste than children because they have greater exposure to different flavours.	F

jacaranda
A Wiley Brand

Crossword on concepts and terms associated with perception

Across

1 A depth perception cue requiring the use of only one eye
4 Maintaining attention on specific stimuli for an extended period of time
5 Name given to a group of visual perceptual principles that are based on the application of applying reduced features to perceive a whole and completed form
6 A visual depth cue based on the principle that an object that partially covers another is closer than the object it obscures
12 A perceptual tendency to perceive objects that produce larger images on the retina as being closer compared to objects producing smaller images
13 A perceptual process where individual pieces of raw sensory information are progressively analysed to form a perception
14 A visual perception depth cue involving the inward turning of the eyes to focus on nearby objects
16 A visual depth cue based on the apparent convergence of parallel lines as they recede into the perceived distance
19 The perceptual tendency to perceive parts of a visual image that are positioned close together as belonging together in a group
20 The predisposition to perceive something in accordance with expectations of what it is believed to be
21 A physiological depth cue where the brain uses tension in the ciliary muscles that adjust the shape of the lens of the eye to perceive depth
22 Our ability to distribute our attention across two or more activities
23 A visual perception depth cue based on the extent to which fine detail can be perceived on the surface

Down

2 A savoury taste due to glutamate often associated with meat or cheese
3 Process of focusing on specific stimuli in our sensory environment
7 A visual perception depth cue based on the difference (disparity) of the two retinal images
8 The perceptual tendency to mentally close up or fill in gaps in a visual image to perceive a completed form
9 The ability to estimate the distance of objects and therefore perceive the world in three dimensions
10 A type of depth cue requiring the use of both eyes
11 Process by which meaning is given to incoming sensory information
15 A source of information from the external environment or from within the body that assists perception of how far away objects are
17 Focusing on one stimuli while ignoring all others
18 A perceptual process where knowledge and expectations are used more than individual pieces of raw sensory information

jacaranda
A Wiley Brand

1 M O N O C U L A R
2 M A L T I O N
3 A S T E N D
4 S U S T A I N E D
5 G E S T A L T
6 I N T E R P O S I T I O N
7 R E T I N A L D I S P A R I T Y
8 C L A S S I C A L C O N D I T I O N I N G
9 D E P T H C U E S
10 B I N O C U L A R D I S P A R I T Y
11 P E R C E P T U A L C O N S T A N C Y
12 R E C E P T I V E F I E L D
13 B O T T O M U P P R O C E S S I N G
14 C O N V E R G E N C E
15 D E P R E S S I O N
16 L I N E A R P E R S P E C T I V E
17 S P E E C H P E R C E P T I O N
18 T O P D O W N P R O C E S S I N G
19 P R O X I M I T Y
20 P E R C E P T U A L S E T
21 A C C O M M O D A T I O N
22 D I V I D E D A T T E N T I O N
23 T E X T U R E G R A D I E N T

TOPIC 9

Distortions of perception

	Activities										
Key knowledge	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	9.10	9.11
• the fallibility of visual perceptual systems, for example, visual illusions and agnosia	✔	✔	✔	✔	✔	✔				✔	✔
• the fallibility of gustatory perception, for example, supertasters, exposure to miraculin and the judgment of flavours							✔			✔	✔
• distortions of perception of taste and vision in healthy individuals, such as synaesthesia and spatial neglect								✔	✔	✔	✔
Key science skills			✔						✔		

Source: © VCAA, *VCE Psychology Study Design: 2023–2027.* p. 30

ACTIVITY 9.1

Analysis of visual illusions

Visual illusions are perceptual distortions involving a mismatch between the perceptual experience and physical reality. There are key characteristics that distinguish them from ordinary, everyday visual stimuli.

PERCEPTUAL DISTORTION OCCURS CONSISTENTLY

- the misinterpretation of the visual stimulus that leads to the distorted perception of reality occurs consistently (i.e. Every time we see the stimulus we have the same illusory experience.)

PERCEPTUAL DISTORTION IS UNAFFECTED BY PRIOR KNOWLEDGE THAT IT IS AN ILLUSION

- the misinterpretation occurs regardless of prior knowledge of the illusion (i.e. The illusory experience occurs even when we know we are looking at a visual illusion.)

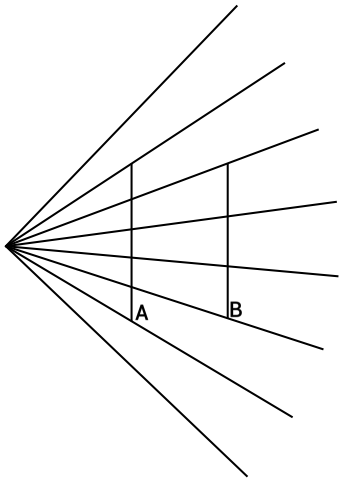
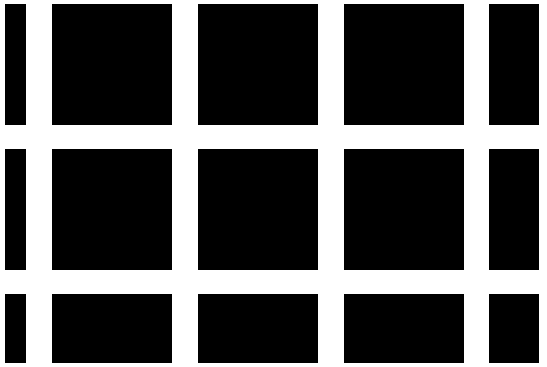
PERCEPTUAL DISTORTION IS UNAFFECTED BY PRIOR UNDERSTANDING OF WHY IT OCCURS

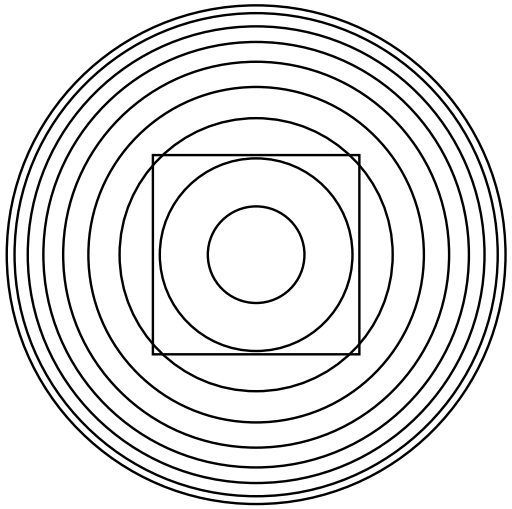
- the misinterpretation occurs even when we understand why it occurs (i.e. We understand the physiological or psychological explanations behind it.)

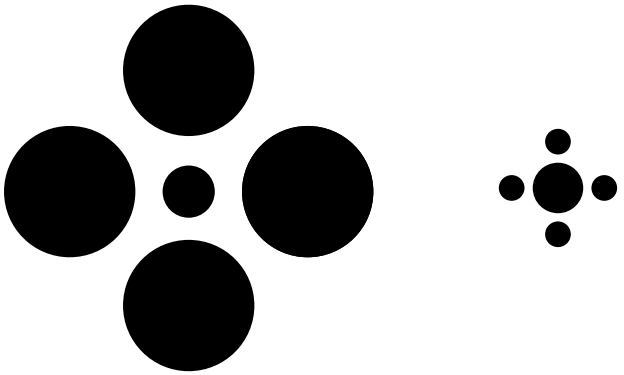
For each of the visual stimuli on the following pages, consider the physical reality, describe your perceptual experience, and then analyse each stimulus with reference to key characteristics of a visual illusion. Indicate whether or not it is an illusion. If it is not an illusion, explain why.

In the bottom row, include an example of a visual illusion of particular interest to you. Insert a copy of the illusion or a weblink to its location.

jacaranda
A Wiley Brand

Visual stimulus	Physical reality	My perceptual experience	Are all key characteristics of a visual illusion evident?
Example 1  	The lines marked A and B are the same length.	Line A seems to be longer than line B.	☑ Yes ☐ No ☐ Unsure Example: Student responses will vary but they should elaborate on the key characteristics described in the introduction.
Example 2 	A grid of squares separated by rows and columns of white	Grey smudges seem to appear at the intersections but disappear as soon as you look directly at them.	☑ Yes ☐ No ☐ Unsure Explain: Student responses will vary but they should elaborate on the key characteristics described in the introduction.

Visual stimulus	Physical reality	My perceptual experience	Are all key characteristics of a visual illusion evident?
Example 3 	The square is perfect.	The square appears distorted.	☑ Yes ☐ No ☐ Unsure Explain: Student responses will vary but they should elaborate on the key characteristics described in the introduction.
Example 4 	The picture frame is perfectly rectangular.	The picture frame appears to be distorted.	☑ Yes ☐ No ☐ Unsure Explain: Student responses will vary but they should elaborate on the key characteristics described in the introduction.

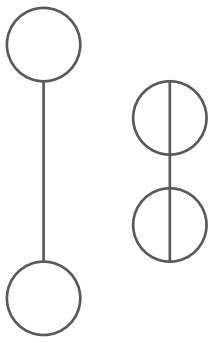
Visual stimulus	Physical reality	My perceptual experience	Are all key characteristics of a visual illusion evident?
Example 5 	The centre circles in the two displays are the same size.	The centre circle in the right-hand display appears to be larger than the centre circle in the left-hand display.	☑ Yes ☐ No ☐ Unsure Explain: Student responses will vary but they should elaborate on the key characteristics described in the introduction.
Own example			☑ Yes ☐ No ☐ Unsure Explain: Student responses will vary but they should elaborate on the key characteristics described in the introduction.

ACTIVITY 9.2

Explaining the Müller-Lyer illusion from a biopsychosocial perspective

The Müller-Lyer illusion has been explained from biological, psychological and social perspectives, but no single explanation is without criticism.

For each of the following four variations of the Müller-Lyer illusion, decide if the Carpenter's World or Perceptual Compromise explanation best explains why the illusion occurs. Justify each of your responses.

Variations of the Müller-Lyer illusion	My opinion of best explanation for perceptual distortion	Justification for my opinion
Version 1 	There is no single correct answer for any version. The activity requires considered opinion based on understanding of different explanations.	.....
Version 2 	.....	.....

jacaranda
A Wiley Brand

Variations of the Müller-Lyer illusion	My opinion of best explanation for perceptual distortion	Justification for my opinion
Version 3		
Version 4		

ACTIVITY 9.3

Measuring the Müller-Lyer illusion

Construct the simple apparatus for measuring the size of the Müller-Lyer illusion and collect data from two or more participants.

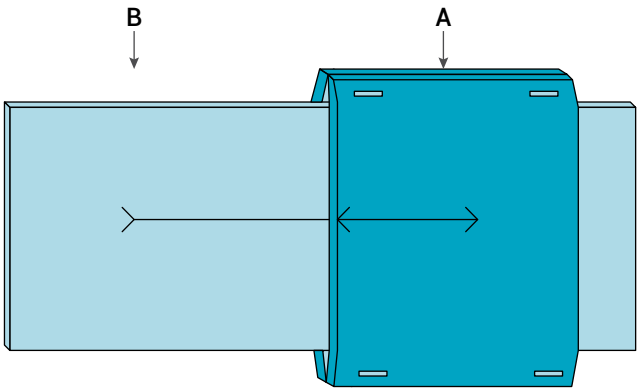
Part A Make the apparatus

Step 1 Cut out two cardboard squares (A) about 8cm long, and one rectangle (B) about 15 cm long and 6–7 cm wide.

Step 2 On one of the squares draw a horizontal line with arrowheads on both ends.

Step 3 On the rectangle draw a long horizontal line with an arrowhead as shown in the diagram. The horizontal lines should be accurate in length to a full centimetre to enable precise measurements.

Step 4 Staple the cardboard squares together at the top and bottom so that the rectangle can be slid back and forth between them.



Part B Assess two participants

Task 1: Data collection

Step 1 Select two volunteer participants, one who knows the illusion and one who does not. Each participant is assessed separately.

Step 2 Present the Müller-Lyer apparatus to each participant. Ask the participant to move slide B to the right until the horizontal part of the line showing on it appears to be equal in length to the horizontal line on A.

Step 3 Using a ruler, measure the horizontal part of the line showing on B.

Step 4 Record the measurement. Do not let the participant see the record so that no feedback is given.

Step 5 Push B through the A squares until the arrow on it touches or nearly touches the left-hand arrow on A.

Step 6 This time, ask the participant to move B to the left until the horizontal line on it appears to be equal in length to the horizontal line on A.

Step 7 Measure and record the horizontal line on B, again making sure that the participant does not know the measurement.

Step 8 In all, the participant should make judgments alternately, 5 times to the right and 5 times to the left.

Step 9 Take the data for each participant and find the mean length of the line on B. Compare this with the actual length of the horizontal line on A. Also compare the mean scores for the different participants.

Step 10 Debrief the participant. Describe the illusion and explain the purpose of the activity and what will be done with the results. Allow the participant to find out about their results and to ask questions that you should answer as best you can.

jacaranda
A Wiley Brand

Task 2: Data interpretation

1 On the basis of your data, how difficult is it to ignore the influence of the arrowheads?

Participants typically cannot ignore this influence.

2 Did the direction or movement make any difference to the size of the error?

The direction or movement should not make any difference to the size of the error.

3 Did prior knowledge of the illusion make any difference?

Prior knowledge of the illusion should not make any difference.

4 Why was it important not to provide feedback to participants on their judgments?

To not influence participant estimates and therefore the results.

5 What other variables involved in perception may have influenced the results? How might these have been controlled?

Variables and controls may include:

- standardisation of instructions and procedures (e.g. experimental setting, distractions, quality of the apparatus, manipulation of the apparatus, presentation of specific instructions)
- participant variables (e.g. motivation, age, sex)
- experimenter effects
- number of trials

Source: Grivas, J. & Lawrie, P. (1991). *Psychology experiments and activities*. Marrickville: Harcourt Brace Jovanovich.

ACTIVITY 9.4

Build an Ames room and examine the illusion

1 Assemble a model of the Ames room using the template provided to examine the structure of the room and illusory effect. Make sure you cut out the peephole and the person. Consider pasting the paper pieces on card for a more stable structure. You may also use the model to measure the illusory effect with volunteer participants, for example, to compare children, adolescents and adults.

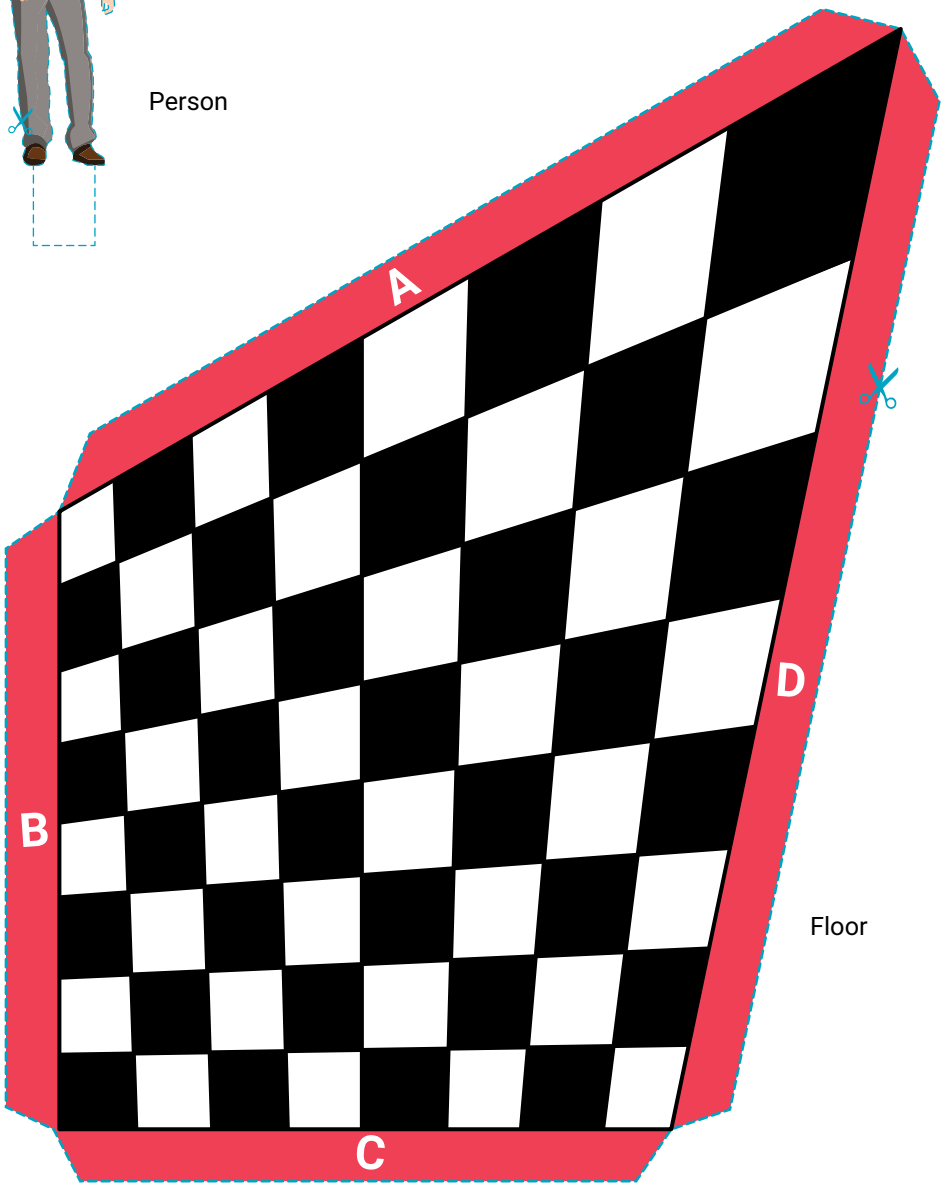
Description of Ames room characteristic or perceptual constancy involved	How it distorts our perception
Distorted shape of the room	Room is trapezoidal in structure but from the perspective of the peephole appears to be rectangular. As a result we sacrifice size constancy of characters in the room to maintain shape constancy of the room.
Restricted viewing position (peephole)	The peephole ensures our perspective is limited to the use of monocular depth cues only and ensures we cannot perceive the true proportions of the room.
Distorted shape of objects inside the room	Objects are drawn with distorted shapes but these distortions are designed so that objects appear normal from the perspective of the peephole. Linear perspective is distorted (tiling on the floor). This amplifies the effect of perceiving the room as normally dimensioned, increasing the likelihood of sacrificing size constancy of characters within the room.

jacaranda
A Wiley Brand

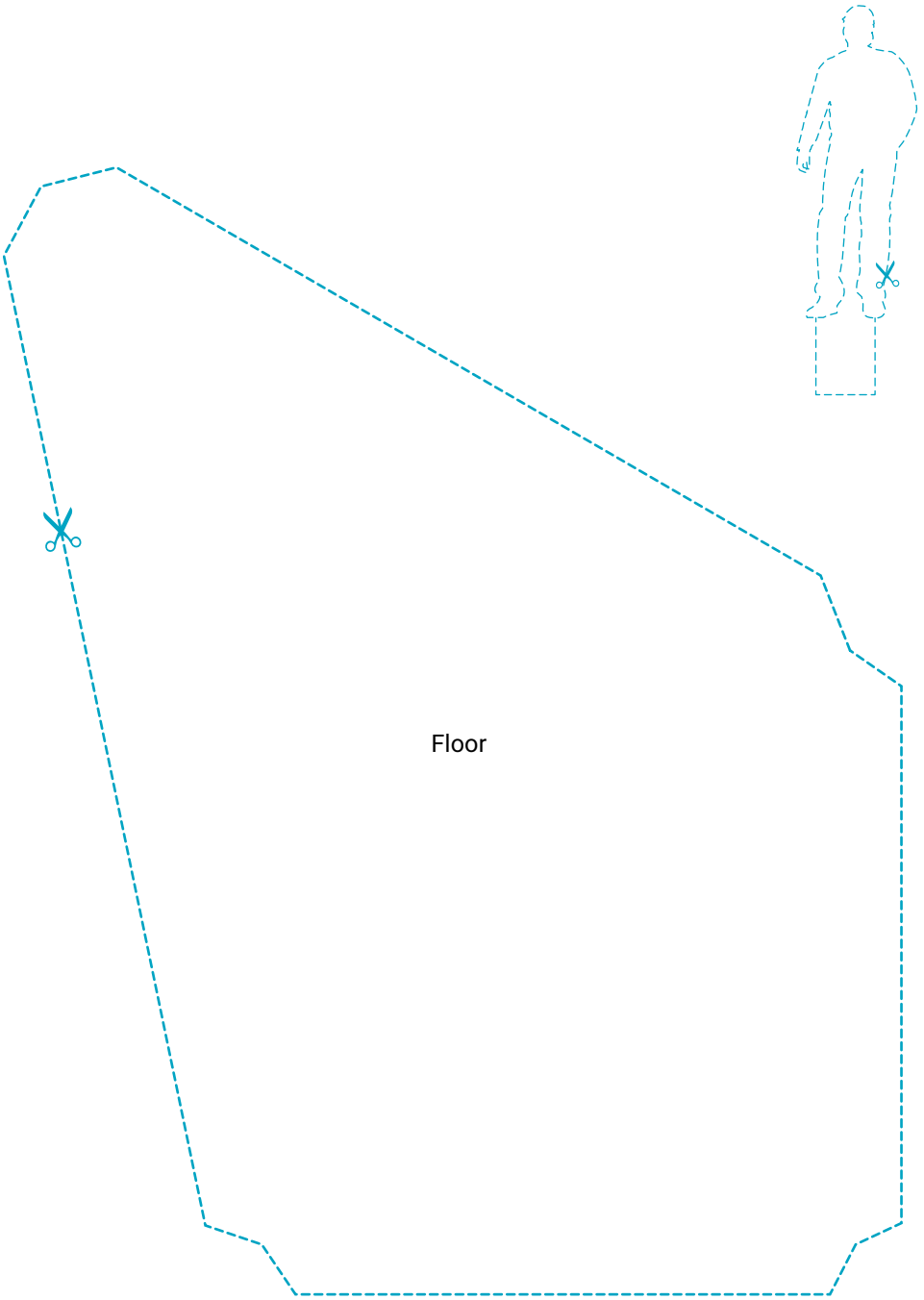
2 One explanation for the Ames room illusion is known as the *apparent distance theory*. In your own words, explain this theory.

According to *apparent distance theory*, when two retinal images are the same size but one image **appears** to be at a greater distance, then the one that appears further away will be interpreted as bigger or larger. In the Ames room, the perceived rectangular shape of the room is consistent with the retinal image, but not consistent with the room's real shape. The back corners on either side of the room actually produce equal-sized retinal images because the vertical length of the further left corner is double the length (but twice the distance from the observer) of the nearer right corner. Because the observer does not have the depth cues available to 'work out' the real difference in distance between the two corners, the equal-sized retinal images of the corners are interpreted as equal in size. This produces an illusion of a rectangular room and results in the perceptual distortion of a person 'growing taller' as they walk from one side to the other.

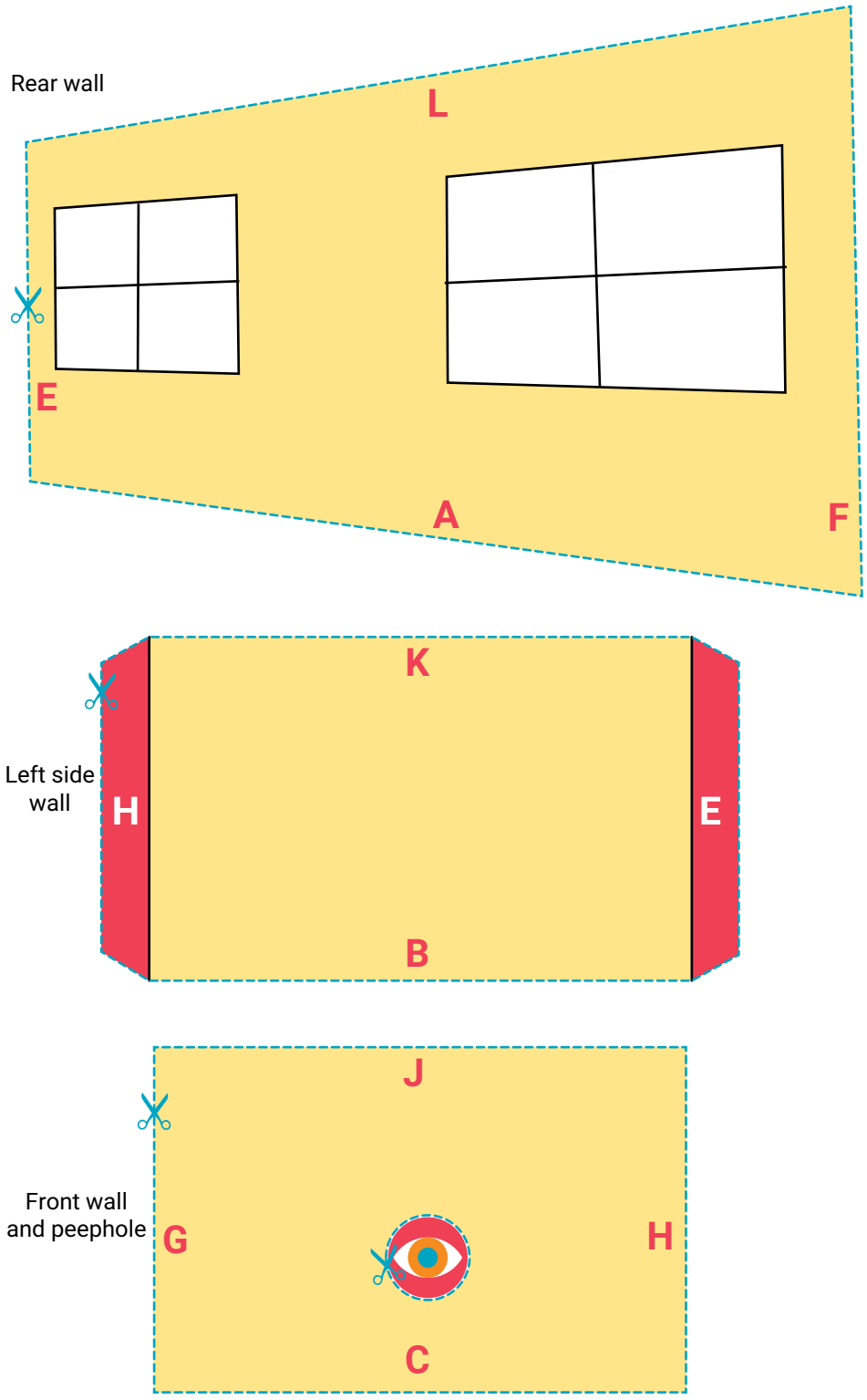
Person

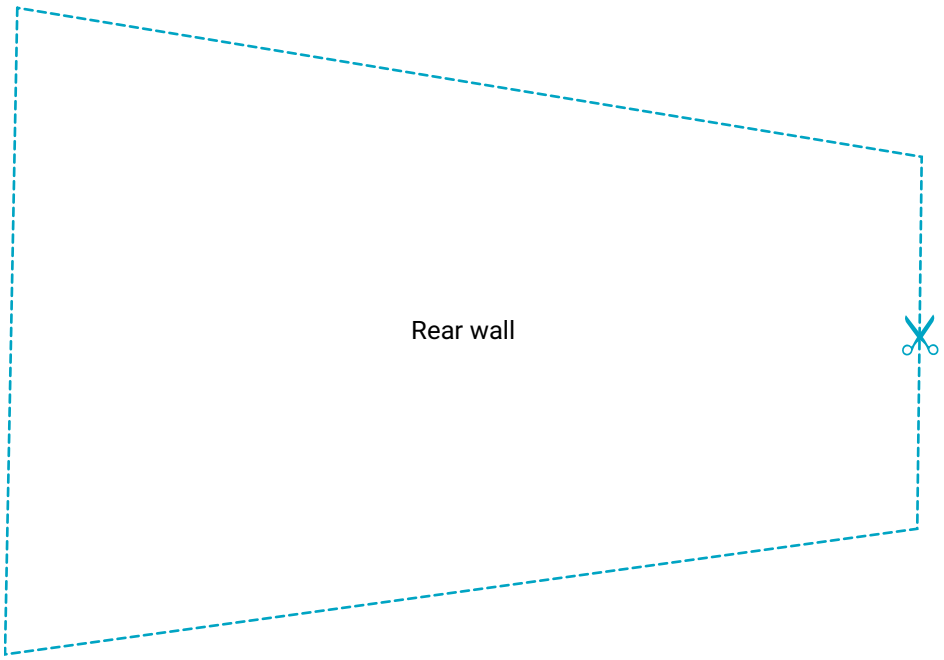


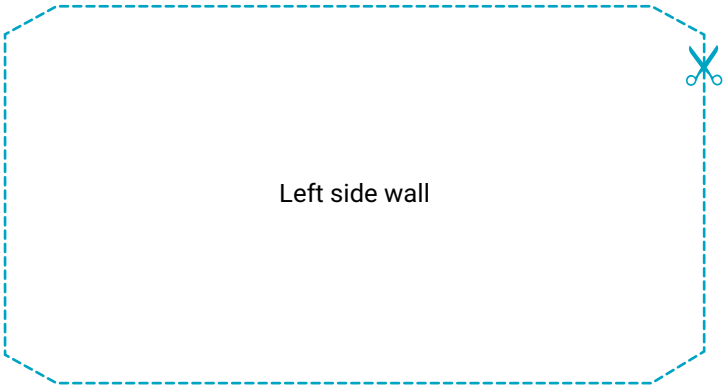
Floor

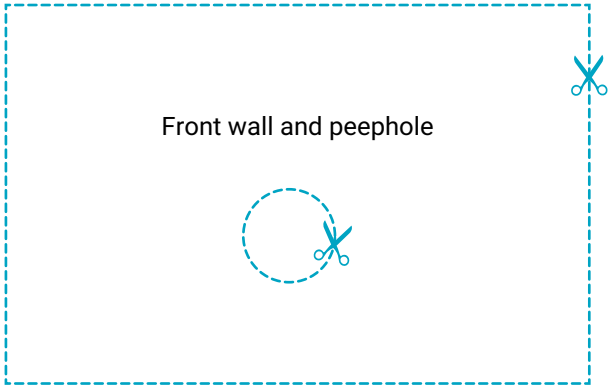


jacaranda
A Wiley Brand

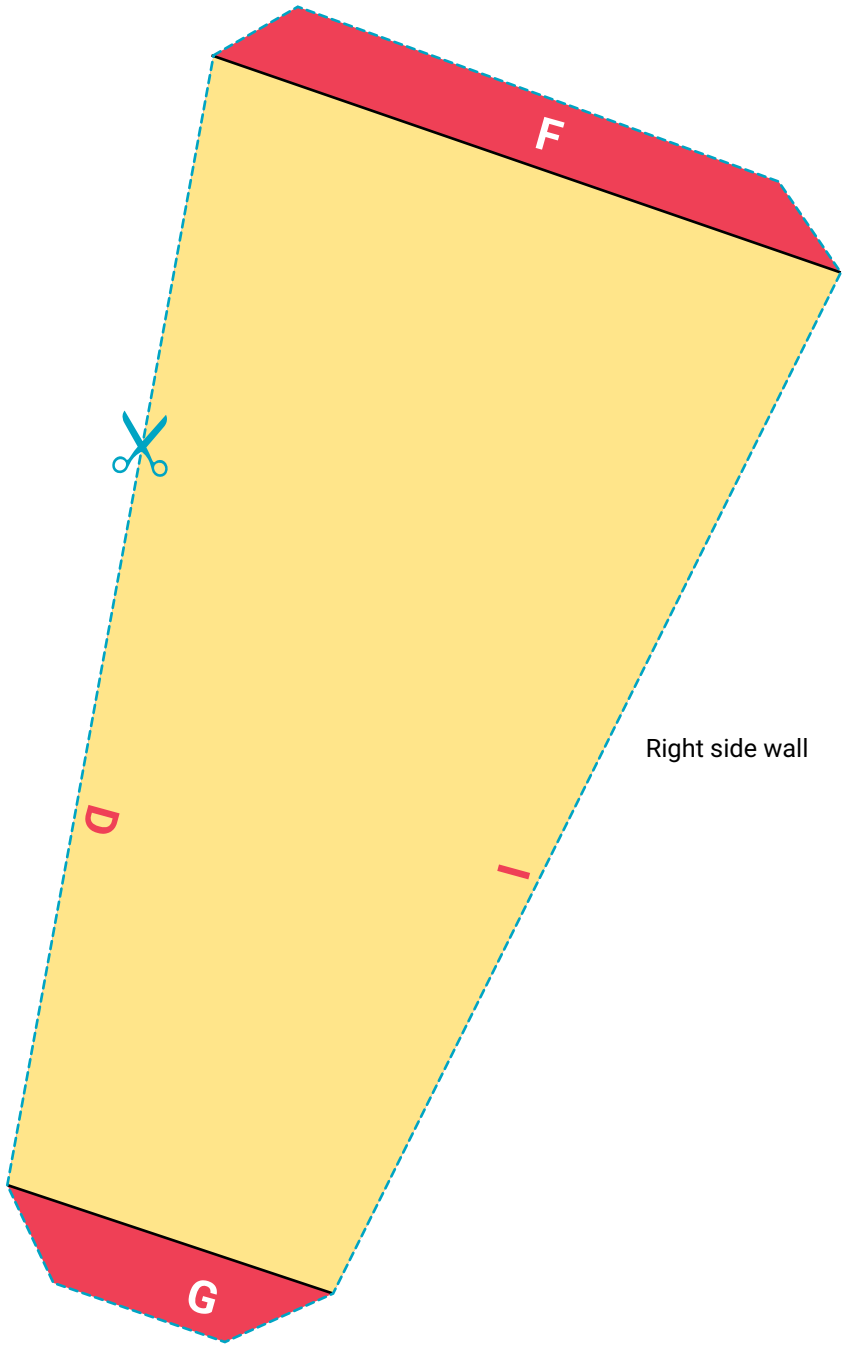

Rear wall
L
E
A
F
K
Left side wall
H
E
B
J
Front wall and peephole
G
H
C



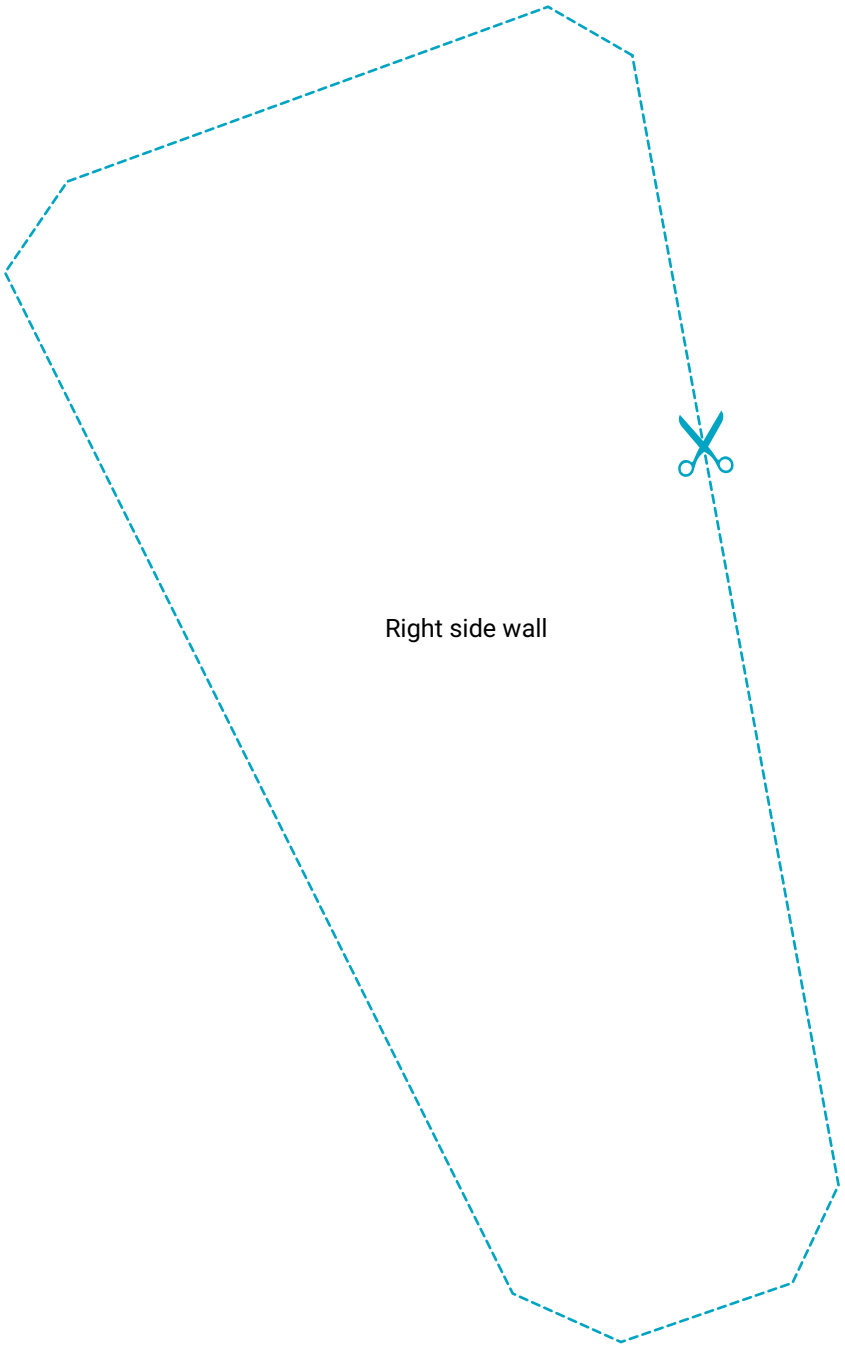




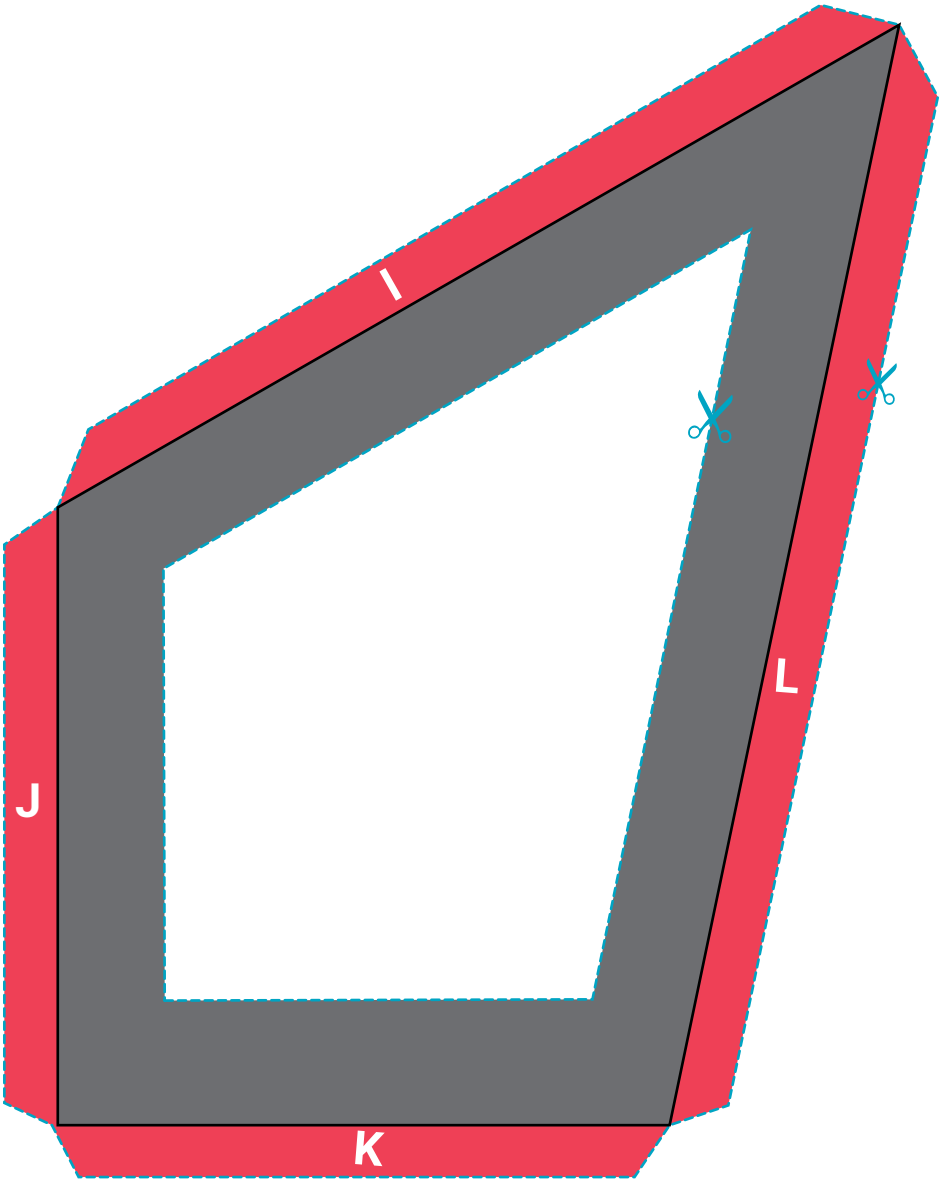
jacaranda
A Wiley Brand

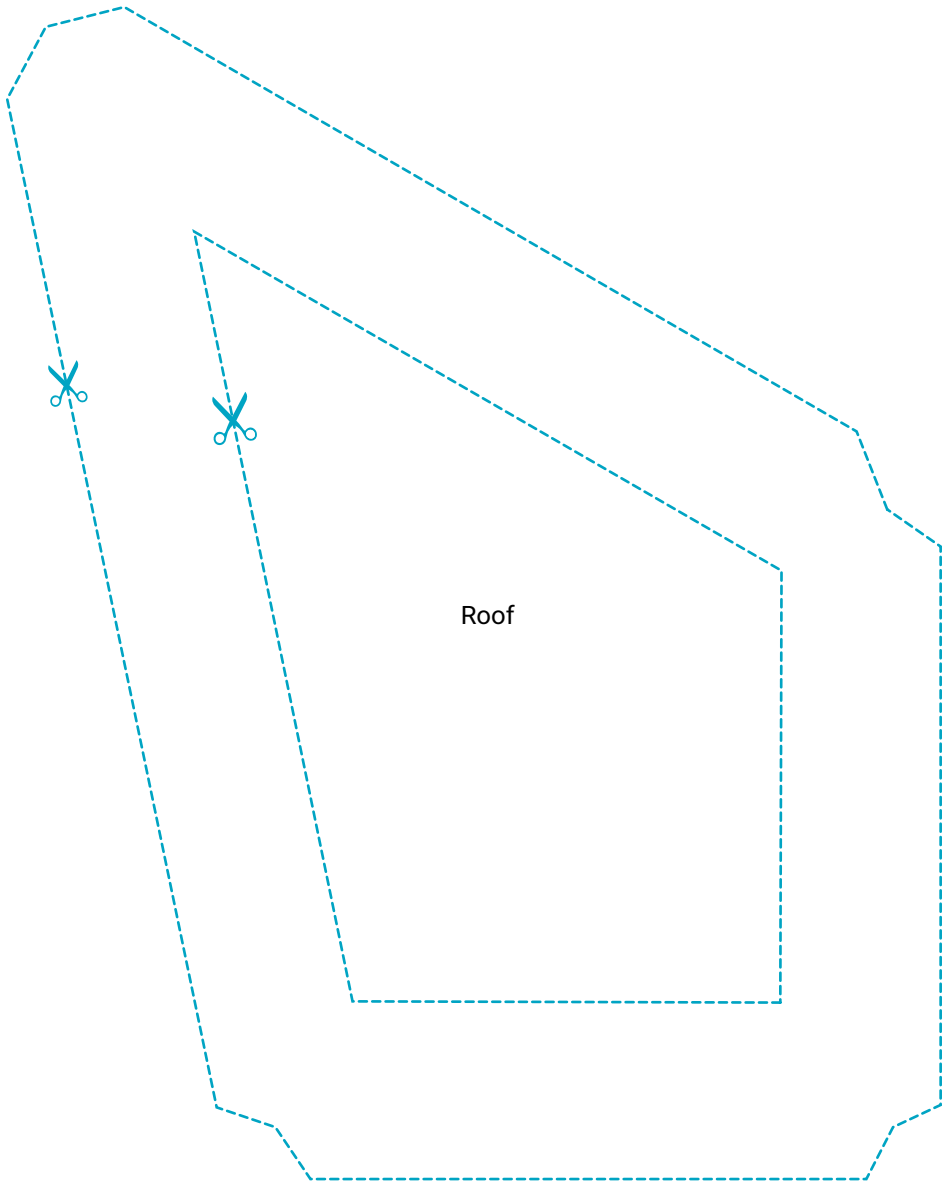


Right side wall



jacaranda
A Wiley Brand


I
J
K
L



jacaranda
A Wiley Brand

ACTIVITY 9.5

Thinking about agnosia

Part A

1 Provide a general definition for 'agnosia'.

Agnosia is characterised by loss or impairment of the ability to recognise and identify objects, persons, sounds or other sensory stimuli using one or more of the senses despite otherwise normally functioning senses.

2 Define 'visual agnosia'.

Visual agnosia is loss or impairment of the ability to recognise visual stimuli. In particular, people with visual agnosia have difficulty recognising familiar objects and possibly faces. These difficulties are not related to sight, loss of memory, language or impairment in other cognitive abilities.

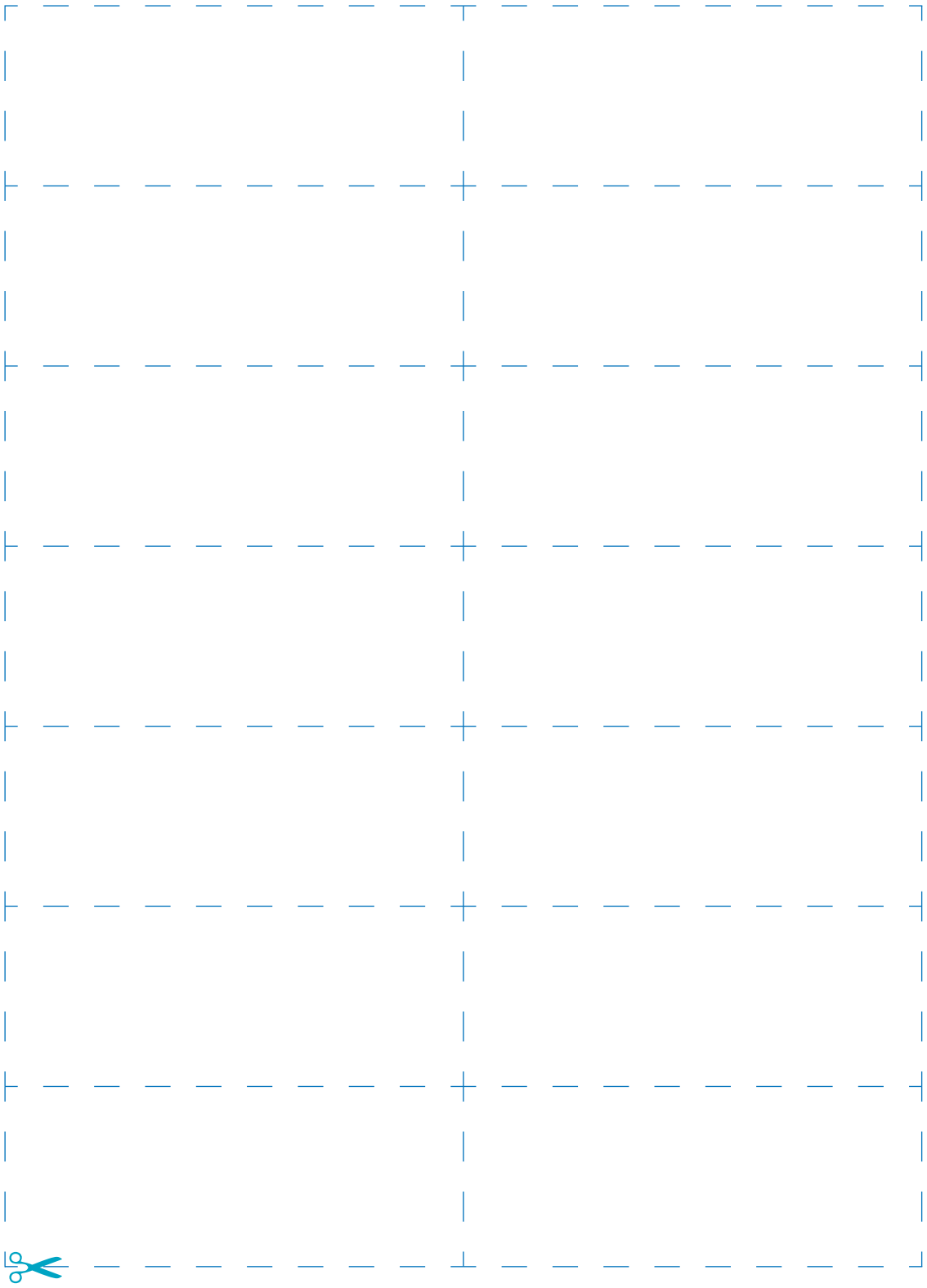
Part B Differentiating between seven forms of visual agnosia

Cut out the statements and examples on the following page and paste under the correct headings in the table below.

Type of visual agnosia	Description	Example
Apperceptive	Cannot identify visual stimuli or parts of visual stimuli. Cannot copy or draw objects and are unable to perceive forms using visual information only. Can perceive form through touch or from verbal descriptions.	A person is given a picture of a triangle but is unable to copy it. They are able to draw it when it is verbally described to them.
Associative	An inability to associate a visual stimulus with stored information in memory. They can correctly describe shapes and features of objects and can copy them in drawings, but they are unable to identify what the object is or what it does.	A person is asked to draw a picture of a cat from a photo. They successfully draw it but cannot explain what it is a picture of or what is does.
Prosopagnosia	Cannot identify familiar faces including recognising their own face when looking at photos or in a mirror. Can use other visual features such as age or facial traits to slowly work out an identity.	A person is shown a recent picture of themselves standing with their family but they are unable to recognise who they are looking at and cannot identify their family members.
Topographical	An inability to navigate in familiar environments because they are unable to use visual cues such as obvious landmarks to help guide them.	A person gets easily lost every time they navigate in their local neighborhood.
Colour	An inability to identify and distinguish between different colours despite being able to see correct colours. They can know the colour of certain objects from memory but are unable to identify colour of objects when shown to them.	A person is asked to sort similar shaped LEGO blocks into several different containers based on different colours but they are unable to because they cannot discern any differences between the blocks.
Agnosic alexia	Cannot recognise or comprehend written or printed words; usually associated with severe reading difficulties even though other language functions, such as speaking, writing and spelling, remain intact.	A person is asked to write a sentence about their recent holiday. They successfully write the sentence but when asked to read what they have just written they are unable to.
Simultanagnosia	An inability to recognise more than one object at a time in a scene. Their attention is drawn to one object over another, resulting in a fractured perception of what they are looking at.	A person is asked to look at a painting of a bowl of fruit but they are only able to report seeing an apple even though there are many different fruits in the artwork.

jacaranda
A Wiley Brand

Descriptions	Examples
Cannot identify familiar faces including recognising their own face when looking at photos or in a mirror. Can use other visual features such as age or facial traits to slowly work out an identity.	A person is asked to look at a painting of a bowl of fruit but they are only able to report seeing an apple even though there are many different fruits in the artwork.
An inability to navigate in familiar environments because they are unable to use visual cues such as obvious landmarks to help guide them.	A person is asked to sort similar shaped LEGO blocks into several different containers based on different colours but they are unable to because they cannot discern any differences between the blocks.
An inability to associate a visual stimulus with stored information in memory. They can correctly describe shapes and features of objects and can copy them in drawings, but they are unable to identify what the object is or what it does.	A person is given a picture of a triangle but is unable to copy it. They are able to draw it when it is verbally described to them.
An inability to identify and distinguish between different colours despite being able to see correct colours. They can know the colour of certain objects from memory but are unable to identify colour of objects when shown to them.	A person is asked to write a sentence about their recent holiday. They successfully write the sentence but when asked to read what they have just written they are unable to.
Cannot identify visual stimuli or parts of visual stimuli. Cannot copy or draw objects and are unable to perceive forms using visual information only. Can perceive form through touch or from verbal descriptions.	A person is asked to draw a picture of a cat from a photo. They successfully draw it but cannot explain what it is a picture of or what is does.
Cannot recognise or comprehend written or printed words; usually associated with severe reading difficulties even though other language functions, such as speaking, writing and spelling, remain intact.	A person gets easily lost every time they navigate in their local neighborhood.
An inability to recognise more than one object at a time in a scene. Their attention is drawn to one object over another, resulting in a fractured perception of what they are looking at.	A person is shown a recent picture of themselves standing with their family but they are unable to recognise who they are looking at and cannot identify their family members.



jacaranda
A Wiley Brand

Part C Understanding the neurological cause of agnosia

Use the words from the shaded panel to complete the paragraph. All words are used and some are used more than once.

agnosia	ventral	visual	dorsal	parietal
occipital	perceptual	damage	identification	symptoms
spatial	brain	temporal	pathway	location

Agnosia is typically associated with damage along neural pathways that connect areas of the brain that process perceptual information. With visual agnosia, damage is most likely to be found in a pathway extending from the primary visual cortex in the occipital lobe to the temporal lobe. This pathway is called the ventral stream. The ventral stream is known as the 'what' pathway and is involved with visual object identification and recognition. In contrast, the dorsal stream is known as the 'where' pathway and leads from the primary visual cortex to the parietal lobe, which is involved with processing an object's spatial location. The type of visual agnosia acquired by the individual and the symptoms primarily depend on the specific location of the damage and the severity.

ACTIVITY 9.6

True/False quiz on supertasters

Indicate whether each item is true or false by writing T or F in the column on the right.

Statement	T/F
1 A supertaster is more sensitive to all tastes than a normal person.	F
2 As a result of their perceptual experiences, a supertaster can develop a stronger liking to certain foods compared to someone who is not a supertaster.	T
3 Supertasters have superior tasting ability.	F
4 Supertasters have more taste buds on their tongue compared to someone who is not a supertaster.	T
5 Super tasting ability is most likely to have a genetic explanation.	T
6 Males are more likely to be supertasters than females.	F
7 Supertasters are more likely to avoid bitter tastes compared to other tastes.	T
8 A supertaster is typically more sensitive to bitter tastes.	F
9 On average, supertasters experience the sweetness of sugar at twice the intensity of someone who is not a supertaster.	T
10 A supertaster's perceptual experience of taste is different to someone who is not a supertaster.	T
11 Taste buds and taste receptors are the same structure.	F
12 A supertaster is more sensitive to some tastes compared to someone who is not a supertaster.	T
13 Oral irritants can affect supertasters more, creating higher levels of discomfort.	T
14 Supertasters can become more at risk of bowel cancers due to avoidance of bitter tastes associated with vegetables.	F
15 As a result of their perceptual experiences, supertasters are more likely to develop a dislike for more foods.	T
16 Supertasters are more likely to smoke cigarettes.	F
17 If a person is found to be more sensitive to bitterness, they are usually more sensitive to other tastes as well.	T
18 High numbers of tongue papillae are the best indicator of being a supertaster.	T
19 Supertasters are more likely to drink coffee compared to the general population.	F
20 Forty per cent of the general population are thought to be supertasters.	F

jacaranda
A Wiley Brand

ACTIVITY 9.7

Summarising influences on the judgment of flavour

Part A

Use the words in the shaded panel below to complete the passage on how perceptual set and the colour intensity and texture of a food or beverage can influence our perception of its flavour. A word may be used only once and all words are used.

brighter	dominate	duller	expectations
felt	flavour	flavoured	integration
intensely	mouth	past	perceptual
senses	smell	surface	tactile
taste	tasted	time	visual

Flavour is a perceptual experience produced by a combination of taste and other sensations such as smell, sounds, temperature, tactile (touch) sensations and visual sensations. The overall experience of flavour demonstrates that taste perception results from the integration of input from different senses, not just taste. In turn, the multi-sensory nature of flavour may be influenced by factors such as perceptual set, colour intensity and texture.

Perceptual set influences our experience of flavour by expectations based on preconceived ideas about how foods (and drinks) should taste. These form through past experience. It is not even essential to have actually tasted something to have an expectation of flavour.

The colour of food tends to dominate other sensory information in influencing our expectations of taste and flavour. The more intensely coloured foods tend to be perceived as more intensely flavoured and vice versa. For example, brighter colours are generally associated with more intense flavours whereas foods with duller colours are more likely to be judged as bland.

Texture is the property of the food that is felt in the mouth. The food's texture determines how much of its surface area comes into contact with our taste receptors as well as the length of time it will remain in our mouth and therefore be exposed to the taste receptors.

Part B

Use information in Part A to complete the following chart illustrating how flavour can be influenced by different factors.

Flavour is:
A perceptual experience produced by a combination of taste and other sensations.

influenced by

Perceptual set
Description:
Perceptual predisposition for flavour to be experienced in accordance with expectations.

How it influences:
The flavour we experience is influenced by expectations based on preconceived ideas about how foods (and drinks) should taste.

influenced by

Texture
Description:
The property of the food or beverage that is felt in the mouth that contributes to fl avour (along with taste, vision, etc.)

How it influences:
Helps to determine how much of its surface area comes into contact with taste receptors and also for how long the taste receptors are exposed to the chemical molecules in the food/drink.

influenced by

Colour intensity
Description:
More intensely coloured foods and drinks tend to be perceived as more intensely flavoured and vice versa.

How it influences:
Intensity/richness/brightness of the colour of a food or drink.

jacaranda A Wiley Brand

ACTIVITY 9.8

Analysing perceptual distortion associated with synaesthesia

1 Define 'synaesthesia'.

A perceptual experience in which stimulation of one sense produces additional sensations in another, increasing the overall perceptual experience.

2 In your own words, explain each of the following statements relating to the synaesthesia.

Statement relating to synaesthesia	Explanation
Synaesthesia is not a disease.	Synaesthesia does not interfere with daily function and does not require medical intervention. For many people it enhances their overall perceptual experiences.
Grapheme-colour is the most common form of synaesthesia.	The most common type of synaethesia is when people perceive colour when looking at specific letters or numbers even though colour is not part of the stimulus. It tends to be one-way.
Synaesthesia is a real and not imagined experience.	It is an involuntary and automatic perceptual response to stimuli that is very difficult, if not impossible, to suppress. It is highly vivid and memorable and is associated with normal waking consciousness.

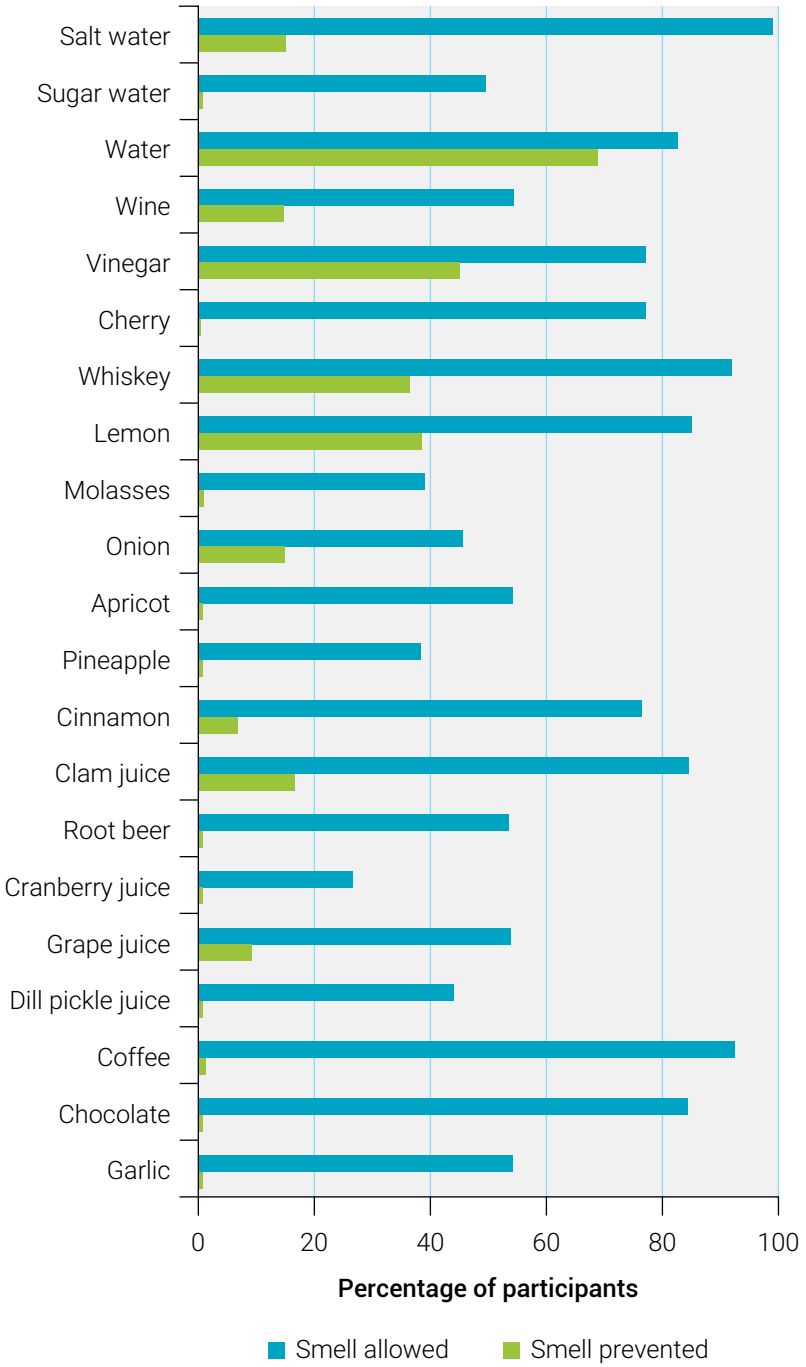
Statement relating to synaesthesia	Explanation
The perceptual experience is consistent over time.	The cross-sensory experiences tend to be very consistent over time with the same perceptions forming with certain stimuli when presented. For example, always perceiving 'blue' when seeing the letter 'A'.
Synaesthesia is not fully explained by genetics.	Some examples of synaesthesia have been observed to occur within the same family, suggesting genetic explanations, but many other examples do not.
Synaethesia has a number of plausible explanations.	Plausible explanations include hyper-sensitive sensory processing areas of the brain; excessive neural connections between sensory processing areas of the brain resulting from insufficient neural pruning in early development; or abnormal neural pathways/connections bridging between two or more sensory processing regions of the cortex.
The brains of synaesthetes may have different architecture.	The brains of synaesthetes may have abnormal neural pathways or be 'wired' differently, so that neighbouring sensory areas in the brain cross-activate one another, thereby triggering additional sensations — the experience of seeing colour when looking at shapes might be due to cross-activation of the colour and shape recognition regions in the cortex.

jacaranda
A Wiley Brand

Data analysis on the role of smell in taste perception

A team of American researchers conducted one of the earliest investigations on the role of smell in taste perception. In this study, 21 familiar foods and drinks were individually liquefied in a blender and dropped onto each participant's tongue from an eye dropper. The participant's task was to name the food or drink.

The results are shown below. The blue rectangles give the results when participants were allowed to smell the odour of the substance and the green rectangles give the results when the participants were prevented from smelling. Consider the data and then answer the questions.



Source: Adapted from Mozell, M.M., Smith, B.P., Smith, P.E., Sullivan, R.L., & Swender, P. (1969). Nasal chemoreception in flavor identification. *Archives of Otolaryngology, 90*(3), 367–373.

1 Name the type of graph.

bar graph

2 Write a brief title for the graph that summarises what is shown.

Example: The percentage of participants tested who could identify each of the 21 substances, with and without smell.

3 Draw two conclusions from the results.

Examples:

- Smell improved performance greatly on a taste perception task.
- Smell has a crucial role in taste perception.
- For several familiar substances, such as coffee, garlic and chocolate, correct identification was impossible without smell.

4 Write a research hypothesis that would be supported by the results.

Examples

- Perception of taste depends on smell.
- A substance will be correctly identified more frequently when participants are allowed to smell than when not allowed to smell.
- If a participant is allowed to smell a substance, then the participant is more likely to correctly identify the substance compared to when prevented from smelling.

jacaranda
A Wiley Brand

ACTIVITY 9.10

True/False quiz on distortions of perception

Indicate whether each item is true or false by writing T or F in the column on the right.

Statement	T/F
1 There can be a difference between what we perceive and what reality is actually like.	T
2 Perceptual distortions can occur with all of the senses.	T
3 Perceptual distortions demonstrate the fallibility of perception.	T
4 We can continue to see an illusion even when we know we are looking at a visual illusion and know why it occurs.	T
5 The Müller-Lyer illusion demonstrates that not all people experience the illusory effect of an illusion.	T
6 Visual perception is more dependent on a healthy brain than a healthy pair of eyes.	T
7 Taste perception is more likely to fail when combined with visual perception than tactile perception.	F
8 Our eyes are entirely responsible for our sight.	F
9 Our sense of taste can be altered by miraculin.	T
10 Spatial neglect is an attention disorder.	T
11 Texture is a property of food or drink that is felt in the mouth.	T
12 Synaesthesia is a type of extrasensory perception.	F
13 Of the sensory systems that humans share, taste is the sense that we rely on the least.	T
14 The Ames room illusion is based on the unusual construction of the room and use of monocular vision.	T
15 The reason why a person appears to be smaller or taller in the Ames room is because the back wall is trapezoidal in shape.	F
16 Noise can distort our perception of taste.	T
17 Our expectations about what a food or drink will taste like can alter our perception of its taste.	T
18 A synaesthete is someone who experiences ordinary sensory events in extraordinary ways.	T
19 Seeing provides an accurate record of the world around us.	F
20 The Müller-Lyer illusion is best explained by the perceptual distortion caused by the brain not noticing the person is actually walking towards or away from the observer due to distortions in the shape of the room.	F
21 Flavour is not in a food or drink — it is produced by the brain.	T
22 Synaesthesia occurs in people with healthy, intact brains.	T
23 One of the most common forms of synaesthesia is grapheme-colour synaesthesia where letters or numbers produce a perceptual experience involving colour.	T
24 Professional food tasters are less likely to be influenced by perceptual set than the general public.	F
25 Visual illusions are less likely to be experienced if the observer knows in advance what the illusion is.	F

Crossword on concepts and terms in distortion of perception

Across

1 A person who is more sensitive to certain tastes than others and experiencing greater intensity

10 Neurological attentional disorder whereby individuals are unable to notice anything either on their left or right side

12 The predisposition to perceive something in accordance with expectations of what it is expected to be

13 A type of visual agnosia characterised by an inability to recognise a familiar face, including their own when seen in a mirror or photograph

Down

2 A type of visual agnosia involving the inability to associate a visual stimulus with stored information about objects in memory

3 A type of visual agnosia characterised by an inability to recognise more than one object at a time in a scene that contains more than object

4 Perceptual experience in which stimulation of one sense involuntarily produces additional unusual experiences in anther sense

5 A type of protein associated with certain berries that can affect a person's perception of taste

6 A consistent perceptual misinterpretation of real sensory information whenever that sensory information is viewed

7 A perceptual experience produced by a combination of taste and other sensations

8 Loss or impairment of ability to recognise and identify objects, people, sounds or other sensory stimuli despite having normally functioning senses

9 A type of visual agnosia involving the inability to perceive the individual parts of a stimulus as a meaningful and unified whole

11 Small mushroom-shaped structures on the tongue that contain taste buds

jacaranda
A Wiley Brand

1 SUPERTASTER
2 ASSOCIATIVE
3 SIMULTANAGNOSIA
4 SYNAESTHESIA
5 MIRRORING
6 VISUAL
7 FALSENEGATIVE
8 AGNOSIA
9 APPERCEPTIVE
10 SPATIALLY
11 PAPILLAE
12 PERCEPTUALSET
13 ARONSON