

YEAR 11 ATAR COURSE BOOK



**ACADEMIC
TASK FORCE**

REVISION SERIES

PSYCHOLOGY

UNIT 1 & 2

The background of the bottom half of the cover is an abstract, high-contrast image. It features swirling, organic shapes in vibrant shades of lime green, teal, and deep purple, set against a white background. The overall effect is reminiscent of liquid smoke or ink diffusing in water, creating a sense of movement and depth.

SONYA CERNY



REVISION SERIES

PSYCHOLOGY

YEAR 11 ATAR COURSE

SONYA CERNY



ACADEMIC GROUP

■ ACADEMIC TASK FORCE ▲ ACADEMIC ASSOCIATES ■ THE EXAM EXPERTS

Achieve Success at School

Academic Group Pty Ltd
P.O. Box 627, Applecross
Perth, Western Australia 6953

Tel: (08) 9314 9500
Email: learn@academicgroup.com.au
Website: www.academicgroup.com.au

First published 2023
Reprinted 2024

© Academic Group Pty Ltd (ABN 50 151 087 286)

National Library of Australia ISBN 978-1-74098-330-3

Copyright ©

Copyright in this book is owned by Academic Group, unless otherwise indicated. 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 enquiries should be made to the Publisher.

Printed in Western Australia on paper supporting responsible forestry.



About the Author

After finishing her Bachelor of Secondary Education, Sonya Cerny taught Science, Human Biology, HASS and Art until pursuing her interests in visual arts through a Masters of Applied Design and Art at Curtin University. Sonya was fortunate enough to establish ATAR Psychology at Aranmore Catholic College, and a few years later completed a Graduate Diploma in Psychology. Her passion for Psychology and desire to produce a resource to help students understand and navigate the new syllabus, led her to write this book.

Acknowledgements

- Jacqui Edwards, Rhianna Hall, and Steven King for their encouragement and advice
- Sarah Scott and Joanie Scott for generously sharing their insight into stroke recovery and aphasia
- Annie Kicinski, Finlay Murphy, Katy Rickatson, Natalie Ivery, and Jana Krýže, for kindly providing images
- Lola and Maeby for their meows of endearment
- The incredible psychology students who make teaching an absolute joy
- Images by Adobe Stock, Science Source, istock, Shutterstock and Wikimedia

CONTENTS PAGE

UNIT ONE: BIOLOGICAL AND LIFESPAN PSYCHOLOGY

Biological psychology

Chapter 1:	Nervous System, and Structure and Function of the Brain	1
Chapter 2:	Historical Research on the Structure and Function of the Brain	17
Chapter 3:	Applications of Contemporary Methods to Improve Knowledge of Brain Structure and Function	25

Lifespan psychology

Chapter 4:	Brain Plasticity	34
Chapter 5:	Developmental Stages Across the Lifespan	41
Chapter 6:	Piaget's Theory of Cognitive Development	48
Chapter 7:	Attachment Theories and the Case Study of Genie the Wild Child	61

UNIT TWO: ATTITUDES, STEREOTYPES AND SOCIAL INFLUENCE

Attitudes and stereotypes

Chapter 8:	Attitudes, Attribution Theory, and Social Identity Theory	73
Chapter 9:	Stereotypes and the Relationship between Attitudes, Prejudice and Discrimination	85

Social influences

Chapter 10:	Social Influence Theory, Obedience and Conformity	97
Chapter 11:	Antisocial and Pro-social Behaviour in Response to Social Influence	111

SCIENCE INQUIRY

Chapter 12:	Ethical Guidelines	123
Chapter 13:	Formulating Research and Methodology	128
Chapter 14:	Data Collection	146
Chapter 15:	Processing and Analysing Data	154
Chapter 16:	Drawing Conclusions and Evaluation of Research	163

7th Edition APA Referencing Guide	170
Guide to Writing an Extended Response	173
Answers to Review Questions	176
Glossary of Key Terms	188

INTRODUCTION

The Academic Task Force Revision Series is a comprehensive revision resource for students to use alongside class textbooks and lesson notes. This Revision Series book, enables students to review and improve their understanding of concepts for Psychology Year 11, Units 1 & 2 in preparation for ATAR examinations. Each chapter includes a checklist, comprehensive revision notes and key teaching concepts, examination level review questions and teaching points beyond the syllabus to help explain concepts. Model answers and a reference guide are provided at the back of the book.

Key Teaching Points and Beyond the Syllabus

The Year 11 ATAR Psychology course, Units 1 & 2 key concepts and course objectives are detailed at the start of each chapter in a checklist format so you can track your progress. You can measure and monitor the concepts you have learnt in class and reviewed in this book. You can then track your revision progress against each of the key teaching points. Finally, you can measure your progress and ability to demonstrate your learning with successful completion of review questions assessed against model answers. The key teaching points checklist enables you to identify gaps in your study plan and to set your revision pace throughout the year.

Each chapter provides comprehensive revision notes that correspond with the current syllabus. Additional information not explicitly contained in the syllabus is provided within '**beyond the syllabus**' text boxes, as well as displayed in purple font in the glossary of key terms. While this material is not assessable, it may be of interest to students to support and develop their understanding of syllabus content.

Theories and Studies

Each named theory includes their specified features, strengths, limitations, and their application to a real-world context. Identified studies have been described in terms of their aim, method utilised, key findings, contribution to psychology, and criticisms or limitations.

Chapter Review Questions

Each chapter includes review questions to reinforce topic learning and exposes you to questions and answers at test/examination level. End of chapter review questions have been written using terminology from the SCSA glossary of questioning terminology where applicable. The questions have been allocated marks, and answers are provided in table format, similar to Psychology WACE exam marking keys. Model answers and marking key are provided at the end of the book and should be used to help you assess your understanding of examinable concepts.

7th edition APA referencing guide

Students are required to acknowledge sources of information using appropriate referencing. A guide for using the 7th APA referencing style is outlined at the back of the book.

Guide to writing an extended response

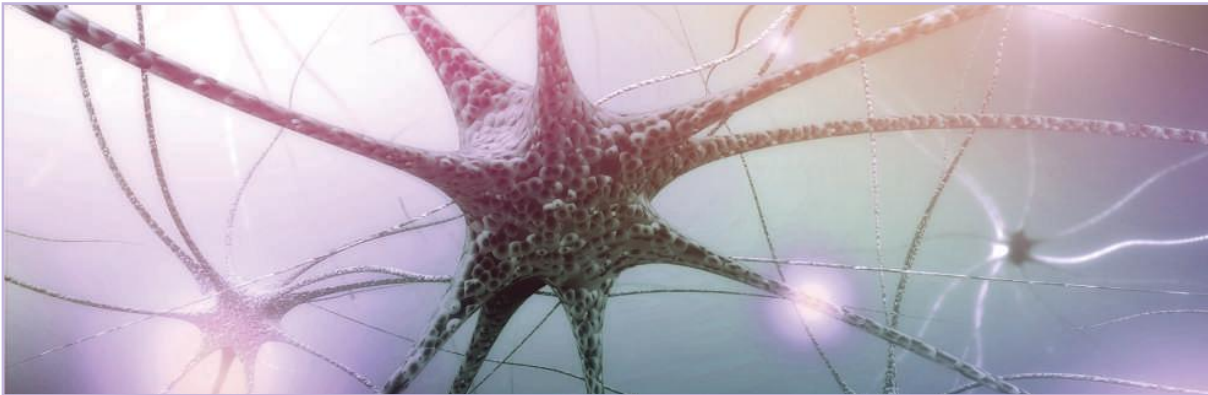
Pointers to help you formulate the extended response section of WACE exams are listed. An example of an extended response question, sample answer and marking key are provided.

This Revision Series book, will help you achieve success at school and be a valuable resource in your revision for Psychology Year 11 Units 1 & 2 throughout the year. All the best for your exams!

Sonya Cerny

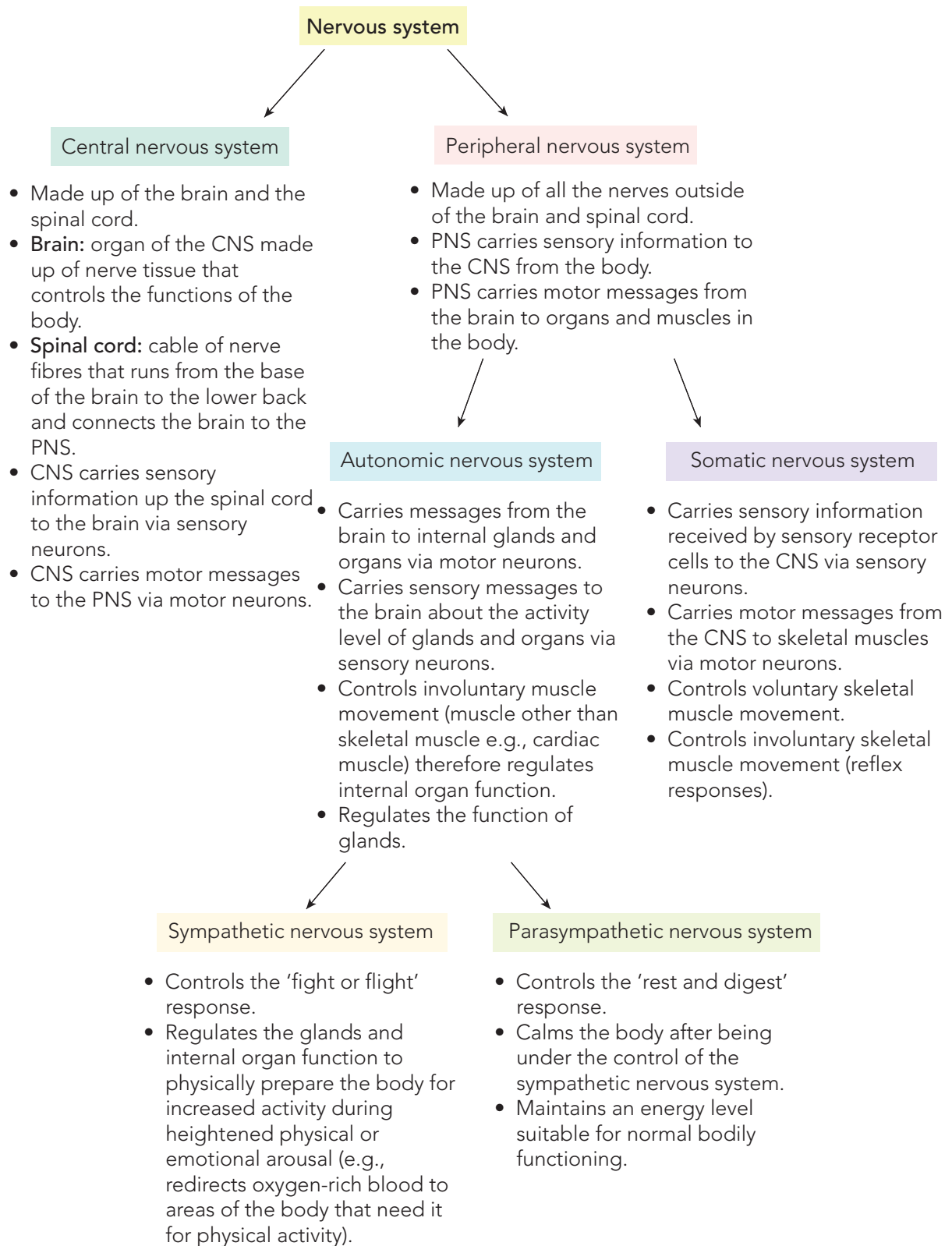
NERVOUS SYSTEM, AND STRUCTURE AND FUNCTION OF THE BRAIN

1



Key teaching points	Learn	Revise	Demonstrate
Biological psychology			
• Structural organisation of the nervous system			
◦ Central nervous system – brain and spinal cord			
◦ Peripheral nervous system – somatic and autonomic			
• Role of the functional divisions of the peripheral nervous system			
◦ Autonomic – sympathetic and parasympathetic			
◦ Somatic – sensory and motor			
• Features of neurons			
◦ Structure and function of the neuron – dendrites, soma/cell body, axon, axon terminals, myelin sheath			
◦ Functions of sensory, motor and interneurons			
• Neural transmission			
◦ Direction of transmission			
◦ Electro-chemical signal			
◦ Role of the synapse			
◦ Role of neurotransmitters			
• Location, structure and function of the brain			
◦ Hindbrain – medulla, cerebellum			
◦ Midbrain – reticular formation			
◦ Forebrain – hypothalamus, thalamus			
◦ Cerebral cortex			
• Left and right hemispheres – contralateral control of the body			
• Corpus callosum			
• Lobes of the brain – frontal, parietal, temporal, occipital			
• Localisation of functions – Broca's area, Wernicke's area, pre-frontal cortex, primary motor cortex, primary sensory cortex, primary auditory cortex, primary visual cortex			

STRUCTURAL ORGANISATION OF THE NERVOUS SYSTEM



Nervous system: the system that produces and relays messages between the brain, spinal cord and a network of neurons.

Central nervous system (CNS): part of the nervous system made up of the brain and spinal cord that carries sensory information up the spinal cord to the brain via sensory neurons and carries motor messages to the PNS via motor neurons.

Peripheral nervous system (PNS): nerves outside of the brain and spinal cord that carry sensory information to the CNS from the body and motor messages from the brain to organs and muscles in the body.

Autonomic nervous system (ANS): branch of the PNS that carries motor messages from the brain to internal glands and organs via motor neurons, causing their involuntary activity, and carries sensory messages to the brain about the activity level of glands and organs via sensory neurons.

Somatic nervous system: branch of the PNS that carries sensory information received by sensory receptor cells to the CNS via sensory neurons and carries motor messages from the CNS to skeletal muscles via motor neurons.

Sympathetic nervous system: branch of the ANS that regulates the glands and internal organ function to physically prepare the body for increased activity during heightened physical or emotional arousal.

Parasympathetic nervous system: branch of the ANS that reverses bodily functioning produced by the sympathetic nervous system by calming the body and maintaining an energy level suitable for normal bodily functioning.

ROLE OF THE FUNCTIONAL DIVISIONS OF THE PERIPHERAL NERVOUS SYSTEM

Divisions of the autonomic nervous system

Body part affected	Sympathetic nervous system	Parasympathetic nervous system
Pupils of the eyes	Pupils dilate	Pupils constrict
Salivary glands	Saliva production inhibited	Saliva production stimulated
Heart	Heart rate increases	Heart rate decreases
Digestive tract	Digestion is inhibited	Digestion is stimulated

- Figure 1.1 illustrates how the somatic nervous system regulates reflexes that involve skeletal muscle movement. Steps one through to five occur without conscious control.

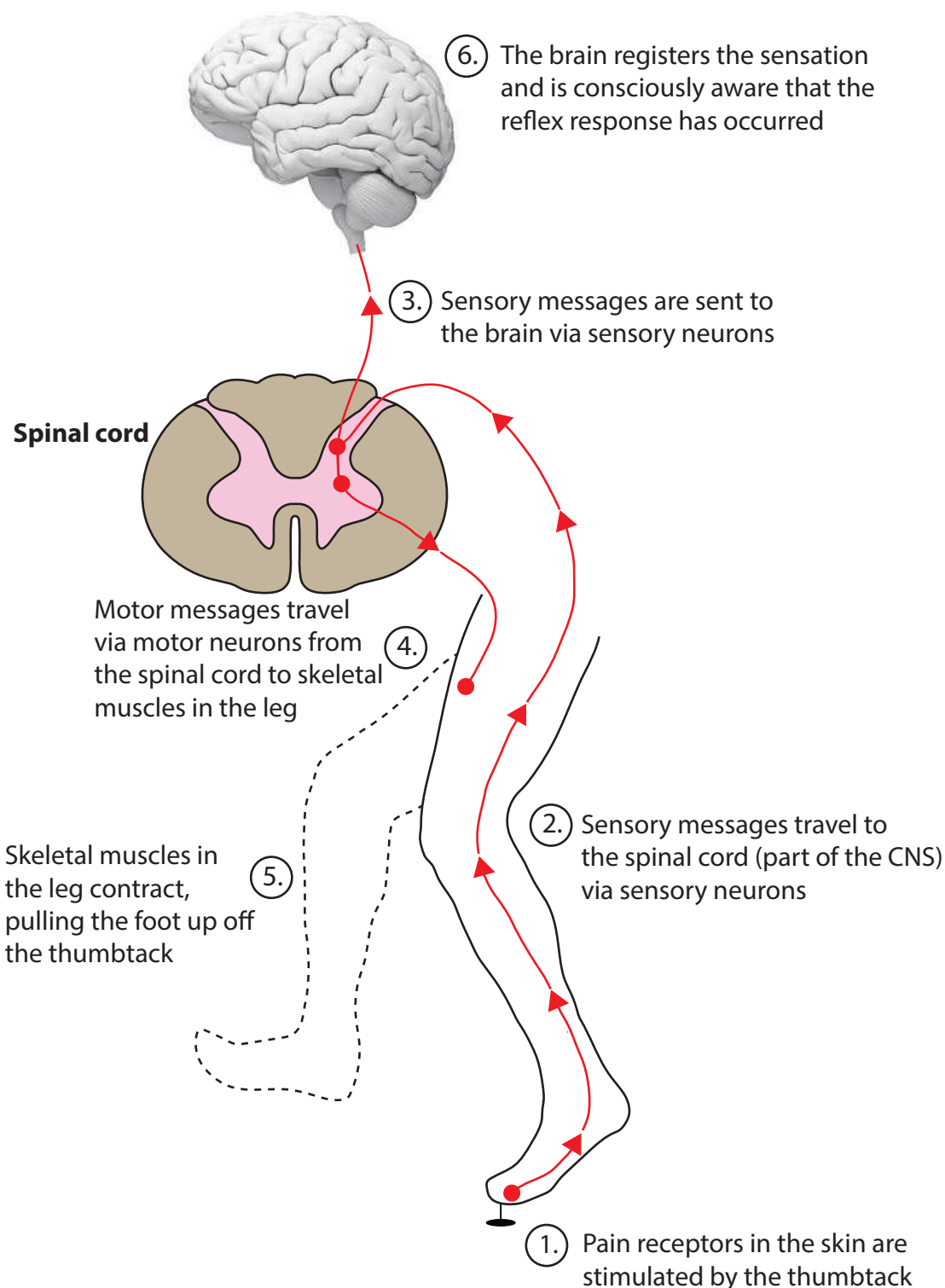


Figure 1.1

FEATURES OF NEURONS

Neurons (nerve cells): cells of the nervous system that communicate with each other, as well as muscle and gland cells.

Dendrites: extensions of the cell body that receive neurotransmitters from pre-synaptic neurons and convert them into electrical nerve impulses that are conducted toward the cell body.

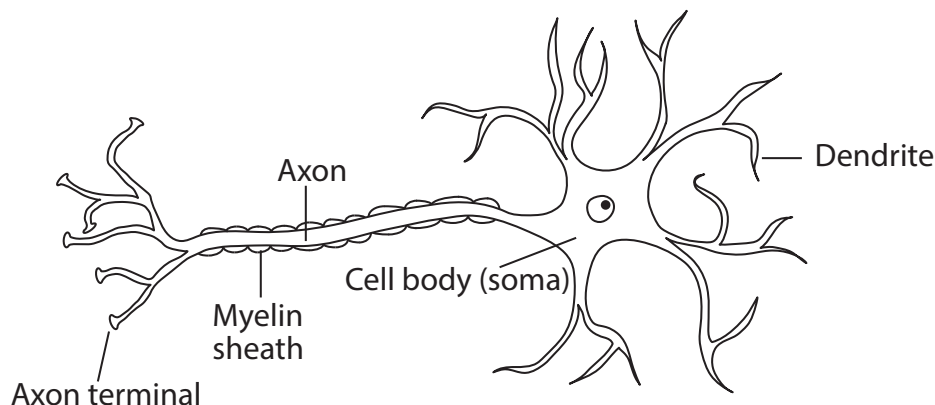
Cell body (soma): contains a nucleus that controls the activities of the neuron.

Axon: the long projection of a neuron that conducts electrical nerve impulses and carries them away from the cell body.

Axon terminals: the enlarged end points of axon branches that store neurotransmitters and release them into the synaptic cleft.

Myelin sheath: fatty covering of the axon that acts as an insulator protecting the axon from stimuli that could interfere with electrical nerve impulse transmission.

- The myelin sheath also increases the speed of electrical nerve impulse transmission and helps improve the conduction of the transmission.



Functions of sensory, motor and interneurons

Sensory neurons: process sensory information from the sense organs and carry the sensory messages to the spinal cord and brain (CNS).

Motor neurons: carry motor messages from the spinal cord and brain (CNS) to the muscles, glands and organs of the body.

Interneurons: act as the connection between sensory neurons and motor neurons and transfers messages from sensory neurons to motor neurons within the CNS. Figure 1.1 includes a representation of interneurons within the spinal cord.

Beyond the syllabus

Serotonin is the neurotransmitter typically associated with regulating and improving mood. Depression is a mood disorder that is partly influenced by serotonin. Instead of serotonin moving effectively from the axon terminal of the pre-synaptic neuron and binding to receptors on the dendrite of the post-synaptic neuron, some of the serotonin moves up and is reabsorbed into the axon terminal, meaning not enough travels through the synaptic cleft.

Selective serotonin reuptake inhibitors (SSRIs) are a type of medication that only affect serotonin; hence they are 'selective'. SSRIs inhibit the serotonin reabsorption allowing the neurotransmitter to successfully pass to the post-synaptic neuron.

Prozac is the brand name of an antidepressant called fluoxetine, a commonly prescribed SSRI (Figure 1.2). Regular exercise has been found to increase neural transfer of serotonin in the brain, hence a general practitioner, psychologist or psychiatrist may recommend that individuals with depression exercise on a regular basis.



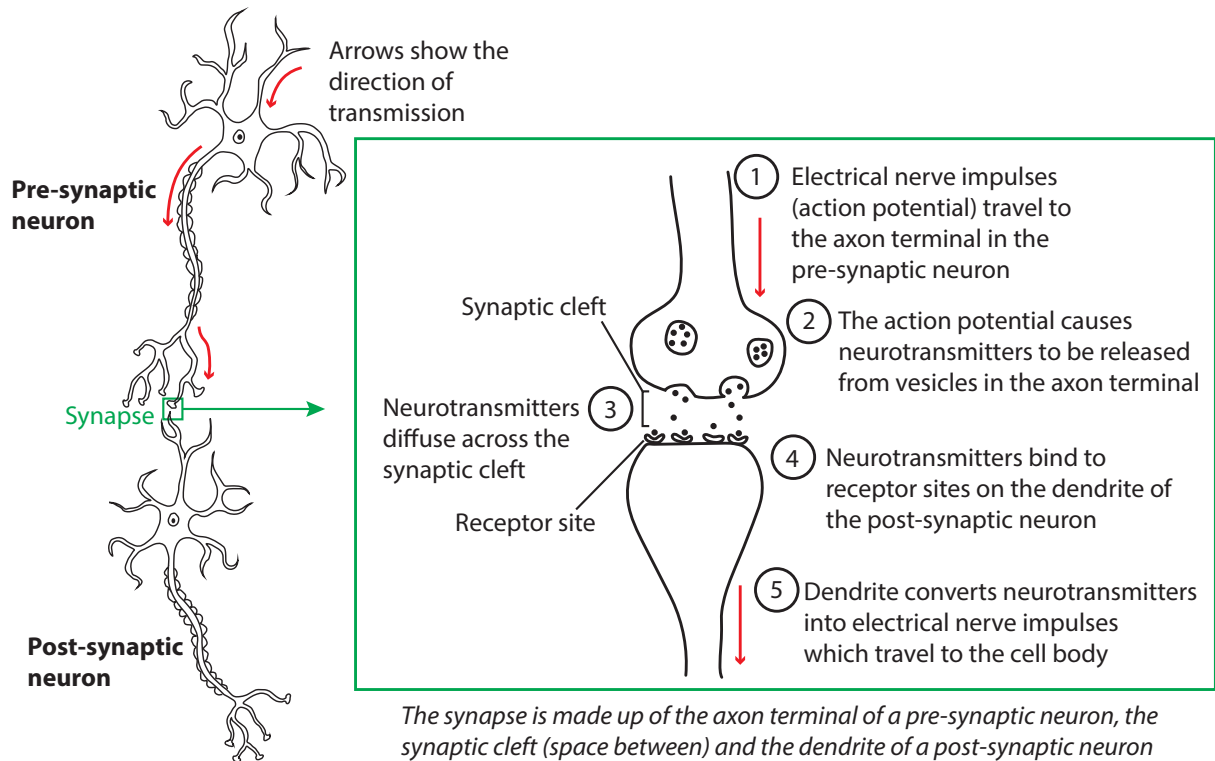
Figure 1.2

NEURAL TRANSMISSION

Role of neurotransmitters

Neurotransmitters are molecules found within the nervous system that act as chemical messengers.

- Neurotransmitters allow neurons to communicate by relaying information between them across the synapse, as well as from neurons to glands and muscle cells.



Electro-chemical signal

- Neurons can be explained as carrying electro-chemical signals, as an electrical nerve impulse (action potential) travels through the neuron and neurotransmitters travel between the synapse of communicating neurons.
- The electrical nerve impulses are the 'electro' component and the neurotransmitters are the 'chemical' component of the signal.

Direction of transmission

- The electrical nerve impulse, also known as the action potential, travels in one direction only; from the dendrites to the cell body, then along the axon to the axon terminals.
- Once the action potential reaches the axon terminals, it causes the release of neurotransmitters into the synaptic cleft.
- The speed of the action potential through neurons depends on the thickness of the myelin sheath that covers the axon. Acting as an electrical insulator, myelin increases the transmission speed of the nerve impulses.

Action potential: the electrical impulse that travels along the axon of neurons toward the axon terminals where it causes the release of neurotransmitters into the synaptic cleft.

Role of the synapse

Synapse: the axon terminal of a pre-synaptic neuron, the synaptic cleft and the dendrite of a post-synaptic neuron.

Synaptic cleft: the space between two neurons.

- The neuron that transmits a signal into the synapse is called the **pre-synaptic neuron** (before the synapse) and the neuron that receives a signal from the synapse is the **post-synaptic neuron** (after the synapse).
- The synapse allows neural transmission to occur by converting the electrical nerve impulse from one neuron into a chemical signal and then back again into an electrical nerve impulse in another neuron.

LOCATION, STRUCTURE AND FUNCTION OF THE BRAIN

- When the embryo is growing in the womb, the brain first develops into three bulges that later develop into the hindbrain, midbrain, and forebrain.

Hindbrain: coordinates sensory and motor messages entering and leaving the spinal cord, and is responsible for balance and coordination.

- **Medulla:** the lowest part of the brainstem that relays information between the spinal cord and brain, and regulates the respiratory and cardiovascular systems.
- **Cerebellum:** the convoluted structure at the lower back (posterior) of the brain sitting underneath the cerebrum. The cerebellum is involved in balance, judging distance, and coordination of fine motor movement.

Midbrain: receives sensory messages from all the senses, except smell, and sends information to the forebrain.

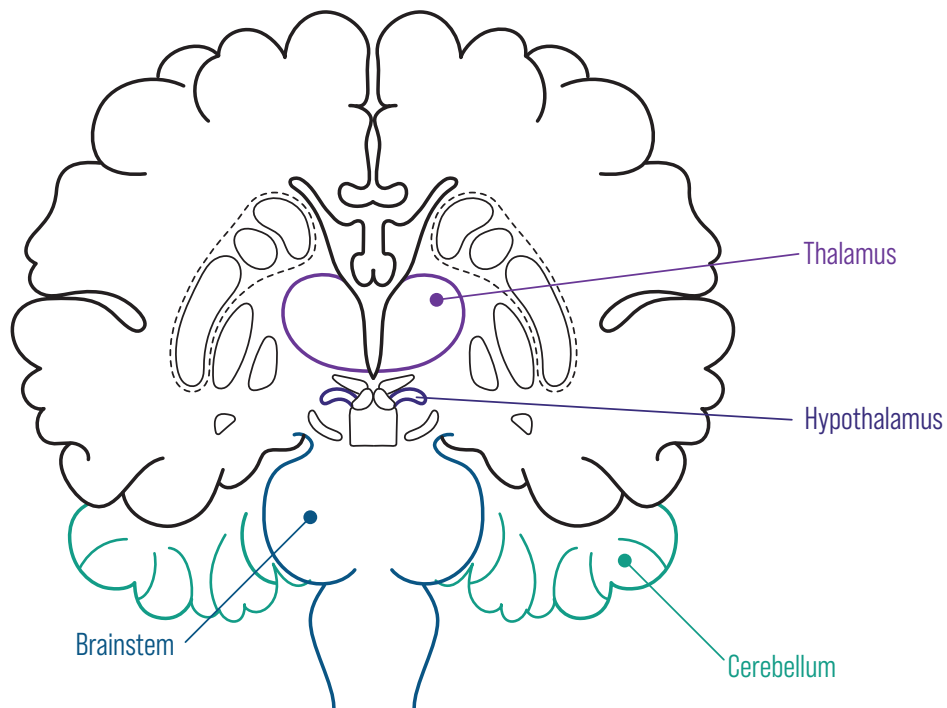
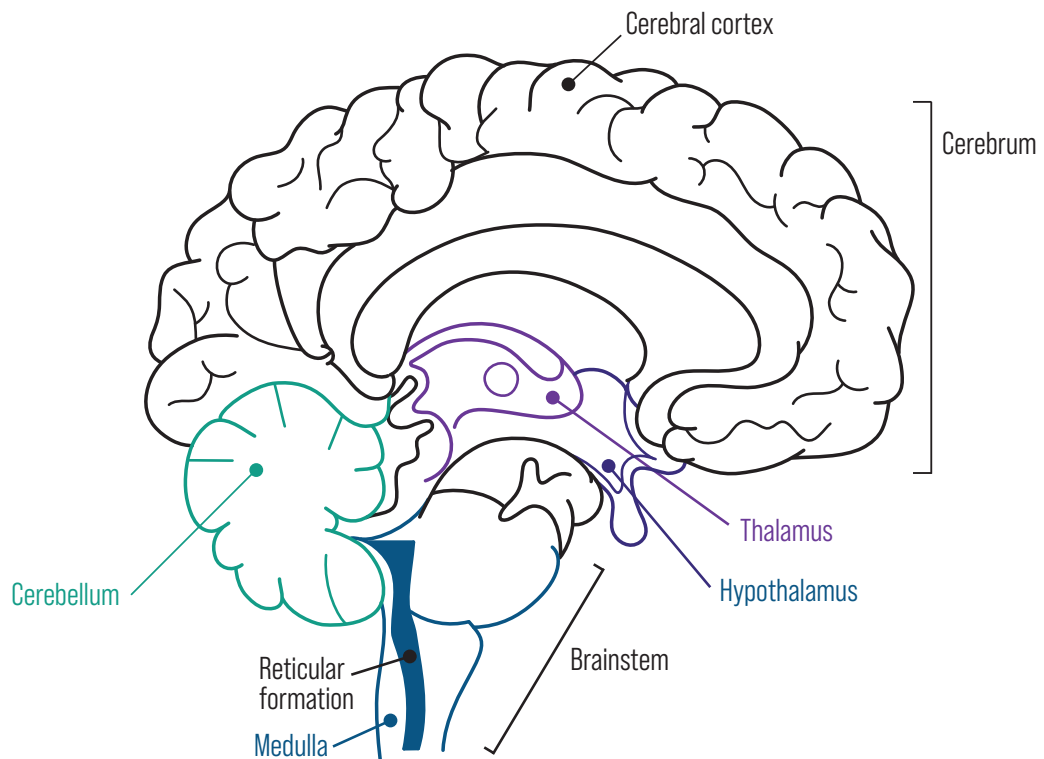
- **Reticular formation:** network of nuclei located within the length of the brainstem that helps maintain wakefulness and alertness and aids in the regulation of the sleep-wake cycle.

Forebrain: the largest part of the brain that plays a key role in cognition, emotion, behaviour and processing sensory information

- **Cerebrum:** the largest part of the brain consisting of **white matter** (whitish nerve tissue largely comprising of myelinated axons) on the inside, and the cerebral cortex (made up of **grey matter**; dendrites, unmyelinated axons and cell bodies of neurons) on the outside. The cerebrum is split into two cerebral hemispheres.
- **Thalamus:** double-lobed structure located just above the brainstem that receives sensory information, except smell, and transmits information to the cerebral cortex. The thalamus also has an influence on sleep.
- **Hypothalamus:** a structure that sits below the thalamus and regulates sleep, eating, body temperature and sexual drive. The hypothalamus also regulates the release of hormones from the pituitary gland that sits beneath it.

Cerebral cortex: the outermost layer of the brain made up of nerve cell tissue that is responsible for higher order processes such as memory, language, reasoning, emotion and decision-making.

- This two- to four-millimetre-thick layer of tissue sits on top of the cerebrum and has deep furrows to increase surface area. The nerve tissue is comprised of unmyelinated neurons (neurons without the myelin sheath), and the cell bodies of neurons, which are collectively known as grey matter.



Left and right hemispheres

- The cerebrum is the largest part of the brain and is divided into two halves known as the hemispheres. The hemispheres are connected by the corpus callosum and each hemisphere is dominant in the control of specific tasks.
- Hemispheric specialisation is the concept that each hemisphere has greater control over certain functions. Both hemispheres are involved in almost all functions but each is dominant in specialised functions.
- The hemispheres have contralateral control of the body which means the left hemisphere controls the right side of the body, and the right hemisphere controls the left side of the body.

Left hemisphere	Right hemisphere
<ul style="list-style-type: none"> • Controls movement of the right side of the body • Responsible for producing speech • Responsible for comprehending language • Responsible for writing • Responsible for reasoning • Responsible for logical thinking • Responsible for mathematic processes • Specialises in sequential information processing 	<ul style="list-style-type: none"> • Controls movement of the left side of the body • Responsible for the ability to draw pictures • Responsible for spatial orientation • Specialises in experiencing and expressing emotion, as well as perceiving the emotion of others • Responsible for music and art awareness • Involved in intuition • Responsible for creativity

Corpus callosum: the thick band of nerve fibres connecting the cerebral hemispheres of the brain and allowing the transfer of information between them. This is the largest white matter structure in the human brain with myelinated axons allowing for optimum nerve impulse transmission between neurons.

Lobes of the brain

- The cerebral cortex has a few very deep furrows, called fissures, and these are used to partially divide the cerebral cortex into lobes.

Frontal lobes <ul style="list-style-type: none"> • Controls voluntary movement • Responsible for planning and decision making • Responsible for problem solving • Responsible for the ability to reason • Responsible for the ability to organise information • Responsible for the expression of personality • Responsible for the recognition of emotions • Controls speech production • Responsible for impulse control 	Temporal lobes <ul style="list-style-type: none"> • Responsible for understanding speech • Interprets auditory information • Responsible for processing the sense of smell • Involved in facial recognition • Involved in recognising body language • Partly responsible for the recognition of emotions • Involved in long-term memory formation
Occipital lobes <ul style="list-style-type: none"> • Responsible for visual perception • Responsible for visual processing • Responsible for interpreting visual information • Involved in facial recognition • Responsible for the perception of distance and depth 	Parietal lobes <ul style="list-style-type: none"> • Responsible for processing sensory information relating to the sense of touch (e.g., temperature, pain, pressure) • Responsible for spatial awareness • Responsible for proprioception (perception of the location and movement of body parts) • Involved with the integration of sensory information (manages hearing, sight, touch, smell and taste)

Localisation of functions

	Broca's area	Wernicke's area
Location	Adjacent to the primary motor cortex in the left frontal lobe.	Adjacent to the primary auditory cortex in the left temporal lobe.
Function	Controls the fine muscles responsible for the production of clear (articulate) speech. These include the muscles of the tongue, cheeks, lips and jaw, as well as muscles of the larynx (voice box) and pharynx (throat).	Responsible for the understanding (comprehension) of language and the production of meaningful speech.
Impairment caused when damaged	Broca's aphasia (non-fluent aphasia). Impairment in the ability to produce articulate speech.	Wernicke's aphasia (fluent aphasia). Impairment in the ability to understand language and produce meaningful speech.

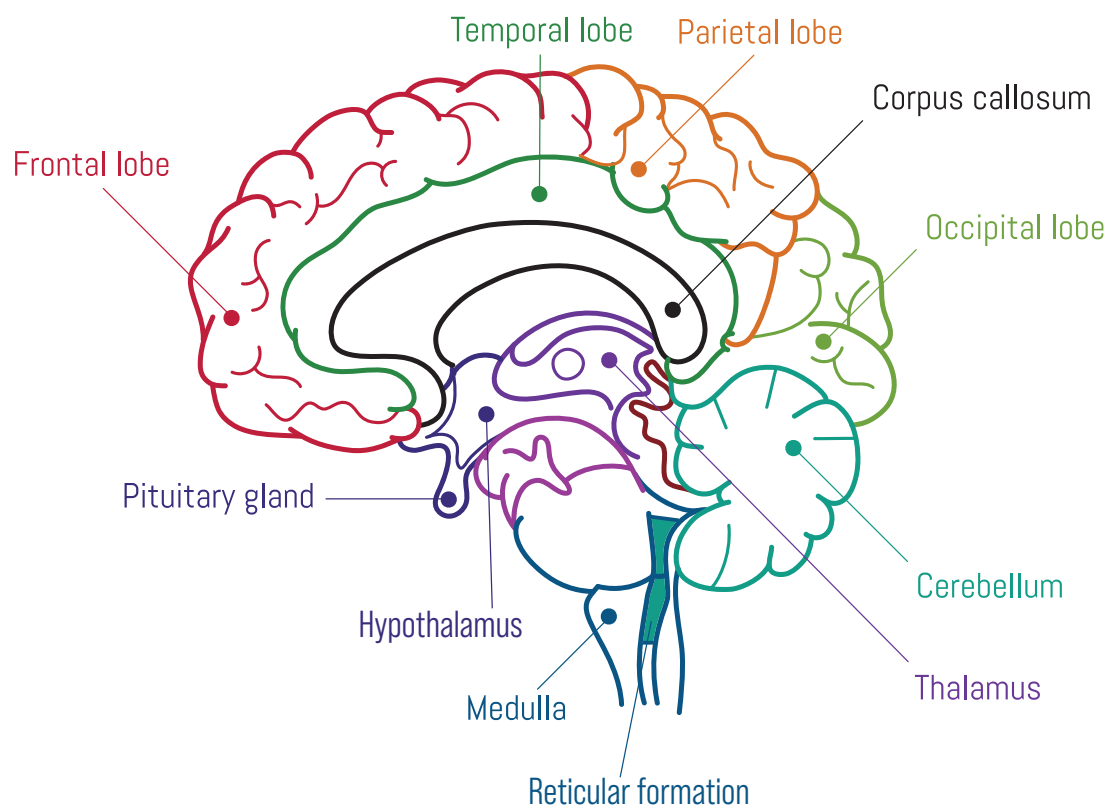
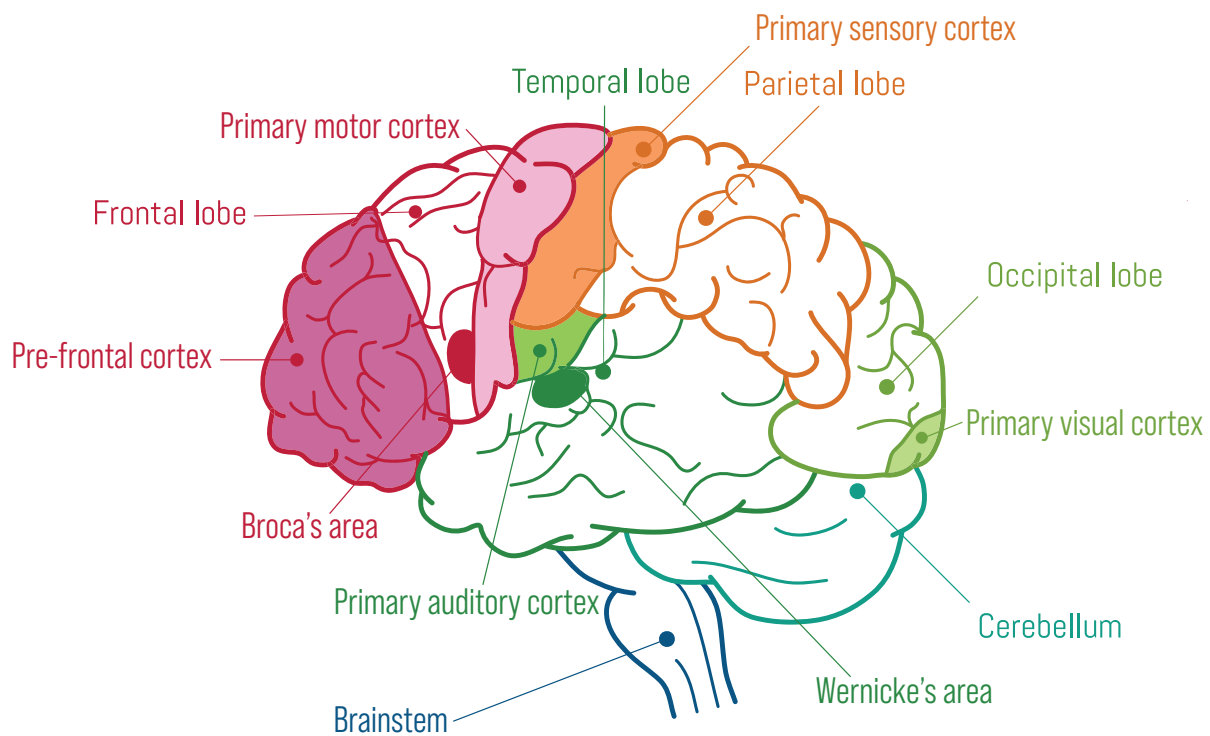
Pre-frontal cortex: the front layer of the frontal lobes that coordinates executive functions, such as the ability to predict the consequences of behaviours, as well as the ability to recognise and regulate emotions.

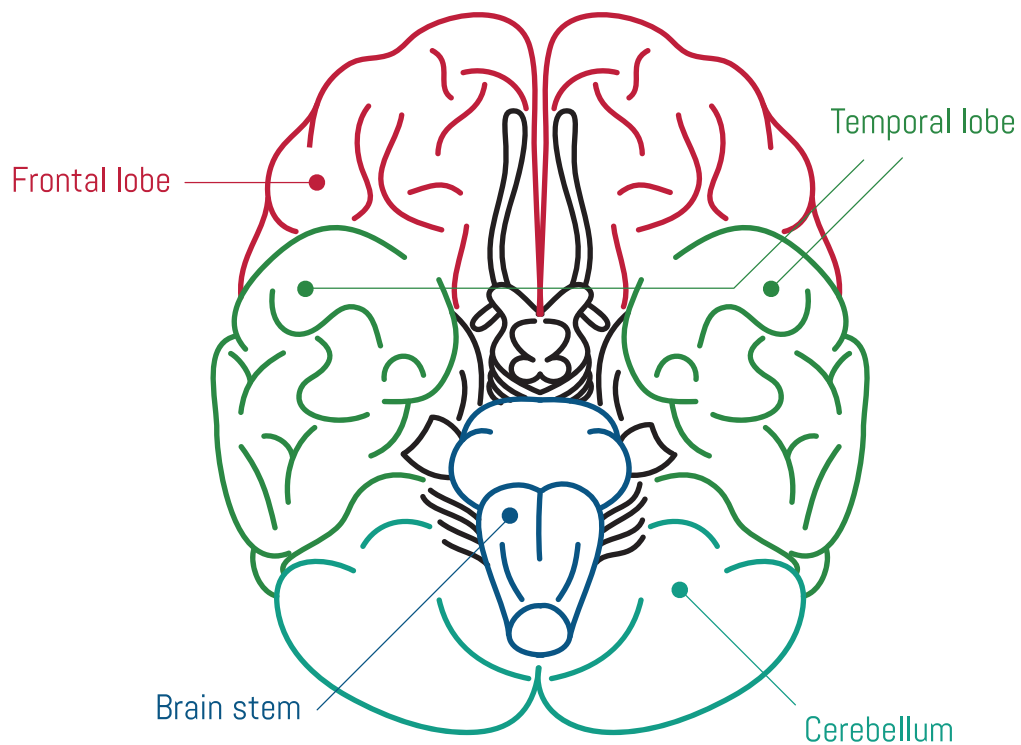
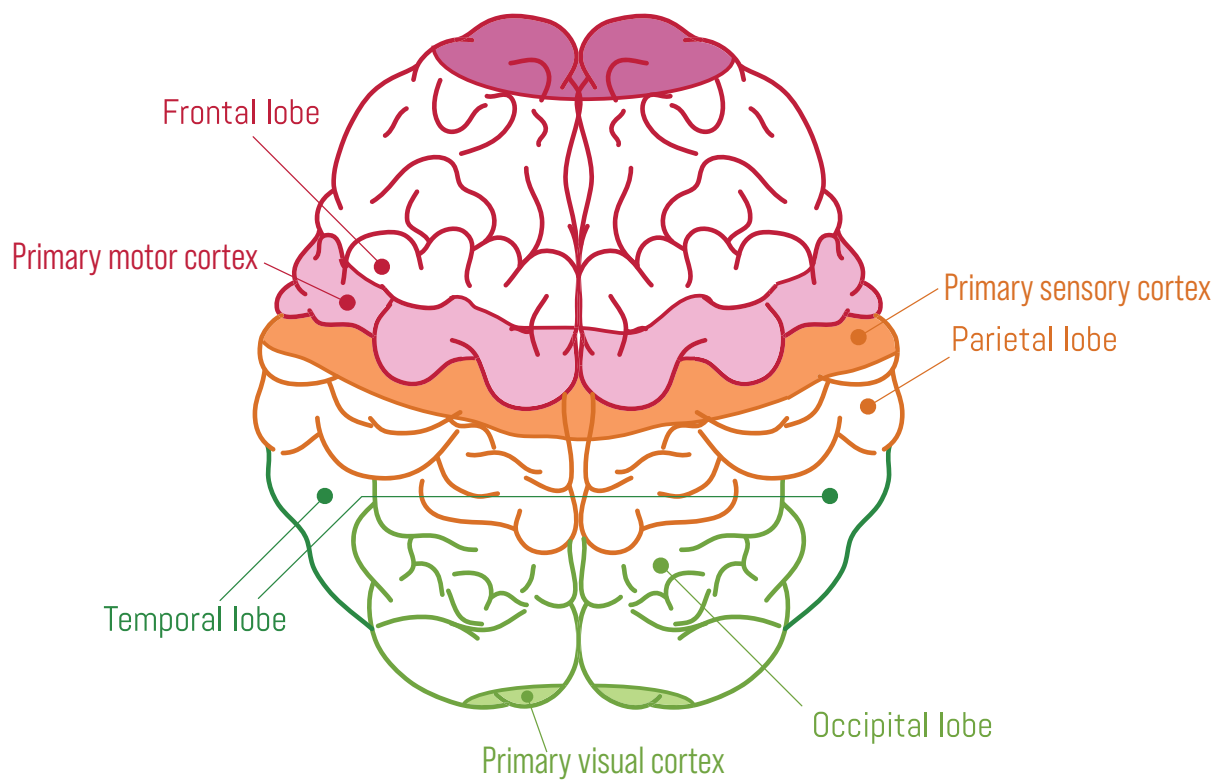
Primary motor cortex: a strip of cerebral cortex running through the frontal lobes that controls voluntary movement of the body. Different zones of the primary motor cortex correspond to the various parts of the body, with the size of each zone representing the importance of the body part according to how often it is used (often represented as a human homunculus).

Primary sensory cortex: a strip of cerebral cortex running through the parietal lobes that registers and processes sensory information. A human homunculi can be used to visually represent how different zones on the primary sensory cortex correspond to the sensitivity of body parts (measured by the density of sensory receptors).

Primary auditory cortex: an area within both temporal lobes that registers and processes auditory information that is received from the ears.

Primary visual cortex: an area within both occipital lobes that registers and processes visual information that is received from the eyes.





Beyond the syllabus

Sarah Scott suffered an ischaemic stroke at high school in 2009, when she was eighteen-years-old and preparing to sit her final exams. As a consequence of the stroke, she became paralysed and developed Broca's aphasia that caused difficulty swallowing, speaking, reading and writing. Her plan to study biology at university was immediately put on hold, and Sarah spent the following years working extremely hard with therapy, participating in work experience, volunteer work, and taking part in the Channel 4 television series 'The Undateables' (in 2013).

Now age thirty-one, Sarah is a Vector Manufacturing Specialist II at Adaptimmune and an advocate for Style for Stroke, and the Stroke Association, which is the only UK-wide charity supporting stroke victims of all ages. With the help of her mother Joanie, Sarah was kind enough to answer a few questions and provide insight into her world.

Can you describe what happened the day you had your stroke and how you felt when you realised what had happened?

"I was at school in English class. I was supposed to be reading aloud when suddenly I couldn't speak and the right side of my body went weak. I thought I was just tired or something and I wasn't scared."

Tell me a little about the therapy you underwent (or still do) to help regain the ability to speak and read.

"I was in hospital and rehab for five months and had occupational and speech therapy. My speech was bad and I could only say yes and no and I couldn't walk or swallow at first. I regained movement, but aphasia is something I still have, reading and writing and numbers are hard. I had a six-week intensive speech therapy course in America, which helped a lot."

'The Undateables' ran over eleven seasons, finally finishing up in 2020. Why did you decide to be on the show?

"To raise awareness that young people can have a stroke and aphasia – also to find a boyfriend! I am engaged now, but not to the guy on the show."

How does having aphasia change the way you are treated by others?

"I have had people thinking I'm shy or that I have a learning disability. Having aphasia can make people think you're less intelligent and that's hard sometimes."

What is one piece of advice you would give to a young person who has experienced a stroke or aphasia?

"Don't give up – you can continue making progress for the rest of your life if you push yourself to practice and to live life in your community."

Follow Sarah's journey on her YouTube channel @SarahScottAphasia

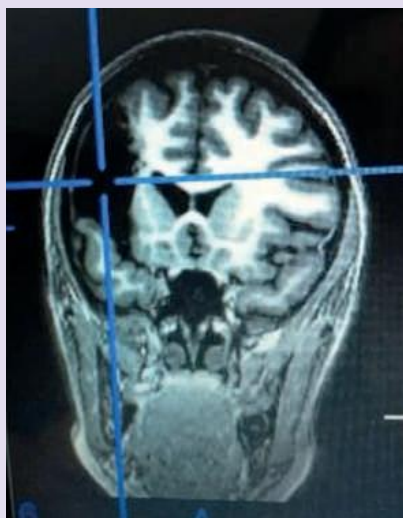


Figure 1.3 This MRI scan shows damage to Sarah's left frontal lobe, specifically Broca's area.



Figure 1.4 Sarah, pictured with her incredibly supportive mother, Joanie.

Question 1

- (a) (i) Briefly describe the structure of the spinal cord. (1 mark)

- (ii) Name the branch of the nervous system of which the spinal cord is a key structure. (1 mark)

- (b) (i) Circle the correct option to complete the sentence.

Motor neurons carry messages from the **brain / sense organs**. (1 mark)

- (ii) Outline the function of interneurons. (1 mark)

- (c) (i) Neurons communicate via electrochemical pathways. State the means of transmission within neurons. (1 mark)

- (ii) State the means of signal transmission across the synaptic cleft. (1 mark)

Question 2

Emerson is in a dark room and becomes startled after hearing an unfamiliar noise. Changes occur in his body to prepare him for what he might need to do next.

- (a) (i) He needs to be able to quickly improve his sight so that he can see if there is any threat to his safety. Outline what will occur to his eyes in this situation. (1 mark)

- (ii) Emerson requires oxygen-rich blood to reach his muscles in case he needs to run or fight. Outline what will happen to his heart to allow for this process. (1 mark)

- (iii) Name the branch of the autonomic nervous system that is responsible for the changes mentioned in part a(i) and (ii). (1 mark)

- (iv) Name the branch of the peripheral nervous system that regulates digestion and sweating. (1 mark)

- (v) Name the branch of the peripheral nervous system that regulates voluntary skeletal muscle movement. (1 mark)

Question 3

- (a) (i) Name the structure of the brain that is involved in keeping us alert. (1 mark)

- (ii) Name the structure of the brain that is involved in the control of thirst. (1 mark)

- (b) (i) Name the language area of the brain that, when damaged, characteristically causes individuals to produce nonsense words (neologisms) within the content of their speech. (1 mark)

- (ii) Which hemisphere and lobe of the brain is the language area identified in part (b) (i) located? (2 marks)

(iii) In addition to the production of nonsense words, outline **one** other difficulty individuals tend to have when the language area named in part (b) (i) is damaged.

(1 mark)

(c) The primary sensory cortex and primary motor cortex are located next to each other. For each cortex, name the lobe of the brain it is found in. (2 marks)

Primary sensory cortex: _____

Primary motor cortex: _____

(d) The hemispheres of the brain have contralateral control of the body. Describe what this means and provide an example to support your response. (4 marks)

HISTORICAL RESEARCH ON THE STRUCTURE AND FUNCTION OF THE BRAIN

2



Key teaching points	Learn	Revise	Demonstrate
Biological psychology			
• Historical research on the structure and function of the brain			
◦ Phineas Gage – case study illustrating localisation of lobe function			
◦ Roger Sperry (1959-1968) – role of the corpus callosum using split-brain experiments			
◦ Walter Freeman (1936-1945) – role of the pre-frontal cortex using frontal lobotomy			

HISTORICAL RESEARCH ON THE STRUCTURE AND FUNCTION OF THE BRAIN

PHINEAS GAGE – CASE STUDY ILLUSTRATING LOCALISATION OF LOBE FUNCTION

- In 1848 Phineas Gage was working as a foreman building a railroad. The twenty-five-year-old was described as active, well organised, reasonable and calm.
- While compacting powder in a hole in preparation for blasting, he became distracted and the tamping iron hit rock. The powder exploded forcing the iron – pointy end up, into the left side of his face under his cheek bone and continued up and back exiting through the top of his skull.
- Phineas was thrown onto his back, his limbs convulsed a few times and a few minutes later he was able to speak. His men put him in an ox cart and he rode to a hotel in town.
- He remained conscious as his wounds were being attended to by doctors. Fractured bone pieces and some protruding brain was removed and adhesive straps kept the scalp together.
- A year later, when visited by one of the doctors who had treated him, it was discovered that Phineas applied for the position of foreman but the contractors could not give him his position again due to his change in personality.
- While they described him as highly capable, efficient and polite prior to the incident, he was now impatient, impulsive, uncaring for others around him, and would often swear.
- Serious damage to Gage's left frontal lobe caused a marked shift in personality and organisational skills. Therefore, this case contributed to the understanding that the frontal lobes of the brain are responsible for the expression of personality, problem solving and impulse control.

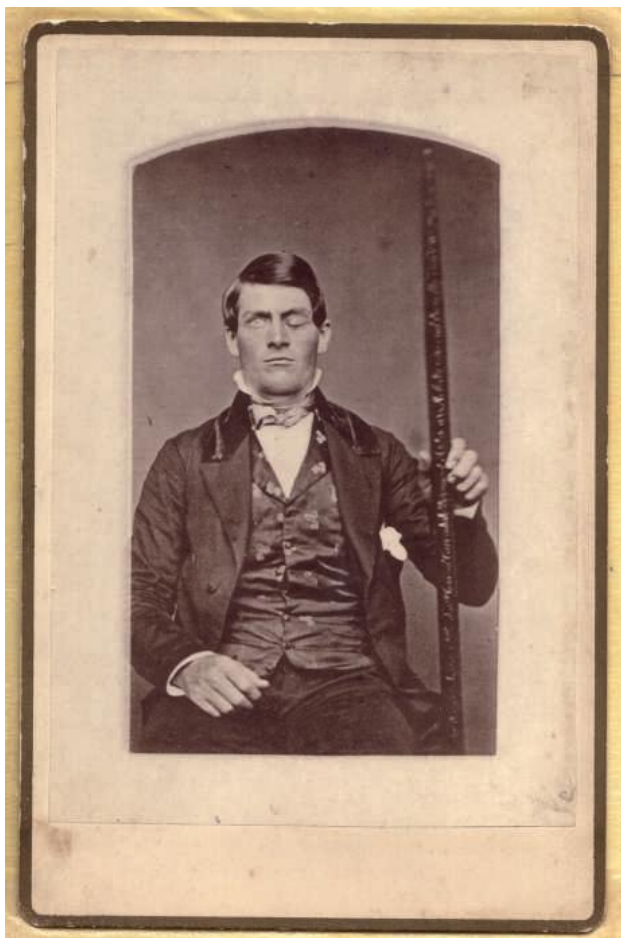


Figure 2.1 Cabinet card photograph of Phineas Gage that has been laterally reversed to show his missing left eye and the scar on the left side of his forehead.

ROGER SPERRY (1959-1968) – ROLE OF THE CORPUS CALLOSUM USING SPLIT-BRAIN EXPERIMENTS

- Before using human volunteers, Sperry conducted split-brain research on cats and monkeys. From this research he deduced that the two hemispheres worked independently of each other, as two split brains, when the corpus callosum connecting them was cut, and that the corpus callosum allowed direct communication between the hemispheres.
- Sperry later conducted research on humans who had undergone split-brain surgery (severing of the corpus callosum) to treat their epilepsy. Optic nerves from each eye cross over at the optic chiasm so input from the left field of view is processed in the right hemisphere and input from the right field of view is processed in the left hemisphere – irrespective of whether the corpus callosum is intact (Figure 2.2).

Optic chiasm: the crossing over of optic nerves at the base of the brain, directly in front of the hypothalamus.

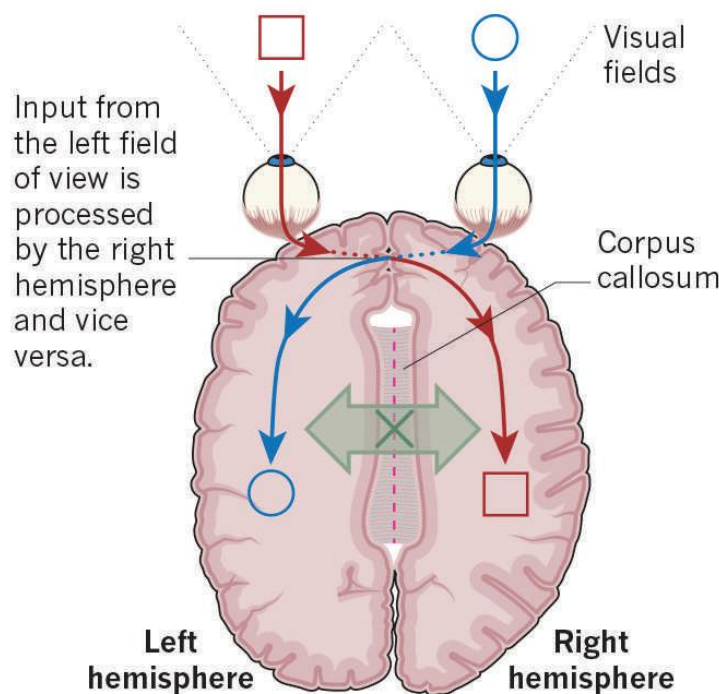


Figure 2.2

- Participants with a severed corpus callosum were asked to focus on a black dot in the middle of a white screen and words or pictures presented on the left of the dot were processed in the right hemisphere and vice versa. In one experiment participants were flashed a word to the right of the dot and asked to say what they saw. Participants had no trouble saying the word. When, however, participants were flashed a word to the left of the dot, they were unable to say what they saw.

- Further experiments required the participants who were unable to say what they saw to the left of the dot, to close their eyes and draw what they saw with their left hand. As voluntary movement of the left hand is controlled by the right hemisphere, and the word flashed to the left of the dot was processed in the right hemisphere (due to the optic chiasm), the participants were able to draw what they saw (Figure 2.3).

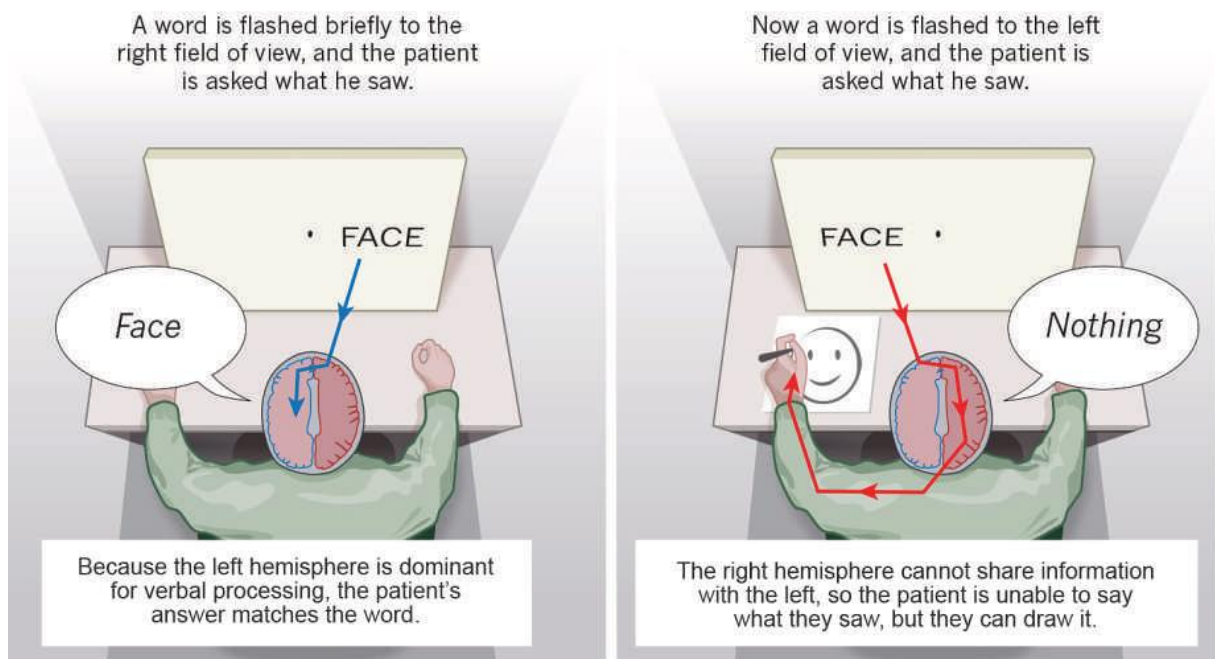


Figure 2.3

- Sperry's split-brain experiments demonstrated that the corpus callosum is required for full functioning of the brain, and that the left hemisphere is responsible for understanding language and speech articulation, while the right hemisphere can recognise language, but is unable to verbally articulate it.

Beyond the syllabus

After having her corpus callosum severed during neurosurgery to manage her epilepsy, Karen Byrne's left hand began behaving independently and continually slapped her face violently, as if it had a mind of its own. Karen was diagnosed with **alien hand syndrome**, characterised by a person no longer having conscious control over one of their limbs. In Karen's case, it was her left hand and occasionally her left leg.

The left hemisphere tends to dominate over the right hemisphere when it comes to having the final say over actions we carry out. This makes sense when we consider the left hemisphere has a greater role in reasoning and logical thinking. Severing the corpus callosum caused a power struggle between Karen's hemispheres with the right hemisphere fighting to have control. Having contralateral control of the left arm and leg, Karen's left hand would engage in self-oppositional behaviour including unbuttoning her shirt immediately after she buttoned it up with her right hand, stubbing out a lit cigarette Karen had placed on an ashtray, and hanging up the phone after Karen had dialled the number.

As is typical with alien hand syndrome, Karen did not feel as if her left hand belonged to her, and it performed voluntary complex goal-directed behaviour such as taking items out of her handbag. Not being aware of this behaviour led to Karen losing belongings on a regular basis.

While there is no current treatment for the syndrome, Karen's doctors did manage to source a medication that allowed Karen's right hemisphere to be brought back under some degree of control after eighteen years of suffering from alien hand syndrome. Dr Michael Mosley interviewed Karen Byrne in his three-part BBC documentary *The Brain: A Secret History*.



Figure 2.4 Karen Byrne's left hand aggressively slapping her in the face after neurosurgery.

Alien hand syndrome can fall into numerous categories:

- Alien hand sign: the feeling an individual has that their hand is not their own.
- Intermanual conflict: one hand performs actions that contradict the actions of the other hand.
- Syndrome of anarchic hand: the affected hand performs goal-directed actions out of the individual's control.
- Levitating hand: the affected hand levitates on its own without conscious choice.

Those with alien hand syndrome have been known to perform self-groping behaviour, and in extreme cases, suffocating and choking.

Roger Sperry's split-brain tests demonstrated that each hemisphere contains a somewhat separate consciousness, a concept evident in people with alien hand syndrome.

WALTER FREEMAN (1936-1945) – ROLE OF THE PRE-FRONTAL CORTEX USING FRONTAL LOBOTOMY

- Walter Freeman, with the assistance of James Watts, was the first person to perform a frontal lobotomy in the USA and used the media to help propel the popularity of this procedure. Freeman claimed that mentally ill people were obsessed with their own problems due to being too self-aware and having overactive emotions.
- He believed the thalamus was the centre of human emotion, and therefore the source of mental illness symptoms, and that severing the neural connections between the thalamus and pre-frontal cortex would eliminate excessive emotions and stabilise personality.
- Freeman and Watts used local anaesthesia on their patients so that they were able to respond to tests and report their feelings and ideas during the procedure.
- The patient's scalp was shaved and markings were drawn on the sterilised scalp. Incisions were made on the left and right side of the frontal lobes and a pair of clamps held the shaft of a knife that was inserted into the incisions and moved in wave-like motions. The knife cut the bundles of nerve fibres connecting the pre-frontal cortex (front part of the frontal lobes) and the thalamus of the brain (Figure 2.5).
- The pre-frontal cortex is responsible for complex functions that include reasoning, decision making, and the expression of personality. Freeman's main goal was to reduce agitation in participants, and while that was the consequence for many patients, others also developed apathy (a lack of interest), decreased concentration and a numbness in emotional response.
- Advances in the development of antipsychotic medications and knowledge of the many patients who suffered due to the procedure led to the decline of Freeman's reputation and the decline in popularity of the lobotomy procedure.

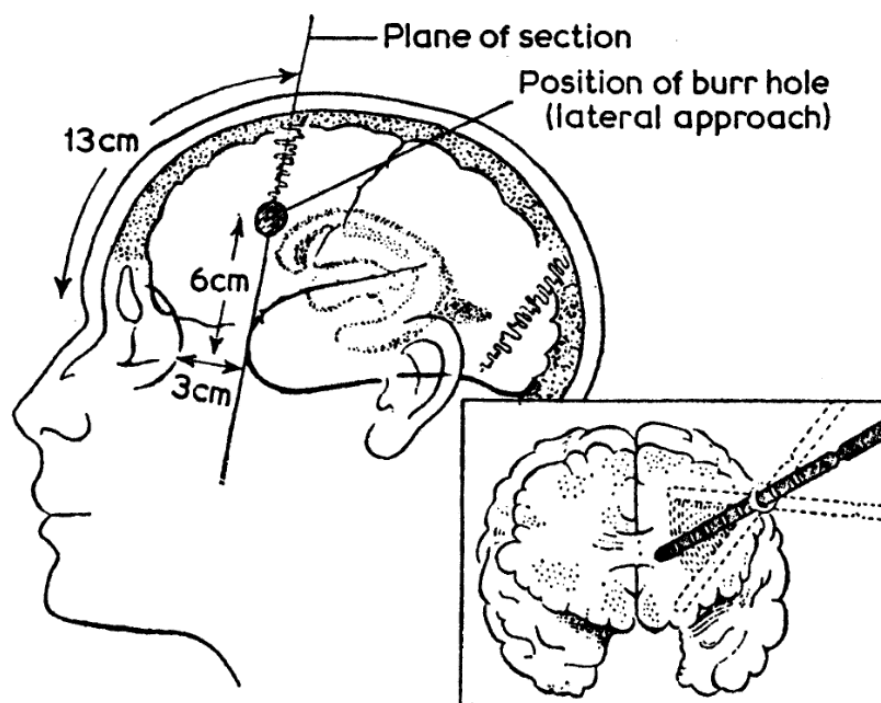


Figure 2.5 Diagram showing the position of burr holes made in the skull and the sweeping motions the knife makes when cutting the nerve fibres between the pre-frontal cortex and thalamus of the brain.

Question 1

- (a) Identify the type of research used in the study of Phineas Gage. (1 mark)

- (b) Identify whether results can be generalised from the study of Phineas Gage and provide a reason for your response. (2 marks)

- (c) Apply the findings from Phineas Gage to explain the localisation of brain function. (3 marks)

Question 2

- (a) Describe the human participants used in Sperry's split-brain experiments. (1 mark)

- (b) Outline the findings Sperry made in relation to speech production. (2 marks)

- (c) Provide the conclusion Sperry made in terms of the importance of the corpus callosum. (1 mark)

Question 3

- (a) Explain why patients of Freeman and Watts were placed under local anaesthetic rather than general anaesthetic. (3 marks)

- (b) Describe the rationale Freeman gave for performing frontal lobotomies. (3 marks)

- (c) List **three** side effects many patients who had a frontal lobotomy experienced. (3 marks)

One: _____

Two: _____

Three: _____

APPLICATIONS OF CONTEMPORARY METHODS TO IMPROVE KNOWLEDGE OF BRAIN STRUCTURE AND FUNCTION



Key teaching points	Learn	Revise	Demonstrate
Biological psychology			
• Applications of contemporary methods to improve knowledge of brain structure and function			
◦ Electroencephalogram (EEG)			
◦ Computed tomography (CT)			
◦ Magnetic resonance imaging (MRI)			
◦ Functional magnetic resonance imaging (fMRI)			

APPLICATIONS OF CONTEMPORARY METHODS TO IMPROVE KNOWLEDGE OF BRAIN STRUCTURE AND FUNCTION

Still pictures: single static images that are two-dimensional.

- Computed tomography (CT) and magnetic resonance imaging (MRI) are two scanning techniques that produce still pictures.

Dynamic pictures: three-dimensional images that change in real time.

- An example of a scanning technique that produces dynamic pictures is functional magnetic resonance imaging (fMRI).

Structural imaging: neuroimaging techniques producing scans showing brain structure.

- CT and MRI techniques are used to determine structural details of the brain including areas of tissue damage, brain atrophy (loss of neurons and neural connections), fluid filled spaces, enlarged regions, bleeding in the brain, cracks in the skull, and the size and location of tumours. Figure 3.1 shows how MRI can portray structural abnormalities in the brain.

Functional imaging: neuroimaging techniques producing scans showing brain function in real time.

- An example of a scanning technique that displays brain activity in real time is fMRI.

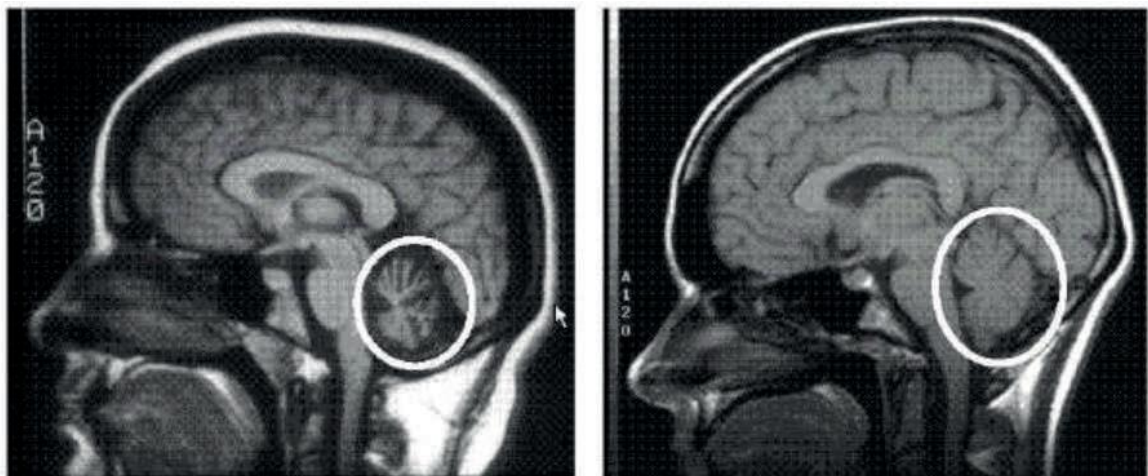


Figure 3.1 These MRI scans are of two different people, each with the cerebellum circled. The scan on the left shows cerebellar degeneration where atrophy of neurons have caused shrinkage of the cerebellum. The brain on the right shows a typical cerebellum.

Temporal resolution: ability to detect when brain activity occurred.

- The greater the ability to detect rapid changes in brain activity, the higher the temporal resolution. For example, EEG is a technique that has high temporal resolution because changes in brain waves within milli-seconds can be identified.
- When trying to assess activity of a brain region during a task, high temporal resolution indicates exactly when the activation occurred.
- One way to remember that temporal resolution refers to the timing of brain activity is to think of the word 'tempo', a musical term referring to speed.

Spatial resolution: ability to differentiate which specific part of the brain is active.

- While EEG has high temporal resolution, it has low spatial resolution since the exact location of neural activity cannot be displayed.
- A method that has high spatial resolution is fMRI which can pinpoint the location of neural activity with millimeter precision. However, fMRI has low temporal resolution given that the specific time activity occurred is unattainable.
- When trying to remember the difference between temporal and spatial resolution, think of the term 'space' for spatial resolution as it implies the specific area of the brain that is active.

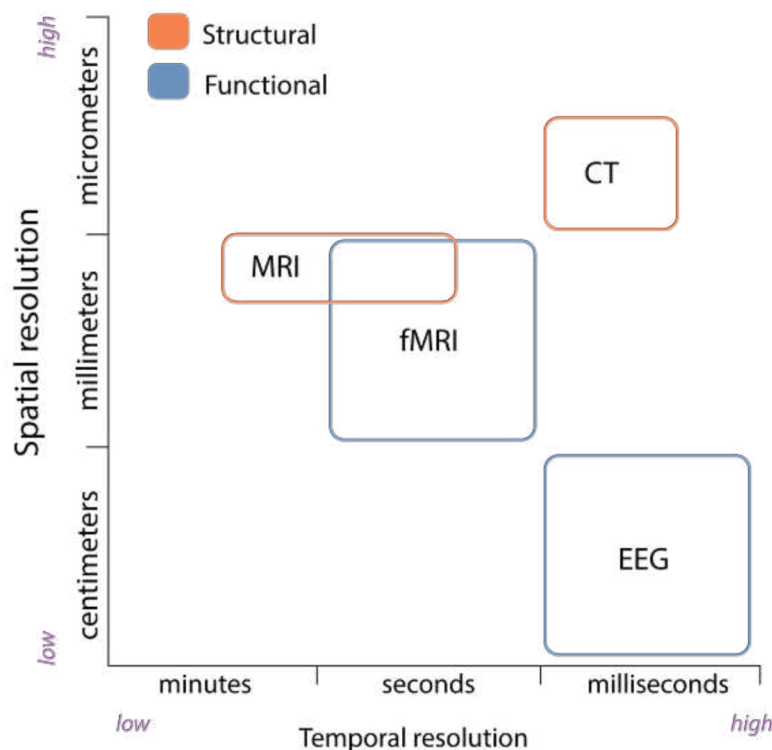


Figure 3.2 Graph showing relative temporal and spatial resolutions of common neuroscience methods. The cell body of a motor neuron is approximately 100 micrometers (μm) in diameter.

ELECTROENCEPHALOGRAM (EEG)

- EEG is a functional technique that shows brain activity in real time.

How it works

- Electrodes are placed on the scalp and electrical activity (brain waves) in the brain is detected, then carried via wires to an EEG recording machine where it is displayed (Figure 3.3).
- Electrical changes within thousands of neurons are detected at the same time (rather than from single neurons).



Figure 3.3 The monitor displays electrical activity detected by each electrode placed on the scalp.

Uses

- Able to help diagnose epilepsy and other seizure disorders.
- EEG recordings can be analysed for sleep research.
- Shows which part of the brain is being utilised during mental tasks.
- Can be used to confirm whether an individual in a coma is brain dead.

Strengths

- Has high temporal resolution, meaning it can detect rapid changes in brain waves (within milliseconds).
- It is a safe and non-invasive process as electrical activity is measured; electricity is not run through the body.

Limitations

- Has low spatial resolution, meaning that the precise location of neural activity is not clear. While the conductive gel helps increase temporal resolution, it also reduces the spatial resolution – as does the scalp, skull and thick membrane surrounding the brain.
- It can be a messy procedure as conductive gel is placed on each electrode which is then pressed onto the scalp.

COMPUTED TOMOGRAPHY (CT)

- This structural neuroimaging technique produce still pictures.

How it works

- A rotating x-ray beam moves 360 degrees around the patient while taking multiple x-ray images.
- A computer pieces together the many two-dimensional x-rays and produces a three-dimensional reconstruction that the technician can scroll through to view 'slices' of the brain.

Uses

- Can check for fractures in the skull (better defines bone fractures than MRI scans).
- Can be used to diagnose brain tumours and aneurysms.
- Can be used to measure the size of a brain tumour.
- Can help assess brain injury from trauma (bleeding of the brain, or fluid filled spaces).

Strengths

- Patients with pacemakers (or other metal in the body such as aneurysm clips) can have this scan.
- CT scans can image bone, soft tissue and blood vessels at the same time (unlike MRI scans which do not show bone as clearly).

Limitations

- Patient is exposed to ionising radiation – this can slightly increase the likelihood that they will develop cancer later in life.
- This scan is not suitable for pregnant women as the ionising radiation may damage the foetus.

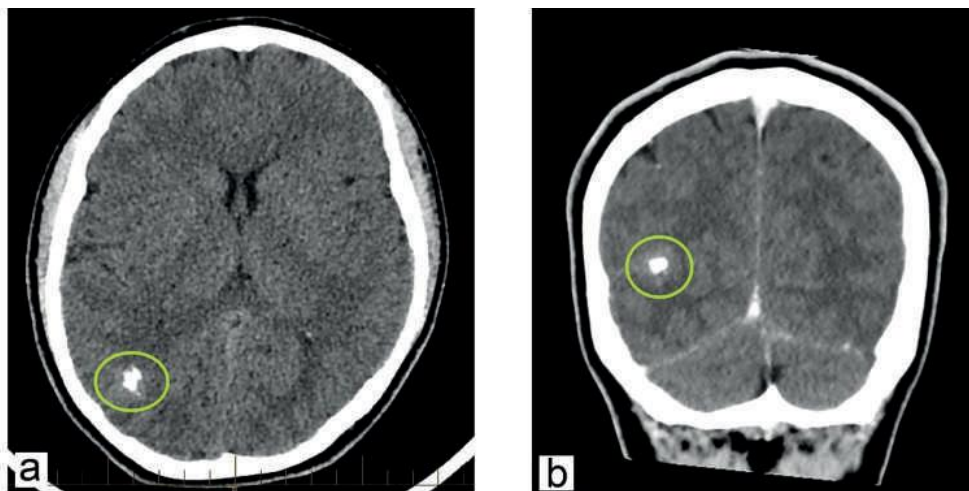


Figure 3.4 CT scans of an individual showing a tumour in the right occipital lobe. Look at the scans as if you are looking in the mirror – the right side of the brain is on the left side of the scan. Image (a) shows a 'slice' on the axial plane – moving from the top of the head, down to the brainstem, image (b) shows a 'slice' on the coronal plane – moving from the face to the back of the head. The tumour is circled in green.

MAGNETIC RESONANCE IMAGING (MRI)

- This structural neuroimaging technique produce still pictures.

How it works

- This type of scan uses a strong magnetic field and radio waves to produce pictures of the brain.
- The magnetic field lines up the protons (positively charged particles) in hydrogen atoms then short bursts of radio waves tip the protons out of alignment.
- As the protons realign, they release radio signals which are detected in the scanner. Different structures (such as tissue and bone) produce different signals, allowing them to be distinguished in pictures.

Uses

- Can be used to diagnose brain tumours and aneurysms.
- Can be used to measure the size of a brain tumour.
- Can help assess the effects of a stroke.
- Can help assess brain injury from trauma (bleeding of the brain, or fluid filled spaces).

Strengths

- More detailed pictures are formed than those produced by CT scans (better at detecting soft tissues – such as brain tumours).
- Does not expose the patient to ionising radiation (is safer for pregnant mothers to use than CT scans, although it is not recommended during the first trimester of pregnancy when the foetus' organs are forming).

Limitations

- Patient cannot have magnetic metal on or in the body (such as a pacemaker).
- Some MRI scanners produce loud banging noises and require ear protection to be worn – the noise may also cause distress in some patients.

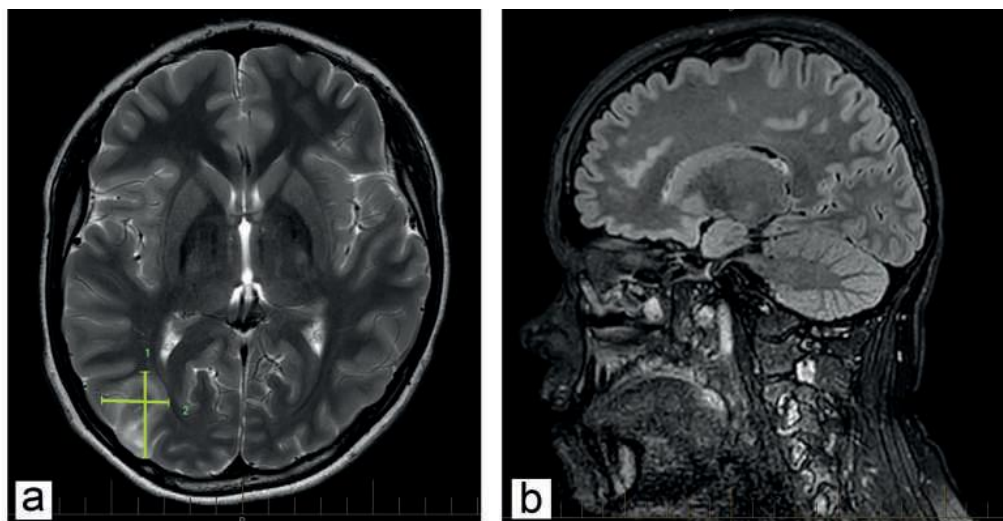


Figure 3.5 MRI scans of an individual with a tumour in the right occipital lobe. The green lines in image (a) measure the length and height of the tumour. Image (b) shows a 'slice' on the sagittal plane – moving from one side of the face to the other.

FUNCTIONAL MAGNETIC RESONANCE IMAGING (fMRI)

- This functional neuroimaging technique produces dynamic pictures.

How it works

- This type of scan uses a strong magnetic field and radio waves to show where neurons are consuming oxygen in the brain in real time.
- The scanner creates a three-dimensional map of the brain broken up into tiny 'volume blocks' called voxels. When neurons in the brain communicate with each other through electrical impulses and neurotransmitters, energy is used (metabolic change occurs). Oxygen rushes to the area through the blood causing the voxel to change colour and become red, and the voxel colour returns to normal once the body stops rushing oxygen to the active neurons.
- The scanner detects the colour change because blood that is high in oxygen has iron and is more attracted to magnets than blood that is low in oxygen. The difference in magnetism is shown as shades of light and dark and is called the BOLD signal (blood oxygen level dependent signal). The higher the BOLD signal, the greater the oxygen level in the blood.

Uses

- Can show the parts of the brain that are active when a patient is performing a task.
- Is used to help plan for tumour removal surgery. The patient is asked to do tasks that cause changes in areas of the brain responsible for producing speech, the surgeon can map where this area is and avoid it during surgery.
- Can help assess the effects of a stroke.
- Can detect the brain activity of patients with neurological conditions such as Parkinson's disease.

Strengths

- Has high enough spatial resolution for the scans to determine the location of neural activity, down to a few cubic millimetres.
- Does not expose the patient to ionising radiation.

Limitations

- Patient cannot have magnetic metal on or in the body (including some types of cochlear implants, aneurysm clips and pacemakers).
- Has temporal resolution lower than CT and EEG methods, meaning the scan takes longer to detect changes in neural activity. This is because the BOLD signal relies on the body's response to metabolic changes. While the EEG can detect electrical activity within the milli-second, fMRI may take around two seconds.

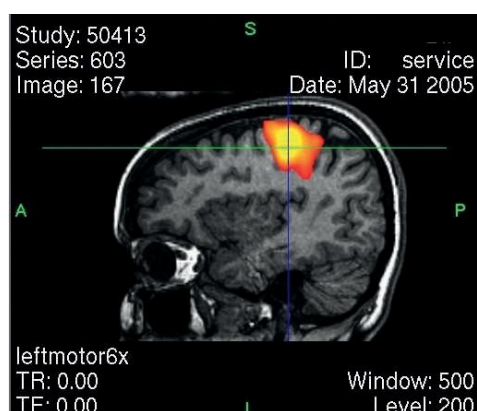


Figure 3.6 fMRI taken when patient touches their fingers of the right hand together, thus causing activity in the left parietal lobe.

Question 1

- (a) Compare MRI and fMRI scanning techniques. Provide **one** difference and **two** similarities. (3 marks)

Difference: _____

Similarity: _____

Similarity: _____

- (b) After experiencing headaches and blacking out for several months, Casey, who is five-months pregnant, is given a referral by her GP to have an MRI scan. Identify and explain **two** reasons why her GP has requested she have an MRI on her head, rather than a CT scan. (4 marks)

One: _____

Two: _____

- (c) Outline what is measured during an EEG. (1 mark)

Question 2

- (a) During an fMRI scan, the consumption of a particular substance is being detected. Name this substance. (1 mark)

- (b) One benefit of the fMRI scan is its high spatial resolution. Describe what spatial resolution refers to. (1 mark)

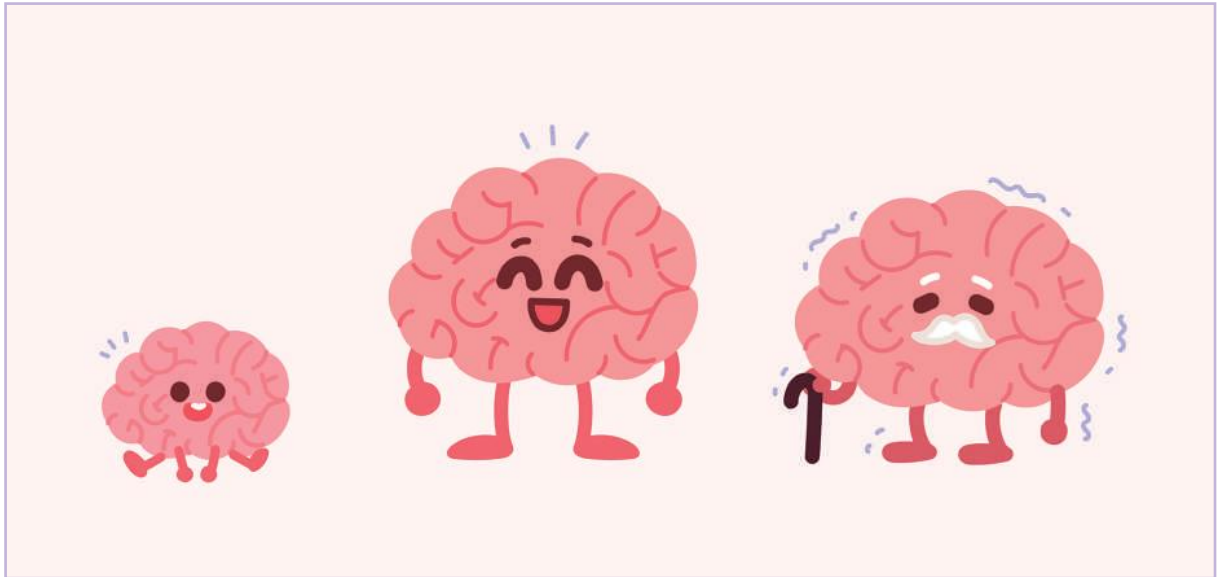
- (c) One limitation of the fMRI scan is its low temporal resolution. Describe what temporal resolution refers to. (1 mark)

- (d) Suggest **two** factors that reduce the spatial resolution of an EEG. (2 marks)

One: _____

Two: _____

BRAIN PLASTICITY



Key teaching points	Learn	Revise	Demonstrate
Lifespan psychology			
• Role of brain plasticity in infancy and adolescent development			
◦ Adaptive and developmental plasticity			
◦ Infancy			
• Stages of plasticity – proliferation, migration, circuit formation, synaptic pruning, myelination			
◦ Adolescence			
• Effect of changes in brain structures on behaviour and emotion – cerebellum, amygdala, corpus callosum, frontal lobe			
• Effect of changes in frontal lobe development on behaviour and emotion – pre-frontal cortex			

ROLE OF BRAIN PLASTICITY IN INFANCY AND ADOLESCENT DEVELOPMENT

Brain plasticity: the ability of neural connections to grow and reorganise.

Developmental plasticity: the ability of neural connections in the brain to reorganise in response to sensory input from the environment.

- A baby practising a motor skill, such as turning the wheels of a toy truck, is an example of developmental plasticity whereby the brain is functionally reorganised (Figure 4.1).



Figure 4.1

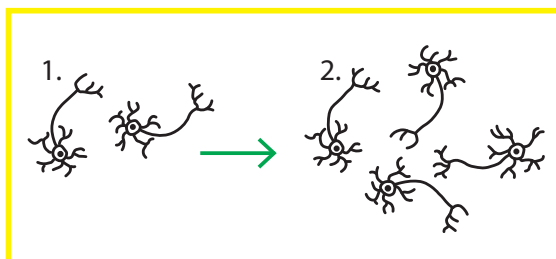
Adaptive plasticity: the ability of neural connections in the brain to reorganise in response to learning new information, or to compensate for lost functions and take advantage of remaining functions.

- An example of adaptive plasticity would be a stroke patient suffering from Broca's aphasia due to damage to Broca's area in the left frontal lobe. While spontaneous speech is initially diminished, over the next three months, the brain experiences a state of heightened plasticity and neural connections are rearranged and re-established. Speech therapy during this period has the greatest impact on rehabilitation.
- Infants who experience brain injuries recover more fully than adults who experience similar injuries because the brain's plasticity is greatest during the first few years of life. As brain regions are not yet specialised in the developing brain, other areas of the brain can take over the function of damaged areas.

STAGES OF PLASTICITY DURING INFANCY

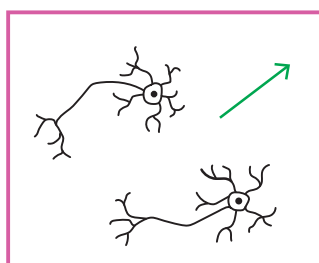
Proliferation

- Proliferation is the growth and division of cells, including neurons, that leads to the increase in total cell number.
- While most neurons are already formed when the infant is born, some neurons are still created during infancy.
- *Note: there is continuing debate over whether the production of new neurons continues in childhood and throughout adulthood. Observing the production of new neurons in humans is highly complex as high-quality samples of brain tissue are not readily accessible and the samples show neurons at only one point in time.*



Migration

- While an infant is born with around 100 billion neurons, there are still neurons being generated after birth from deep inside the brain.
- Newly generated neurons move throughout the brain until reaching their final position; this positioning allows for connections between neurons (neural circuits) to be made.
- Neurons migrate by following chemical trails laid down by other neurons, or by moving along scaffolding fibres in the brain.
- Research has shown that the migration of neurons ends around the age of five months.



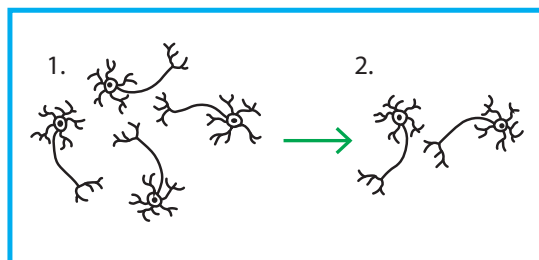
Circuit formation

- After neurons have migrated, they are able to form neural circuits whereby neurons send electrochemical messages between each other. These connections can be within clusters of neurons, as well as over larger distances within the brain.
- During infancy, neural circuits develop rapidly, especially in the primary sensory cortex and primary visual cortex.



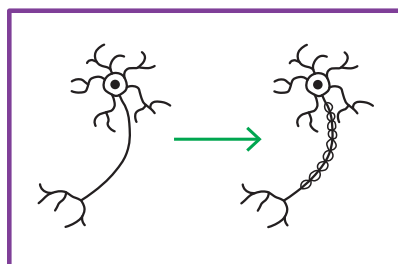
Synaptic pruning

- As infants are born with more neurons than required, neurons that do not form active neural connections with other neurons die.
- Synaptic pruning increases the efficiency of the nervous system by allowing remaining neural connections to strengthen and grow in complexity.



Myelination

- A fatty substance called myelin starts growing over the axons of neurons, insulating neural connections, and allowing for faster and more efficient nerve impulse travel throughout the brain.
- Myelination contributes to the dramatic brain growth typical in infants.
- Myelination begins in the spinal cord, then in the hindbrain, midbrain, forebrain and, finally, in the peripheral nervous system.



THE ROLE OF BRAIN PLASTICITY IN ADOLESCENCE

- Circuit formation continues during childhood and by approximately age eleven in females, and twelve in males, the volume of grey matter is at its maximum.
- Synaptic pruning continues throughout adolescence and into early adulthood, increasing brain efficiency and specialisation of brain areas in response to sensory experiences.
- Loss of grey matter as a result of synaptic pruning progresses from the back to the front of the brain, with the pre-frontal cortex being the last to structurally change.
- The neural connections that remain after synaptic pruning undergo myelination, and while this process occurs in a few areas of the brain during adolescence, it does not occur in the pre-frontal cortex until approximately age twenty.
- While young children can perform goal-directed behaviour through planning, attention and impulse control, these executive functions controlled by the pre-frontal cortex are not able to be consistently used until brain plasticity occurs during adolescence.

EFFECTS OF CHANGES IN BRAIN STRUCTURES ON BEHAVIOUR AND EMOTION

Cerebellum during adolescence

- During adolescence, the cerebellum continues to grow in volume with total volume being reached at approximately twelve years of age in females, and fifteen in males.
- In addition to the increase in volume, synaptic pruning affects behaviour and emotion in adolescence, the influence being significant since the cerebellum, taking up only 10% of the brain volume, consists of more than 50% of the total neurons in the brain.
- Activity in the cerebellum has been linked to decision-making, reward learning, motivation, emotional control, and processing mood. It is therefore understandable that teenagers who are yet to have a fully grown cerebellum typically display impulsive decision-making and have some difficulties regulating their emotions.

Corpus callosum during adolescence

- The thickness of the corpus callosum increases during adolescence through the process of myelination, however, rather than the corpus callosum growing uniformly across the structure, various regions grow at different rates. Research suggests hormonal surges during adolescence may account for these growth patterns.
- As the neural networks within the corpus callosum strengthen, leading to a stronger connection between the two hemispheres, behavioural and emotional regulation continue to improve.

Amygdala during adolescence

Amygdala: a collection of nuclei deep within each temporal lobe that play a role in emotional response (including modulation of fear) and the immediate behavioural reactions as a response to emotion.

- The amygdala grows in volume during adolescence, thought partly to be due to pubertal changes.
- In adults, the pre-frontal cortex regulates the amygdala, but during adolescence this is not the case as the prefrontal cortex is still developing, as are the connections between the amygdala and pre-frontal cortex. Instead of the pre-frontal cortex leading actions based on rational and logical thinking, the volatile amygdala guides many of the automatic actions.
- The amygdala is highly reactive to emotional stimuli such as the facial expressions of other people, and situations perceived to be stressful. This leads to teenagers being more likely to misinterpret emotions of others and social cues and consequently get into accidents or behave inappropriately without thinking before they act. Another example of an immediate reaction to emotions, such as fear, is aggressive behaviour toward other people.

Frontal lobes during adolescence

- The frontal lobes evaluate emotions and use rational thinking when referring to past experiences before responding in a conscious manner. This control of voluntary behaviour is not characteristic of teenagers as these lobes are one of the last regions of the brain to mature. The frontal lobes are not completely myelinated until around the age of thirty, therefore teenagers have less white matter (myelinated axons) in this region compared to adults.
- Myelinated neurons improve connectivity between parts of the brain, and with the frontal lobes not yet fully connected, the reduced ability to integrate information from brain regions affects cognition and emotional processes. The connection between frontal lobes and amygdala, for example, is still strengthening during adolescence, therefore teenagers may exhibit limited impulse control, poor decision-making and planning, and reduced emotional regulation (typically leading to mood swings).

Pre-frontal cortex development during adolescence

- The pre-frontal cortex is the layer of the frontal lobes just beneath the forehead that continues to undergo myelination during adolescence leading to an increase in white matter. In addition to myelination, synaptic pruning continues in the pre-frontal cortex during this period of development, reducing the amount of grey matter and allowing for increasingly complex and efficient connections to be created in the brain.
- Synaptic pruning begins at the back of the brain and continues forward with the pre-frontal cortex being the last part of the brain to develop. This region is responsible for problem solving, attention, and the ability to predict the consequences of behaviours by referring to past experiences, and assessing whether these behaviours will lead to reaching a desired goal. This makes it easier to understand why some teenagers do not seem to assess potential risks and end up engaging in risky and dangerous behaviours.
- The ability to regulate emotion continues to improve during adolescence, as too does the ability to recognise emotions in other people.

Question 1

- (a) Explain how synaptic pruning increases the efficiency of the nervous system. (2 marks)

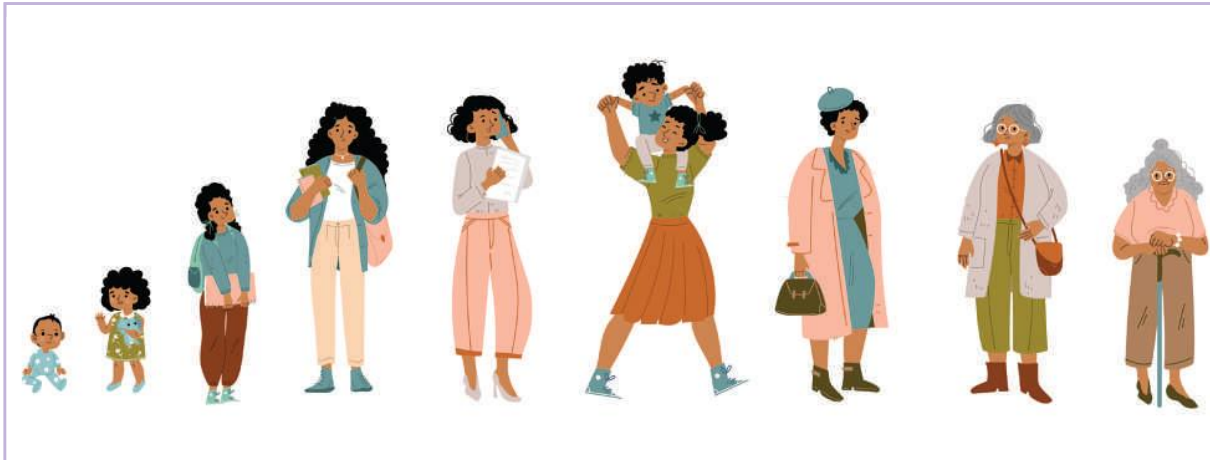
- (b) Explain why emotional regulation and impulse control are processes that adolescents tend to struggle with. (2 marks)

- (c) Define the term 'brain plasticity'. (1 mark)

- (d) At approximately what age does the migration of neurons end? (1 mark)

- (e) Explain why adaptive plasticity occurs more easily in the brain of infants than in the adult brain. (3 marks)

DEVELOPMENTAL STAGES ACROSS THE LIFESPAN



Key teaching points	Learn	Revise	Demonstrate
Lifespan psychology			
<ul style="list-style-type: none"> Developmental stages across the lifespan – prenatal, infancy, childhood, adolescence, early adulthood, middle age, older age 			
<ul style="list-style-type: none"> Changes across developmental stages 			
<ul style="list-style-type: none"> Physical (gross and fine motor skills) 			
<ul style="list-style-type: none"> Cognitive (language) 			
<ul style="list-style-type: none"> Social and emotional development 			

DEVELOPMENTAL STAGES ACROSS THE LIFESPAN

Lifespan psychology: the study of continuity and change throughout the lifespan.

- The table on the following pages shows the development of physical, cognitive, social and emotional domains.
- Physical development will be described in terms of fine and gross motor skills.
 - **Fine motor skills:** skills involving the small muscle movements of the body, for example, writing with a pen, which uses small muscles in the hand.
 - **Gross motor skills:** skills involving the large muscle movements of the body, for example, walking, which uses the large muscles in the legs.



Figure 5.1 The gluteus medius (muscles on the outer pelvis), quadriceps (large muscles at the front of the thigh) and hamstrings (muscles located at the back of the thigh) are used when balancing on one leg. This action is an example of a 'gross motor skill' that utilises large muscles of the legs.

- Cognitive development refers to changes in the ability to think and reason, which includes changes in language.
 - **Verbal fluency:** the ability to produce words that are retrieved from memory.
 - **Tip-of-the-tongue phenomenon:** an individual knows what they would like to say but are unable to recall the specific word required.
- Social and emotional development, also known as psychosocial development, encompasses changes in a person's view of themselves, their emotions, and their relationships with others.
 - **Self-awareness:** the ability for an individual to observe their thoughts, emotions and behaviours.
 - **Self-concept:** the view an individual has about their beliefs, likes and dislikes, and strengths and weaknesses.
- The domains of development interrelate and may be more dominant in some developmental stages than others.

CHANGES ACROSS DEVELOPMENTAL STAGES




Developmental stage	Physical (gross and fine motor skills)	Cognitive (language)	Social and emotional
Prenatal (conception to birth) 	<ul style="list-style-type: none"> By fourteen weeks the foetus is able to curl their toes, suck their thumb, and move their arms and legs. Small muscles in the face are used to smile and grimace. 	<ul style="list-style-type: none"> Unborn babies of thirty weeks listen to their mothers talk and learn speech sounds. 	<ul style="list-style-type: none"> Some research has suggested that the foetus can sense and react to their mother's emotions.
Infancy (birth to 1 year) 	<ul style="list-style-type: none"> Gross motor skills are used when babies hold their head up when lying on their stomach, when they roll over, crawl, sit without support, stand up and walk. Fine motor skills are used when small muscles in the face create facial expressions. Fine motor skills are used when the baby grasps reflexively to anything that touches the palm of their hand (Figure 5.2), when they pick up items between their index finger and thumb (pincer grip), shown in Figure 5.3, and poke with their index finger. 	<ul style="list-style-type: none"> Show a desire to communicate with others. Infants can read and react to facial expressions from their caregivers. Infants use vocalisations (cooing), babbling, cries, gestures and facial expressions to communicate their needs. 	<ul style="list-style-type: none"> At around two months, infants start smiling at people; at four months, like to play with others, at six months, start responding to the emotions of others; at nine months, is clingy with primary caregivers; at one year, plays games (such as peek-a-boo), has favourite people, and is shy around strangers. Imitates facial expressions of others. Forms attachments with primary caregivers. Infants give and accept toys with each other. The first emotions recognised in babies are anger, sadness, fear and joy.



Figure 5.2 A four-week-old infant using the grasp reflex to hold onto his mother's finger.



Figure 5.3 The pincer grip being used by a one-year-old to pick up pieces of food.





Developmental stage	Physical (gross and fine motor skills)	Cognitive (language)	Social and emotional
Childhood (1 to 12 years) 	<ul style="list-style-type: none"> Children of one to two years of age use fine motor skills when using a spoon, scribbling with a pen, unzipping zippers. Gross motor skills are used to walk up steps, run, kick or throw a ball, and climb on furniture. By age five, children use gross motor skills to hop, swing, catch a bounced ball, ride a tricycle, run easily and walk up and down stairs. Fine motor skills are used to turn book pages, use scissors, write some letters and numbers, turn door handles and use a fork and spoon. 	<ul style="list-style-type: none"> Around age one, babies may use partial words ('da' instead of 'dad'), and vocabulary rapidly grows to around fifty words. By age three, vocabulary includes around 200 words, sentences of three or four words are used. By age five, children can speak clearly, tell simple stories, and understand basic grammar rules. By age eleven, children have a vocabulary of around 19,000 words. 	<ul style="list-style-type: none"> Between fifteen months and two years of age, children begin displaying self-awareness by recognising themselves in the mirror (Figure 5.4). By age two, children show affection to those they are familiar with, engage in pretend play, will have temper tantrums, and play alongside children (rather than with them). By age five, children cooperate with other children, take turns in games, show a range of emotions, tell people about their interests, and play with other children. Children develop self-concept, as this develops, they show complex emotions such as surprise, shame, guilt, embarrassment and emotional responses such as jealousy. Self-esteem develops and is generally high and then starts to decline around age twelve. Children between six to twelve form relationships with people outside of the family.

Beyond the syllabus

The rouge test is used to assess whether a young child is able to recognise themselves in the mirror. After placing a smudge of lipstick on the child's forehead without them noticing, the child is placed in front of a mirror (Figure 5.4). If the child notices the lipstick on their forehead in their reflection and attempts to wipe it away, the child has demonstrated self-awareness.



Figure 5.4

Developmental stage	Physical (gross and fine motor skills)	Cognitive (language)	Social and emotional
Adolescence (12 to 20 years) 	<ul style="list-style-type: none"> • Adolescents should be able to use fine motor skills to sew, write, draw and play an instrument requiring fine muscle coordination (e.g., piano, guitar). • Gross motor skills become developed enough to play adult sports. 	<ul style="list-style-type: none"> • Improvement in language comprehension. • Able to comprehend abstract language such as similes and idioms. • Vocabulary continues to increase. 	<ul style="list-style-type: none"> • Twelve-year-olds are getting better at regulating their own emotions. • Adolescents have an increased understanding of their self-concept. • Mood becomes unpredictable. • More time is spent with friends than with family.
Early adulthood (20 to 40 years) 	<ul style="list-style-type: none"> • Motor skills operate at their best. • Good control over fine motor movements. 	<ul style="list-style-type: none"> • Improvement in the knowledge of words and their meanings. • Verbal fluency starts to decline after age thirty-five. 	<ul style="list-style-type: none"> • Intimate relationships tend to form in the mid to late twenties (close friendships or romantic relationships). • Dependence on family decreases.
Middle age (40 to 65 years) 	<ul style="list-style-type: none"> • Older adults find it more difficult to learn and maintain a new motor skill than younger adults (e.g., using a walker to get into a car with no prior experience using a walker). 	<ul style="list-style-type: none"> • Tip-of-the-tongue phenomenon increases with age. • Improvement in the knowledge of words and their meanings. • Verbal fluency continues to decline. 	<ul style="list-style-type: none"> • Decrease in negative emotions, (e.g., anger) and an increase in positive emotions, (e.g., contentment). • Individuals may experience a 'mid-life-crisis' where they desire to feel youthful, want to spend more time alone, or wish to spend more time with particular people. • Fifty-one is the average age women experience menopause. Mood swings may occur.
Older age (65+ years) 	<ul style="list-style-type: none"> • Control over fine motor movements decline. • Gross motor movements are performed slower. • Complex motor tasks require more brain activity than they used to. 	<ul style="list-style-type: none"> • Tip-of-the-tongue phenomenon continues to increase. • Speed of language processing declines. • Difficulties with language production may occur – slower speech, increased number of fillers (e.g., 'ah', 'er'), and pauses in speech. • Verbal fluency continues to decline. 	<ul style="list-style-type: none"> • It becomes common to have smaller and tighter social networks. • Life experiences have allowed for greater regulation of emotions. • Elderly adults become more dependent on others and may feel depressed, shame and guilt due to this dependency. • Maintaining an active social life increases feelings of self-worth and self-esteem.

Question 1

- (a) Define the term 'lifespan psychology'. (1 mark)

There are domains of development that are more dominant in some developmental stages than others.

- (b) (i) Identify the developmental stage that is characteristic of intensive language growth. (1 mark)

- (ii) During which developmental stage do intimate relationships typically form? (1 mark)

- (iii) Identify the developmental stage during which individuals improve their ability to regulate mood. (1 mark)

- (iv) Peak physical motor skill control is typically characteristic of which developmental stage? (1 mark)

- (c) Contrast gross motor skills and fine motor skills and provide an example of both. (4 marks)

(d) (i) Describe the tip-of-the-tongue phenomenon.

(2 marks)

(ii) Within which developmental stage does the tip-of-the-tongue phenomenon typically start to occur.

(1 mark)

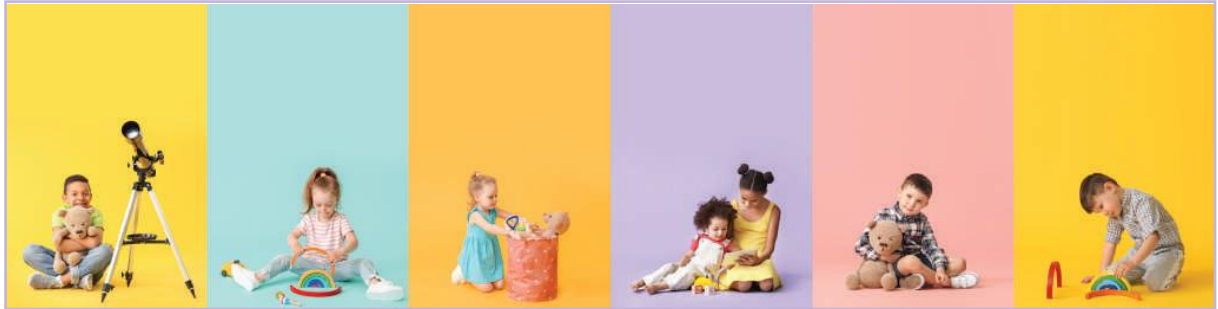
(e) (i) Describe the language development of the foetus.

(2 marks)

(ii) State the developmental domain language falls within.

(1 mark)

PIAGET'S THEORY OF COGNITIVE DEVELOPMENT



Key teaching points	Learn	Revise	Demonstrate
Lifespan psychology			
• Domains of development			
◦ Theory of cognitive development – Piaget (1936)			
• Process of schema formation – assimilation, accommodation, equilibrium and disequilibrium			
• Stages and developmental changes			
– Sensorimotor – object permanence			
– Pre-operational – egocentrism, animism, symbolic thinking, centration, seriation			
– Concrete operational – conservation			
– Formal operational – abstract thinking			
• Use of Piagetian tasks to determine developmental changes			
– Invisible displacement			
– Three mountains			
– Conservation			
– Pendulum problem			

THEORY OF COGNITIVE DEVELOPMENT – PIAGET (1936)

- Jean Piaget recognised that children's cognition differs to that of adults and that as children mature, their intellectual skills change.

PROCESS OF SCHEMA FORMATION

Schemata: experiences of the world organised as mental structures.

- Piaget believed infants are born with a few schemata based on innate reflexes, such as rooting and sucking (Figure 6.1 and 6.2). Soon after birth infants start to develop schemata based on the interaction between senses and motor skills, and over time schemata utilise thinking (cognitive) skills.



Figure 6.1 Stroking the teat of the bottle against the corner of this four-month-old infant's mouth causes him to instinctively turn his head toward it and open his mouth to feed.



Figure 6.2 Once the teat of the bottle touches the roof of his mouth, he starts to suck it. Premature babies sometimes have a weak sucking ability.

- Cognitive development involves the growth and interrelating of schemata that occur through the processes of assimilation and accommodation.

Assimilation: integrating new information into existing schemata without the schemata being altered.

Accommodation: changing existing schemata to integrate new information, or the creation a new schema when integration is not possible.

- Most new information an individual is exposed to can be dealt with using the process of assimilation alone. Assimilating new information gathered through interacting with the world, individuals are kept in a state of balance, or equilibrium.
- No cognitive change occurs during assimilation, because schemata have not been altered.
- However, when an individual is exposed to new information and is unable to assimilate it into an existing schema, a state of disequilibrium, or mental imbalance, is experienced.
- This mismatch between prior knowledge and new information gathered from the environment is instinctively dissatisfying.
- To return to a state of equilibrium, or mental balance, the process of accommodation either 'stretches' existing schemata by incorporating the conflicting information, or creates a new schema if the information differs too greatly to be amalgamated.
- Accommodation produces cognitive change.
- This continual natural drive to seek equilibrium through assimilation and accommodation is what Piaget termed 'adaptation', and this process causes intellectual growth.

Equilibrium: the state experienced when existing schemata (based on prior knowledge) can account for new information.

Disequilibrium: the state experienced when existing schemata are unable to account for new information.

The parents of Mischa, the toddler shown in Figure 6.3, adopted two kittens from a cat rescue and using her senses to see, hear, and smell them, along with the fine muscles in her hands to pet them, she developed a mental representation (schema) for cats. Upon visiting a neighbour a few months later, she was able to interact with her neighbour's cat. Since this cat had very similar characteristics to her pet kittens, the new experience was assimilated into her existing cat schema. Cognitive change did not occur, and she continued experiencing a state of equilibrium.



Figure 6.3

The following week her parents took her to the zoo for the first time. When observing the lions, her parents did not correct her when she called them 'cats', but she noticed they were much larger than cats she had seen before. Mischa was unable to assimilate her experience of lions into her cat schema due to their obvious size difference, and she felt a state of disequilibrium. Using the process of accommodation, she modified the cat schema to account for tiny kittens, through to very large cats (lions) – equilibrium was quickly restored.

The next enclosure housed meerkats, and this time her parents corrected her when she called them 'cats', pointing out that they are meerkats and stand up on their back legs to look around. She tried to assimilate her understanding of meerkats into her existing 'cat' category, but the schema was unable to account for the new information. The characteristics of meerkats made them too different to cats to be successfully integrated into their existing schema, and this assessment caused a state of disequilibrium. She used accommodation to create a new schema specifically for meerkats, thus generating cognitive change and intellectual growth, and she returned to the stable state of equilibrium.

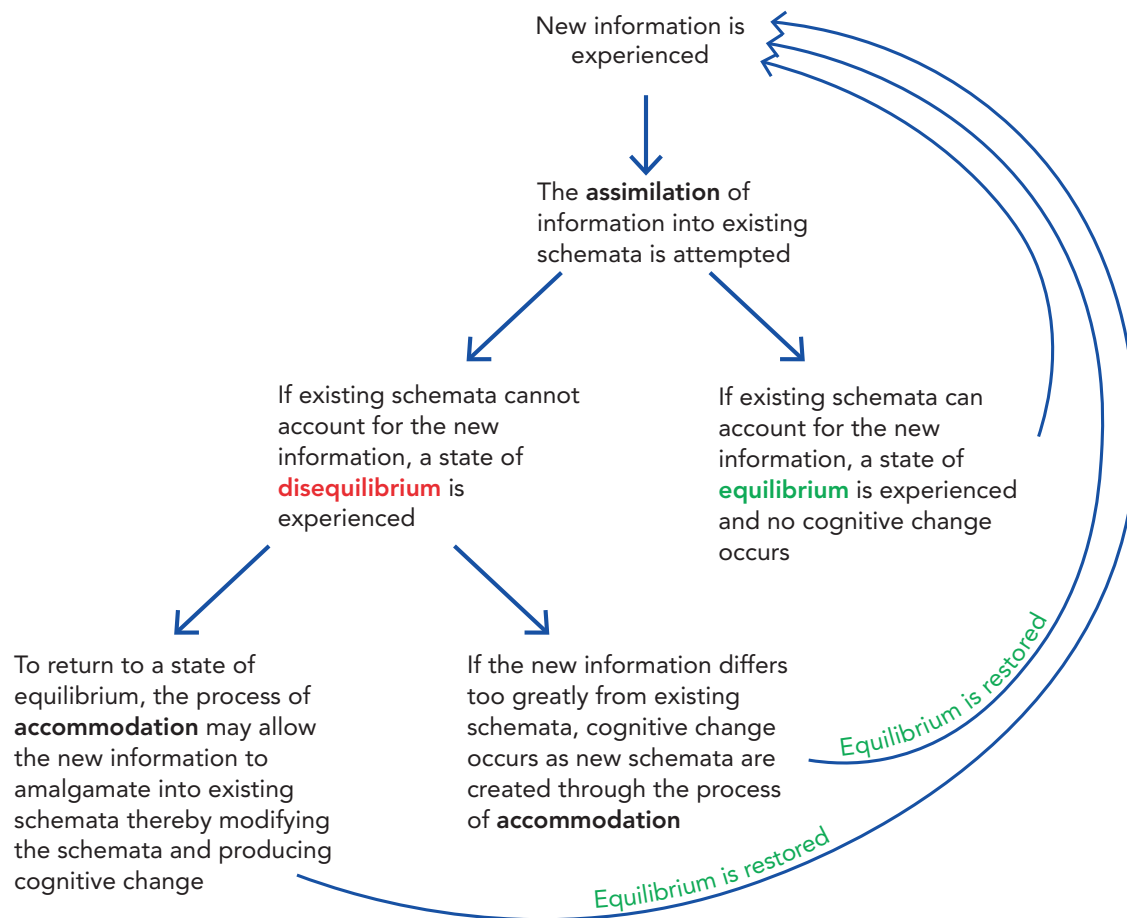


Figure 6.4 Piaget's process of adaptation can be thought of as a continual cycle of incorporating, amending and creating schemata as one comes across new information throughout their life.

STAGES AND DEVELOPMENTAL CHANGES

- Piaget theorised that children move through four stages and in order to pass from one stage to the next, they need to be physically mature and be exposed to appropriate experiences.
- The exposure to these experiences allows children to reach their cognitive potential.
- Each child, regardless of culture, passes through the stages in the same order, and there is no going backwards to earlier stages, except as the result of brain damage.
- Children move through the stages at different rates due to differences in their genetic make-up and exposure to environmental conditions, therefore the provided ages are only approximate averages. Children also experience transitional periods between stages.
- Piaget described numerous cognitive accomplishments children were required to make within each stage before being able to advance to the next stage.

Sensorimotor stage

- 0–2 years
- Fine and gross motor skills are used in combination with the senses.

Accomplishment made

Object permanence: understanding that an object still exists even if it is unable to be touched or seen.

Testing object permanence

- A simple way to test if a child has accomplished object permanence, as shown in Figure 6.5, is by having them watch an object be covered with a tea towel. If the child lifts the tea towel up to retrieve the object, they understand the object still exists even though it is no longer visible.



Figure 6.5

Testing object permanence using invisible displacement

- This Piagetian task is an extension of the simple test described above. In the invisible displacement task, the child witnesses an object being covered by a container and the container then being swapped around with a second, empty container.
- If the child lifts the cup covering the object, they were able to track the item and have accomplished this advanced version of object permanence.
- Figure 6.6 illustrates invisible displacement using a paper cup to cover a ball (1). Image (2) shows the cups being switched around, the cup on the left now covers the ball (3).

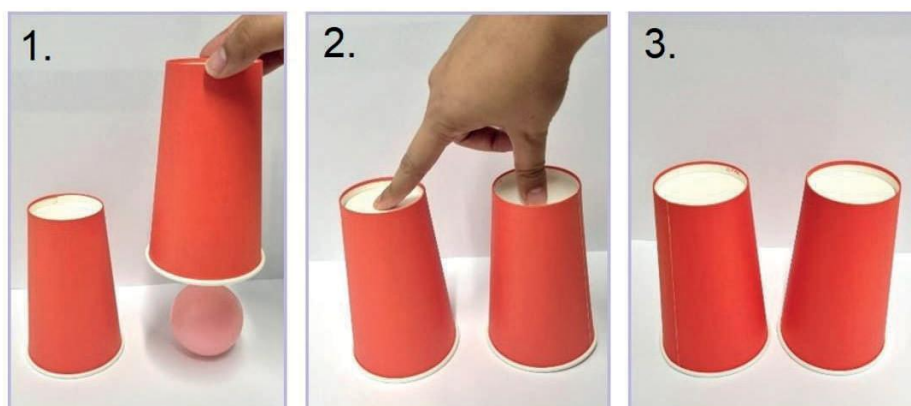


Figure 6.6

Preoperational stage

- 2–7 years
- Children use symbols to represent ideas, such as through language, and engage in pretend play.

Accomplishments made

Symbolic thinking: the use of symbols, such as words or objects, to represent alternative concepts.

- An example of symbolic thinking is a child making a pretend cake with wet sand. The sand symbolises food.

Centration: the ability to only focus on one aspect of a situation at any given time, while disregarding the rest.

- For example, a child focusing on the number of biscuits she and her friend have, but not the size of the biscuits.

Testing centration

- Set up two rows of coins, both with the same number of coins. Ask the child if both rows have the same number of coins, or whether one row has more or less than the other. Slide the top row of coins horizontally so they are spread further apart (Figure 6.7).
- Ask the child again whether both rows are made up of the same number of coins, or if one row has more or less than the other. A child in the preoperational stage will tell you that the top row has more coins than the bottom row. This is because they are unable to comprehend that the number of coins has not changed just because they were moved further apart (conservation). Centration has prevented the child from focusing on more than one concept at a time. They can focus only on the space the coins in the top row take up, assuming there now must be more coins, irrespective of the fact that no extra coins were added.



Figure 6.7

Seriation: the ability to arrange a collection of items or situations in a logical series.

Testing seriation

- A child could be provided with a collection of objects and asked to order them according to size. Figure 6.8 shows how a collection of different size corks (1) can be ordered from smallest to largest size (2).

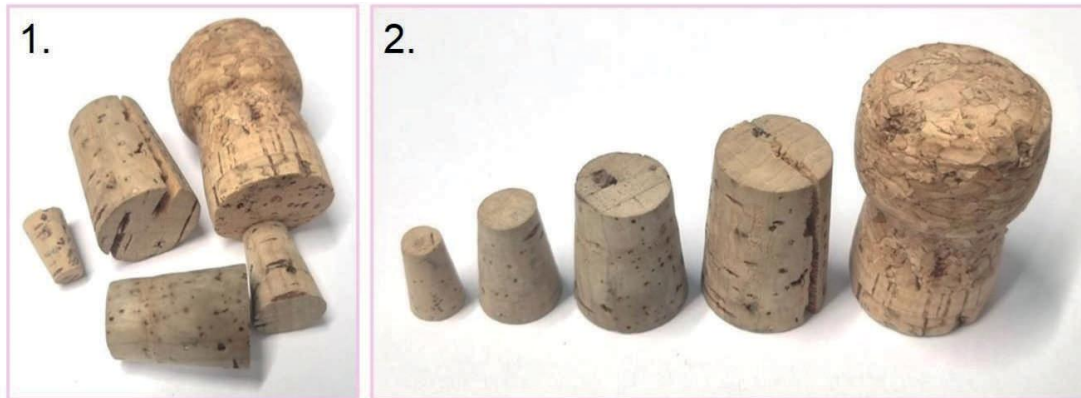


Figure 6.8

Characteristics identified

Egocentrism: the inability to understand the perspective of another person.

The 'three mountain task' to test egocentricity

- The child is shown a model of a mountain range consisting of one mountain topped with snow, one mountain with a hut on top, and a third mountain with a cross on top.
- The child is encouraged to walk around the model and look at it closely.

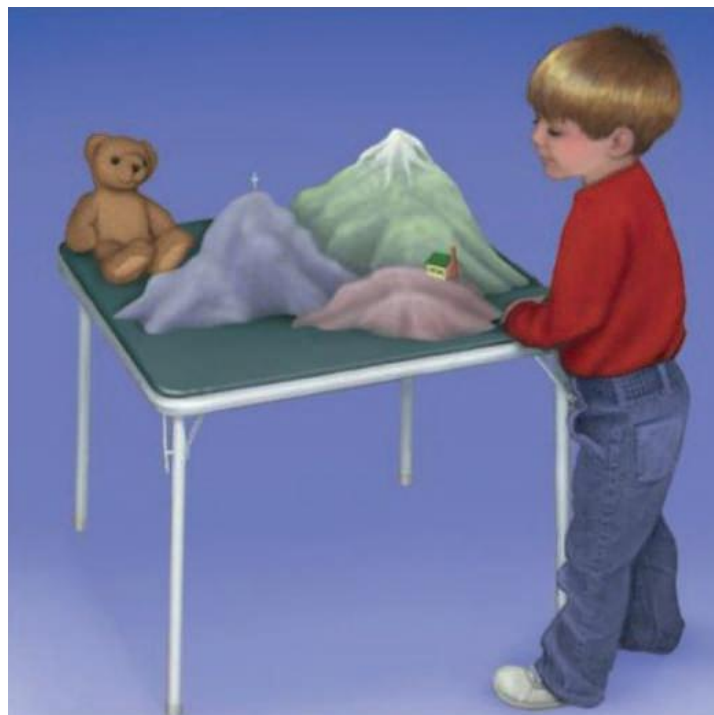


Figure 6.9 In this illustration, a teddy bear has been used instead of a doll.

- The experimenter then places a doll facing the model in multiple locations, and for each location, the child is shown ten pictures of various views of the model, and asked to select the picture that represents how the doll would view it.
- If the child continually selects the picture that matched their own views of the model, then they are unable to consider a viewpoint other than their own and are egocentric.

Animism: the belief that an inanimate object is alive and has feelings. The girl in Figure 6.10 is caring for her teddy bear who she believes is feeling sick.



Figure 6.10

Concrete operational stage

- 7–11 years
- Children begin to reason about mathematics and can perform concrete operations, and start to grasp the concept of conservation.

Accomplishment made

Conservation: mass and volume remain unchanged when the form of an object is altered.

- Centration and conservation are related. Children who focus their full attention on one aspect of a situation and disregard the rest would find it difficult to grasp the notion that changing the appearance of a substance does not alter its basic properties.
- For example, a child who is given a piece of toast but gets upset thinking their sibling, who has their toast cut in half, has more, has displayed centration. The child was solely focusing on the number of pieces of toast and this led to an error in conservation.

Testing conservation of mass

- While the child is watching, make two balls of plasticine of the same size, as shown in Figure 6.11.1. Ask the child if one ball is made up of more plasticine, or if they are made of the same amount of plasticine. Roll one ball of plasticine into a snake-shape Figure 6.11.2. Ask the child if either piece is made up of more plasticine, or if they are both made up of the same amount of plasticine.
- If the child indicates that both are made up of the same amount of plasticine, then they have accomplished conservation of mass.

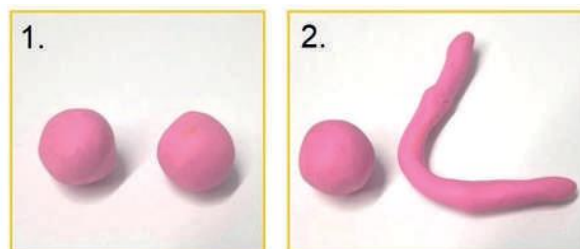


Figure 6.11

Testing conservation of volume

- While the child is watching, pour the same amount of liquid into two short glasses of the same size, as shown in Figure 6.12.1. Ask the child if one glass has more liquid in it than the other, or if they both hold the same amount of liquid.
- Pour one glass of liquid into a tall, skinny glass (Figure 6.12.2). Ask the child if one glass has more liquid in it than the other, or if they both hold the same amount of liquid.
- If the child indicates that both the tall, skinny glass, and the short, wide glass have the same amount of liquid, then they have accomplished conservation of volume.



Figure 6.12

Formal operational stage

- 11+ years
- Children begin to make predictions by reasoning out what might occur, as well imagining hypothetical possibilities.

Accomplishment made

Abstract thinking: using the mind to visualise and consider complex concepts that are not tangible.

- Piaget asked children what the world would be like if humans could live under water. Children in the formal operational stage can imagine such a scenario and ponder possible outcomes.

Testing abstract logical thinking using the pendulum problem

- This Piagetian task demonstrates whether the child has the capacity for abstract logical reasoning.
- The child is tasked with working out which of the following causes a pendulum to swing at different rates; the mass hanging from the string, the length of string, or the height at which the mass is released.
- When a child selects a dependent variable and can use abstract thinking to hypothesise what will occur when alternative independent variables are systematically tested one at a time, then abstract logical reasoning has been demonstrated.
- If the child is unable to show formal scientific reasoning, then they have not demonstrated abstract logical reasoning.
- Figure 6.13 shows the equipment used to run this task in a high school science laboratory.



Figure 6.13

Strengths of theory

- Providing understanding of the difference between the way children and adults learn has helped shape education for children. Child education tends to now be based on their cognitive developmental stages, therefore more suitably catering to their educational needs.
- A great deal of research on cognitive development has since taken place, a large amount of which was inspired by Piaget's findings.

Limitations of theory

- Some researchers criticised the language used in the Piagetian tasks, stating that the repetitive questions asked by the experimenter may cause children to wonder why they are being asked the same question again if the answer has not changed.
- The experimenter does not give feedback to the child as to whether they responded appropriately. The child may assume their first response was incorrect and change it to please the experimenter, therefore the cognitive competence of the children is underestimated due to social pressure.
- The sample of children Piaget used to develop the four stages of cognitive development were made up of his own three children, and the children of his colleague's, all of whom were well educated professionals of high socioeconomic status. Results are therefore unable to be generalised to the population of children.

Application of theory to a real-world context

- The theory can be applied to children's education regarding learning strategies and educational programs. The measurement of individual student understanding as opposed to measuring student performance as part of a combined peer group task is an example of Piaget's influence on education.



Figure 6.14 Prince Bernhard of the Netherlands awarding Jean Piaget (left) with the Erasmus Prize in 1972 for his contribution to the understanding of intellectual development.

Question 1

- (a) (i) Name the **two** processes Piaget theorised children use to increase their number of schemas as well as make them more complex. (3 marks)

One: _____

Two: _____

- (ii) From the two processes named in part (a) (i), identify the process that involves changing an existing schema, or creating a new schema, to fit new information. (1 mark)

- (b) (i) Mahalia gave her son a rattle to play with, then while her son was watching, Mahalia placed the rattle under a blanket. According to Piaget's theory of cognitive development, describe what Mahalia's son would do if he had accomplished object permanence. (1 mark)

- (ii) Name the stage of Piaget's theory of cognitive development Mahalia's son would be in if he has yet to accomplish object permanence. (1 mark)

Question 2

After walking into a chair, Jana kicks it with her foot and exclaims 'bad chair!'.

- (a) (i) Identify the characteristic she is displaying. (1 mark)

- (ii) Suggest the stage of cognitive development that Jana is most likely in. (1 mark)

- (iii) Children in the stage named in part (a) (ii) tend to appear selfish or uncooperative but in fact, they are just unable to see things from another person's point of view. Name the psychological term for this phenomenon. (1 mark)

Question 3

- (a) Describe **one** specific example of how a child could display symbolic thinking while sitting at the kitchen table that has a bowl of fruit on top of it. (1 mark)

- (b) Identify the stage of cognition within which symbolic thinking is accomplished. (1 mark)

- (c) Identify the type of play that supports the development of symbolic thinking. (1 mark)

- (d) Explain **one** criticism of Piaget's theory of cognitive development. (2 marks)

ATTACHMENT THEORIES AND THE CASE STUDY OF GENIE THE WILD CHILD



Key teaching points	Learn	Revise	Demonstrate
Lifespan psychology			
• Theories of social and emotional development – attachment			
◦ Study: emotion over physiological needs with Rhesus monkeys (Harlow, 1958)			
◦ Theory of attachment – Bowlby (1969, 1988)			
• Definition of attachment			
• Evolutionary perspective			
• Monotropy, critical and sensitive periods, maternal deprivation, internal working model			
◦ Study: Strange situation to measure attachment (Ainsworth, 1978)			
• Type A – insecure avoidant attachment			
• Type B – secure attachment			
• Type C – insecure resistant attachment			
◦ Findings about cross cultural patterns of attachment according to van IJzendoorn and Kroonenberg (1988)			
• Impact of enriched and deprived environments on development			
◦ Case study – wild/feral children, such as Genie, the wild child			

THEORIES OF SOCIAL AND EMOTIONAL DEVELOPMENT – ATTACHMENT

STUDY: EMOTION OVER PHYSIOLOGICAL NEEDS WITH RHESUS MONKEYS (HARLOW, 1958)

- Leading up to the experiments, Harlow and his colleagues observed laboratory raised rhesus monkey babies demonstrating high attachment to the cloth pads used to line the floor of their cages.
- Additionally, the babies rarely survived when raised in a bare cage but had greater survival rates when a wire-mesh cone was in the cage. Babies raised in a cage with a terry cloth covered cone developed healthily, according to Harlow.

Aim

To investigate whether contact comfort or the provision of food is more important when forming infant-mother attachment in rhesus monkeys.

Method

Participants

Eight newborn rhesus monkeys.

Materials

Materials included surrogate monkey mothers made from a rubber-covered block of wood covered in cotton terry cloth, surrogate monkey mothers made from wire mesh, milk bottles, and cages.

Design

The independent variable was whether the milk bottle was attached to the cloth covered or wire-mesh surrogate and the dependent variable was the time the monkeys spent on the surrogates.

Procedure

The newborn monkeys were placed in separate cages, each containing two surrogate monkey mothers; one made from rubber-covered block of wood covered in cloth, the other made from wire-mesh. Four cages had a milk bottle attached to the cloth covered surrogate, the other four cages had a milk bottle attached to the wire-mesh surrogate. The time each monkey spent holding onto each surrogate in their cage was timed.

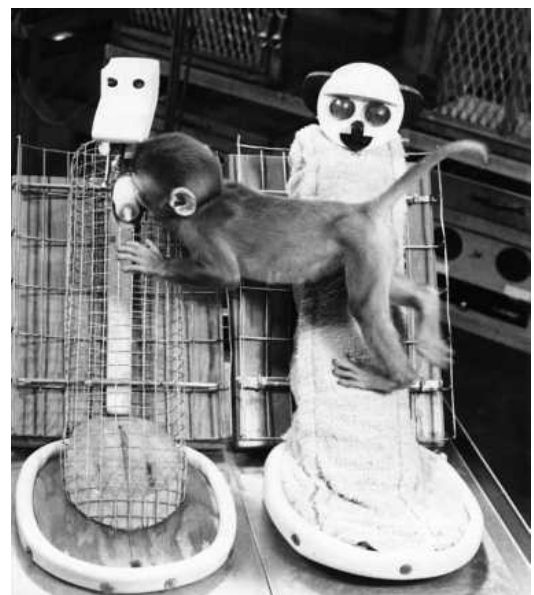


Figure 7.1 A baby rhesus monkey feeding from a bottle on the wire surrogate while still holding onto the comforting cloth covered surrogate.

Key findings

- The baby monkeys spent more time on the cloth covered surrogate mother than the wire surrogate.
- Contact comfort is more important than receiving food in the development of attachment between the infant and mother rhesus monkey.
- The graphs in Figure 7.2 show the average hours per day the rhesus infant monkeys spent on each surrogate mother. The monkeys who were provided with a cloth covered surrogate providing milk spent almost no time on the wire surrogate mother as it offered neither food nor comfort. The monkeys who shared their cage with a cloth surrogate mother, and wire surrogate mother that had a milk bottle attached, spent the minimum time required to feed from the wire surrogate mother, and almost sixteen hours per day clinging on to the cloth covered mother from the age of sixteen days.

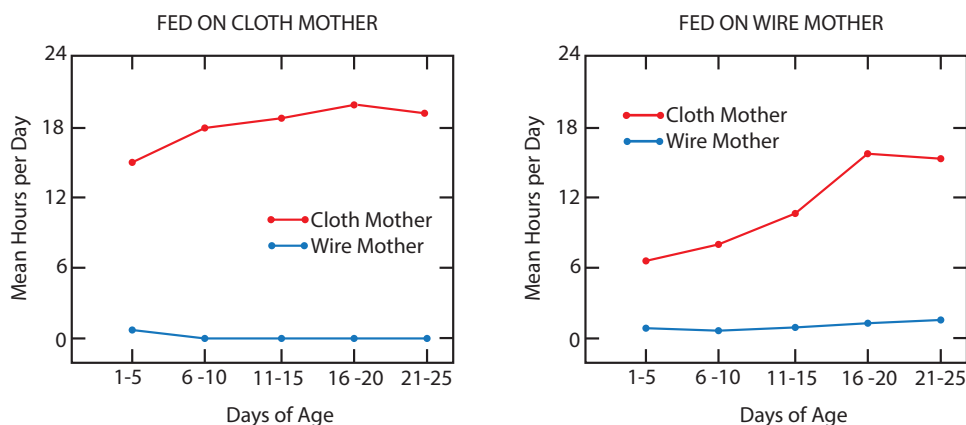


Figure 7.2

Contribution of the study to psychology

- The widespread belief at the time of Harlow's experiments was that the source of an infant's attachment to their mother was through receiving food via breastfeeding. His findings helped to shift this belief to one that acknowledged the role that contact comfort has in forming attachment.
- Knowing contact comfort is critical in forming an attachment between infant and caregiver, Harlow's findings were to be applied to Western society, where mothers were expected to stay home and care for children, as it was believed her provision of milk was critical. Fathers were now seen as equally as capable as mothers in rearing children; therefore mothers could return to the workforce.
- Harlow's research with rhesus monkeys supports Bowlby's maternal deprivation hypothesis as Harlow demonstrated that rhesus monkeys reared apart from their mother suffered social and emotional difficulties later in life. As these monkeys never formed an attachment with a primary caregiver, they grew to become aggressive and exhibited problems interacting with other monkeys.

Criticisms and limitations of the study

- The monkeys experienced psychological pain by being deprived of their mothers and placed in a stressful situation.
- As the research used monkeys as the subjects, the results are not able to be generalised to the human population.

THEORY OF ATTACHMENT – BOWLBY (1969, 1988)

Attachment: the strong emotional connection between an infant and their main attachment figure.

Bowlby's monotropic theory

- Bowlby theorised that children have a biological need to form a bond with one main attachment figure, this bond is more important than that with any other attachment figures, and is usually the mother.
- Mothers also have a biological need to form a close bond with their child.

Monotropy: attachment with only one attachment figure.

Bowlby's maternal deprivation hypothesis

- Bowlby theorised that the first two-and-a-half years of life was a critical period for forming attachment with a main attachment figure (usually the mother). He claimed that if the child failed to form an attachment within this time period, that they would find it difficult to form an attachment later in life.
- A **critical period** is a lifespan stage during which individuals are more sensitive to environmental influences and normal development relies on these particular life experiences occurring.
- **Maternal deprivation** refers to the consequences an individual experiences when they are separated from their mother (or mother-substitute) as a child and attachment is prevented from occurring.
 - Intellectual development may be delayed, evident in abnormally low IQ (intelligence quotient).
 - Emotional development may be affected, specifically via the inability to have empathy for others. This is known as affectionless psychopathy, according to Bowlby.
 - Difficulties forming social relationships with others, for example, intimate relationships in adolescence and adulthood.

Internal working model

- During daily interactions with their primary caregivers within the first few years of life, children develop internal working models of their primary caregiver/s, themselves, and of the interactions they have with others. The internal working models are continually in use, therefore the impact they have on cognition, emotions and behaviour are outside of the child's conscious awareness. These internal working models are mental representations and are called 'internal working models' because they serve as a template, or model, for what relationships are like.
- Internal working models guide the way in which the child responds to others in general, how they approach new relationships in the future, as well as their emotional and social behaviour. Children who experience accurate internal working models of their immediate world are provided with the insight they will need and will therefore be better prepared for interacting with the wider society in the real world when they are older.
- According to Bowlby, children have three internal working models that interrelate: an internal working model of others, the self, and of the relationship between self and others.

Internal working model of others: by the age of five, children have learned a great deal about their caregivers and now have an internal working model of their likes, dislikes, and personality characteristics (e.g., knowledge of their mother's various moods).

Internal working model of the self: the child may create a positive internal working model whereby they come to believe they are worthy of love and comfort due to their caregivers

being sensitive to their needs and responding to their requests of comfort and protection with love. A negative internal working model may develop when caregivers have consistently rejected the child and ignored their needs. In this instance, the child will feel as though they are unworthy of love and care.

Internal working model of the relationship between self and others: the child will base future relationships with other people on their first relationships with primary caregivers. This model may differ for varying caregivers, for example, there may be a positive internal working model of the relationship between child and mother, however, the internal working model of the relationship between child and grandmother may be negative.

- A child who experienced a loving relationship with a main attachment figure will unconsciously expect future relationships to be similar and will demonstrate the same qualities of the main attachment figure, such as respect and reliability. A child whose main attachment figure was unreliable and insensitive to their needs will likely expect people in their future relationships to treat them poorly, and will treat them the same way in return.

Evolutionary perspective

- Bowlby believed that the purpose of attachment behaviour between a human infant and their main attachment figure was to protect the infant from predators and allow for the survival of the species. This is supported through observations of isolated birds and mammals that are more likely to be attacked by a predator than by others of the same species.
- It also makes sense that the attachment figure the infant bonds with is who they believe will reliably and promptly come to their aid when required. Conversely, the failure of an attachment figure to respond accordingly causes extreme stress and can be traumatising for the infant.

Strengths of theory

- Bowlby's research on attachment, specifically maternal deprivation, led to numerous orphan studies being run in the years that followed. The Romanian orphan studies, for example, allowed for improved conditions for the children kept in such institutions.
- Bowlby's internal working model provides strong reasoning for the relationships that adults form. It is clear to see how the first attachments children had with primary caregivers produced the template used for forming relationships throughout life.

Limitations of theory

- Bowlby believed the mother was the main primary caregiver, although the majority of societies around the world are observed to have multiple attachment figures involved in raising children.
- There is evidence to suggest that in many instances high quality aftercare allowed individuals who failed to form an attachment in the first two-and-a-half years of life (the critical period) to fully recover. This critical period should be acknowledged as a sensitive period instead.
- While critical periods require specific life experiences to occur for normal development, **sensitive periods** refer to stages in life whereby the effects that experiences have on the brain are stronger than usual. Normal development is possible even if the required life experiences do not occur during sensitive periods.

Application of theory to a real-world context

- Understanding how maternal deprivation can affect a child's ability to properly develop can help inform social workers to provide education and resources to families in order to support them in providing healthy attachment figures for children.

STUDY: STRANGE SITUATION TO MEASURE ATTACHMENT (AINSWORTH, 1978)

- Ainsworth developed three types of attachment and believed that the type of attachment relationship formed between mother and child depended on how sensitive and responsive the mother was to her child's signals.

Aim

To measure the quality of attachment young children had with their main attachment figure.

Method

Participants

Approximately one hundred one-year-old children and their mothers.

Materials

Materials included a chair and toys for the children to play with.

Design

The independent variable was the mother and stranger leaving and entering the room and the dependent variable was the observed behaviour of the children.

Procedure

The strange situation was controlled observational research whereby one-year-old children were exposed to seven episodes, in the same order, each lasting around three minutes each. Researchers in the adjoining room observed the child through a one-way mirror and/or cameras and recorded the type and intensity of behaviour displayed in fifteen-second intervals. The following behaviours were used to assess attachment.

Proximity-seeking: whether or not the infant stays in close proximity to their mother.

Exploration and secure-base behaviour: how confident the baby feels to explore their environment, while using their mother as a secure base to return to.

Stranger anxiety: how anxious the baby becomes when around a stranger.

Separation anxiety: how anxious the baby becomes when separated from their mother.

Response to reunion: the behaviour shown by the baby when reunited with their mother after a period of separation.

The observations once the mother and her baby were introduced to a playroom with plenty of toys were as follows:

1. The mother encouraged her baby to explore the room.
2. An unfamiliar adult entered the room, spoke to the mother and approached the baby.
3. The mother left the room and the baby was alone with the stranger.
4. The mother returned and the stranger left.
5. The mother left and the baby is completely alone.
6. The stranger returned to the room.
7. The mother returned to the room.



Figure 7.3 A child displaying distress upon the return of her mother.

Key findings

- Ainsworth developed three main types of attachment based on the observations made during the strange situation experiments. For each type of attachment, the behaviour of the mother can be related.

Attachment type	Typical behaviour of infant	Mother's behaviour toward infant
Type A Insecure avoidant attachment	<p>Proximity-seeking: infant does not seek proximity with the mother.</p> <p>Exploration/secure base: infant is happy to explore but does not use the mother as a secure base.</p> <p>Stranger anxiety: shows very little anxiety.</p> <p>Separation anxiety: infant shows no sign of distress when mother leaves.</p> <p>Response to reunion: infant shows little interest in the mother when she returns and may avoid contact.</p>	Mother ignores the infant (infant comes to believe that communication of needs has no influence on mother).
Type B Secure attachment	<p>Proximity-seeking: infant is happy to seek proximity to the mother.</p> <p>Exploration/secure base: infant is happy to explore and also uses mother as a secure base to explore from.</p> <p>Stranger anxiety: moderate stranger anxiety.</p> <p>Separation anxiety: moderate separation distress.</p> <p>Response to reunion: infant is happy and seeks comfort from mother.</p>	Mother is sensitive to the infant's needs (responds to moods and feelings of infants correctly).
Type C Insecure resistant attachment	<p>Proximity-seeking: infant seeks great proximity to the mother.</p> <p>Exploration/secure base: explores very little, does not use mother as a secure base from which to explore.</p> <p>Stranger anxiety: high levels of stranger anxiety.</p> <p>Separation anxiety: high levels of separation distress.</p> <p>Response to reunion: infant may approach mother but resists comfort.</p>	Mother is inconsistent with primary care – sometimes ignores needs of infant, sometimes meets needs of infant.

Contribution of the study to psychology

- The findings from Ainsworth's study provided the first empirical evidence (empirical evidence uses observations) for Bowlby's attachment theory (Figure 7.4). For example, children with a secure attachment type tend to develop a positive internal working model of themselves and therefore throughout life believe they are worthy of being loved and respected by those they are in relationships with. Children with insecure avoidant attachment or insecure resistant attachment type are more likely to develop poor relationships later in life.

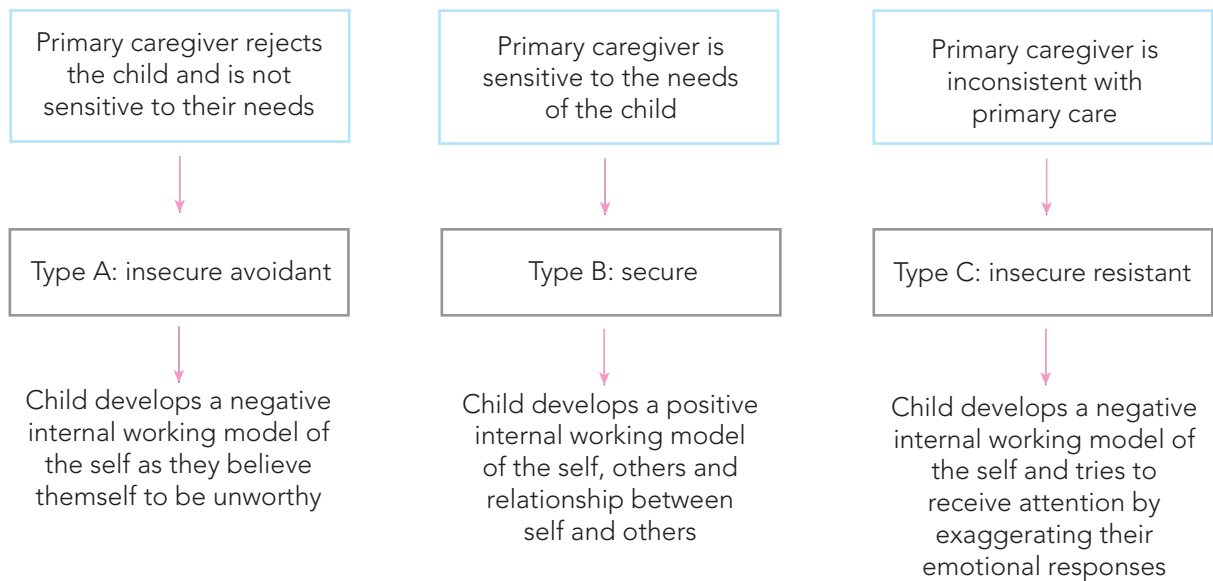


Figure 7.4

Criticisms and limitations of the study

- While Ainsworth claimed that the strange situation was modelled on real-life experiences where infants would be occasionally taken into unfamiliar environments and left for a few minutes, there are people who disagree and believe the infants were caused a degree of psychological harm due to the distress caused.
- The strange situation may only be valid for use in Western Europe and the USA as it was developed in these locations. This means there is cultural bias and it is difficult to generalise the findings to societies outside of Western Europe and the USA.

FINDINGS ABOUT CROSS CULTURAL PATTERNS OF ATTACHMENT ACCORDING TO VAN IJZENDOORN AND KROONENBERG (1988)

- The examination of almost two thousand Strange Situation experiments from eight countries showed the following cross-cultural differences.
 - Type A: insecure avoidant attachments were more prevalent in Western European countries and the USA than in China, Japan and Israel.
 - The most common attachment type across all countries was Type B: secure attachment.
 - Type C: insecure resistant attachment type was more prevalent in Japan and Israel than any of the included countries.

Summary of samples displaying different attachment types in various countries

Country	Number of samples per attachment type			
	Type A	Type B	Type C	Total number of samples
West Germany	48	77	11	136
Great Britain	16	54	2	72
Sweden	11	38	2	51
Netherlands	66	169	16	251
USA	260	797	173	1230
China	9	18	9	36
Japan	5	65	26	96
Israel	8	76	34	118

Beyond the syllabus

The concept of individualistic and collectivist cultures (refer to chapter 10) can be applied to the cross-cultural patterns of attachment summarised by van IJzendoorn and Kroonenberg. West Germany, Great Britain, Sweden, the Netherlands and the USA were found to contain a greater number of samples displaying Type A: insecure avoidant attachment, and are also considered to be individualistic cultures that value the independence of individuals over the needs of the collective community.

Type C: insecure resistant attachment type was more prevalent in Japan and Israel; both being regarded as collectivist cultures that believe the needs of the group to be more important than individual interests. In the last few decades, however, Israel's society has increasingly shifted toward becoming individualistic.

IMPACT OF ENRICHED AND DEPRIVED ENVIRONMENTS ON DEVELOPMENT

- In psychology, an **enriched environment** is described as the social and physical surroundings that facilitate intellectual and sensory stimulation. Enriched environments are believed to greatly impact the early development of children during critical and sensitive periods because brain plasticity is particularly influenced by experience.
- When an individual experiences a **deprived environment**, there is an absence of conditions that stimulate the senses and allow for intellectual growth. The lack of exposure to learning environments, for example, can reduce cognitive development and lead to poor social skills.

CASE STUDY: GENIE, THE WILD CHILD

- Genie's father disliked her and prevented her mother from giving her much attention as a baby. After a doctor told her parents she showed signs of possible retardation (she had a fever at the time so this could have been the cause of her being unresponsive), Genie's father isolated her by confining her to a small bedroom.
- She was harnessed to a potty seat and sat there naked during the day then placed in a sleeping bag that kept her arms restrained at night. Genie heard very little language as her father disliked noise and learned to keep quiet as he would beat her if she made any noise.
- Years later, in 1970 and now aged thirteen, Genie and her mother (who was now almost completely blind) moved away from her father. While accompanying her mother to apply for family aid, a social worker called police who charged her parents and admitted Genie into hospital.
- When assessed in hospital Genie was found to have weak vocal cords from not vocalising and weak muscles used for chewing and swallowing as she had never eaten solid food. She was unable to stand up straight or fully extend her limbs due to being in restraints for much of her life and could not walk without shuffling her feet, let alone climb or run.
- It was evident that the deprived environment she was raised in did not allow her to develop language as she was only able to understand a few single words when spoken to. She was able to say 'stopit' and 'nomore' in a high-pitched voice, but her articulation was so poor that she was not easily understood. Throughout her time in hospital, she was keen for attention and contact from those around her.
- Genie was moved to the hospital rehabilitation center, then later to a foster home, and these highly enriching environments helped her to continue to develop socially, emotionally, physically and cognitively. She grew taller, put on weight, and was able to walk with a steadier gait. She developed close relationships with a few of the staff and began responding to people in a more emotionally appropriate manner.
- Tests demonstrated improvements in cognitive awareness and functioning, her vocabulary quickly grew and she started to comprehend sentences spoken to her. Genie was not, however, able to use grammar and form words into sentences.



Figure 7.5 Genie was unable to stand up straight causing her to move with her characteristic 'bunny walk'.

Question 1

In one experiment conducted by Harlow, he looked at whether the provision of contact comfort or food was most important in the formation of infant-mother attachment in rhesus monkeys.

- (a) Identify the independent variable in Harlow's experiment mentioned above. (1 mark)

- (b) Identify the dependent variable in Harlow's experiment mentioned above. (1 mark)

Question 2

Molly is three-years-old and has started to attend a childcare centre. The supervisor at the centre has been observing Molly for the past two weeks and notices that in the mornings, once Molly is taken out of her stroller, she immediately heads towards the toys and does not show any emotion when her mother leaves. She continues to play alone with the toys throughout the day without guidance from the childcare workers. On one occasion, the supervisor takes a small group of adults on a tour of the facilities and Molly is the only child not bothered by them coming to her and saying hello. While most children show excitement when they are picked up by their parents at the end of the day, Molly takes little notice of her mother and hops into her stroller.

- (a) Five types of behaviour were analysed during Ainsworth's Strange Situation experiment. Outline how the supervisor would describe each type of behaviour shown by Molly. (5 marks)

- (b) Ainsworth used the five types of behaviour listed in part (a) to help develop three attachment styles through her Strange Situation experiment. Name the attachment style Molly is displaying. (1 mark)

- (c) (i) The supervisor at the childcare centre has been studying Bowlby's attachment theory and one aspect of his ideas on attachment is his monotropic theory. Briefly summarise Bowlby's monotropic theory of attachment. (2 marks)

- (ii) Bowlby's monotropic theory led to the development of his maternal deprivation hypothesis. State whether or not it is likely that Molly experienced maternal deprivation or separation and include **one** explanation for your response. (2 marks)

- (iii) Bowlby believed that children form a mental representation, or cognitive schema of their relationship with their primary caregiver that acts as a blueprint for all future relationships. State the name Bowlby gave to this concept. (1 mark)

- (iv) Provide evidence that Molly is not interested in, or confident in forming relationships with others. (1 mark)

ATTITUDES, ATTRIBUTION THEORY AND SOCIAL IDENTITY THEORY

8



Key teaching points	Learn	Revise	Demonstrate
Attitudes and stereotypes			
• Function of attitudes – implicit and explicit			
• Tripartite model of attitude structure – affective, behavioural, cognitive			
• Effect of attitudes on behaviour			
◦ Theory of cognitive dissonance – Festinger			
• Effect of cognitive dissonance on behaviour – avoidance, reduction, rationalisation			
• Magnitude as a factor affecting cognitive dissonance			
• Responses to cognitive dissonance – change beliefs, change behaviour, change perception of the action			
• Study: Cognitive consequences of forced compliance (Festinger and Carlsmith, 1959)			
• Attribution theory to explain behaviour			
◦ Situational and dispositional attributions			
• Social identity theory – Tajfel and Turner (1979)			
◦ Social categorisation, social identification, social comparison			

FUNCTION OF ATTITUDES

Attitude: an evaluation made up of the feelings, beliefs and behaviours toward a person, social group, event or object.

Attitude object: the target of judgement related to an attitude, such as an object, person, event or social group.

- Attitudes can be split into two types, explicit attitudes and implicit attitudes.

Explicit attitudes: conscious judgements held toward an attitude object.

- Explicit attitudes can be measured via self-report tests, such as a rating scale or survey, but are easily manipulated by participants who may exaggerate responses to please the researcher or appear more socially acceptable.

Implicit attitudes: unconscious judgements held toward an attitude object.

- It is more difficult for participants to exaggerate responses based on their implicit attitudes than their explicit attitudes. Measuring implicit attitudes are more likely to produce true and consistent responses.

TRIPARTITE MODEL OF ATTITUDE STRUCTURE – AFFECTIVE, BEHAVIOURAL, COGNITIVE

- The tripartite model of attitudes describes an attitude as being comprised of three components that are associated with an attitude object. The affective, behavioural and cognitive components interrelate (Figure 8.1).

Affect: feelings associated with the attitude object.

Behaviour: behaviours, past and planned, associated with the attitude object.

Cognition: thoughts associated with the attitude object.

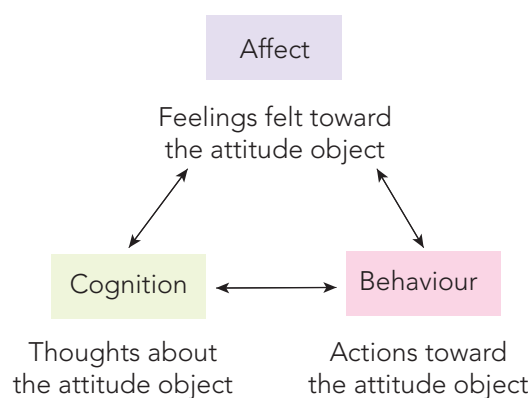


Figure 8.1

- It is important to note that while the tripartite model implies that attitudes predict future behaviour, other attitude research suggests attitudes only play a small role, if any, in foretelling people's actions.

EFFECTS OF ATTITUDES ON BEHAVIOUR

Theory of cognitive dissonance – Festinger

- Leon Festinger theorised that tension occurs within a person when they perceive inconsistency between acquired information.
- The information can include feelings, attitudes, beliefs, actions, and environmental stimuli.

Cognitive dissonance: a feeling of mental discomfort when contradictory information is perceived by a person.

- Festinger believed that once people recognise the inconsistency between their cognitions, discomfort is experienced, and they are then motivated to act to reduce the dissonance.



Figure 8.2 Leon Festinger.

Effect of cognitive dissonance on behaviour

Avoidance

- People are inclined to avoid encountering situations and new information that could increase cognitive dissonance.

Reduction

- To experience a balance between the reality of the world around them, and the expectations people have of their life, cognitive dissonance is continually being reduced.

Rationalisation

- Individuals experiencing cognitive dissonance tend to rationalise, or justify, their behaviour.



In Aesop's fable, *The Fox and the Grapes*, a fox tries jumping to reach a bunch of grapes on a vine twisted around a tree.

After failing numerous times, the fox disdainfully exclaims that he does not want them because they are probably sour. The fox experienced cognitive dissonance and overcame it by rationalising that the grapes are sour, and he does not want to eat them after all.

Magnitude as a factor affecting cognitive dissonance

- Magnitude is a subjective measure of the level of discomfort an individual feels when they experience cognitive dissonance. The greater the magnitude of dissonance, the greater the pressure felt to reduce it.
- There are two factors that predict the amount of discomfort felt due to cognitive dissonance.
 - The more value an individual places on either of the two conflicting cognitions, the greater the magnitude of the dissonance.
 - The maximum level of dissonance an individual can manage before needing to reduce the discomfort.

Responses to cognitive dissonance

- An individual that smokes cigarettes but knows they are bad for her health experiences cognitive dissonance as her behaviour of smoking is inconsistent with her belief that smoking is harming her health. According to Festinger, changes to beliefs, behaviours or the perception of an action to restore consistency in cognition are called dissonance-reducing changes.
- The individual can search for evidence that smoking is not damaging her health and in doing so, she is able to *change her belief*. The dissonance reduces as her cognition and actions are now consistent.
- An obvious way to minimise the mental stress the individual is feeling is by *changing her behaviour* – she can stop smoking cigarettes. Her behaviour of not smoking now lines up with her belief that smoking is unhealthy.
- Lastly, the individual can justify smoking cigarettes by *changing her perception of this behaviour*. She may decide that she smokes because it lowers her anxiety levels and makes her feel relaxed. There is now a balance between cognition and behaviour resulting in decreased dissonance.

Strengths of theory

- Cognitive dissonance can be tested scientifically, such as in Festinger and Carlsmith's cognitive consequences of forced compliance experiment.
- Festinger's theory was instrumental in demonstrating how people can perform a behaviour, then consequently develop a belief, rather than initially forming a belief and then responding to it.

Limitations of theory

- The theory does not consider individual differences, for example people who are highly neurotic are more likely to take action to reduce cognitive dissonance that they experience, than emotionally stable individuals.
- While the results of cognitive dissonance can be measured, such as through self-report measures, cognitive dissonance itself is unable to be observed.

Application of theory to a real-world context

- Cognitive dissonance theory can be applied to eating meat in our current time where cultivated (cell-based) meats are being developed to reduce the environmental impact of traditional meat production.



Figure 8.3 Hanni Rützler, an Austrian nutritional scientist, tasting the world's first cultured meat product in 2013. Costing \$393,000 AUD to produce, it was developed by Mark Post and a team of scientists at Maastricht University in the Netherlands.

STUDY: COGNITIVE CONSEQUENCES OF FORCED COMPLIANCE (FESTINGER AND CARLSMITH, 1959)

Aim

To investigate whether making people perform a dull task would create cognitive dissonance through forced compliance behaviour (performing an action that is inconsistent with personal beliefs).

Method

Participants

Seventy-one male students from a psychology class at Stanford University were selected via convenience sampling.

Materials

Spools on a tray, square pegs on a board, tape recorder, and self-report measure made up of four questions with rating scales.

Design

The independent variable was the amount of reward used to encourage the participants to make a statement conflicting with their personal belief, and the dependent variable was the strength of attitude.

Procedure

The participants took part in a range of experiments as part of their requirement as psychology students. The pretense for participating in the experiments was so they could be evaluated and improved for future use (deception). One experiment was listed as 'measures of performance', a two-hour experiment. The participants were randomly allocated into three conditions, the control condition, one dollar condition, and twenty-dollar condition. They were individually taken by the experimenter to a laboratory room and were told they would complete two tasks and then be interviewed. Participants put twelve spools on a tray, emptied the tray, and repeated these actions for one hour. The second task involved turning forty-eight square pegs on a board a quarter clockwise turn each, using one hand. This continued for thirty minutes while the experimenter pretended to take down notes.

At the completion of the second task, the participants were told that the experiment has two conditions, one where the participants are not given any introduction to the tasks and are expected to do them immediately, and the other where participants are given an introduction by a student who tells them the tasks are interesting and enjoyable. Those in the control group were taken to the secretary's office on the pretense that a student would come to speak with them.

Participants in the one-dollar and twenty-dollar conditions were told the student who normally comes to chat with participants for the second experimental condition is absent and were asked whether they would be willing to speak to the next waiting participant, telling them the tasks are intriguing and fun to do. They were told they would be put on a list to call on if they needed them to cover for the student in the future. Those in the one-dollar condition were paid one dollar to speak to the waiting participant, the participants in the other condition were paid twenty dollars. Those who agreed were taken to the secretary's office by the experimenter and introduced to a female 'participant', a confederate. A hidden tape recorder recorded the conversation between participant and confederate whereby the confederate acted surprised that the tasks were fun as her friend who previously participated told her they found it boring.

Participants disagreed, exclaiming the tasks were very interesting and that they were sure she would enjoy them.

All participants, including those from the control group, were taken to an interviewer who asked four questions that required them to rate on a rating scale from – 5 to + 5 (0 being neutral), including whether the tasks were enjoyable, and whether they would like to participate in a similar experiment in the future. The interviewer also asked whether the participants were suspicious of anything, and if so, what they were suspicious of. They were debriefed at the conclusion of the interview with the experimenter introducing the female student to those in the one-dollar and twenty-dollar conditions. The true purpose of the experiment was explained, and participants were asked to return the money (all were willing to do so).

Key findings

- Data from sixty participants are shown in Table 8.1, twenty participants in each condition. Using the control condition results as a baseline, participants paid one dollar rated the task as more fun than participants who were paid twenty dollars, and demonstrated they were interested in taking part in similar future experiments.
- Participants paid one dollar experienced cognitive dissonance as their belief that the tasks were boring, and their action of telling the fellow participant that the tasks were fun did not match up. The small amount of money they received was not a sufficient incentive to justify lying so they changed their belief instead, convincing themselves that the tasks were interesting and enjoyable after all. The magnitude of the dissonance for participants paid one dollar was greater than those paid twenty dollars, thus the pressure to reduce the mental stress was higher.
- Participants paid twenty dollars did not experience cognitive dissonance as the large amount of money they were paid was enough to justify lying to their fellow participant.
- There was a negative relationship between the amount of incentive (money paid), and the amount of attitude change required.
- Participants with a high incentive to comply with the behaviour (offered \$20) only slightly changed their attitude (compare results between the control condition and twenty-dollar condition in Table 8.1). This demonstrates a low magnitude of dissonance.
- Participants provided with a low incentive to comply (offered \$1), changed their attitude to a greater extent (compare results between the control condition and one-dollar condition), demonstrating a high magnitude of dissonance.

Average interview ratings for each experimental condition

Interview question	Condition		
	Control	One dollar	Twenty dollars
How fun and interesting the tasks were	– 0.45	+ 1.35	– 0.05
Wanting to participate in similar experiments in the future	– 0.62	+ 1.20	– 0.25

Table 8.1

The data from eleven of the seventy-one participants was unable to be used in the results. Five participants told the interviewer they had suspicions the true purpose of the experiment was telling the female participant that the tasks were fun. Three participants refused to speak to the female participant and did not accept the money. Two students told the female participant they found the tasks boring but were told to say they were interesting, and one participant insisted that the female participant give him her phone number so he could call her and explain the experiment.

Contribution of the study to psychology

- This experiment provided inspiration for other researchers to perform alternative studies that demonstrated similar findings therefore resulting in good reliability.
- Findings from this experiment provide valuable insights into how individuals rationalise changing their beliefs in order to align with their actions as well as the justifications they make for their actions.

Criticisms and limitations of the study

- Explicit attitudes were measured using rating scales, rather than implicit attitudes. This means that unconscious cognitions and emotions were not recorded.
- As deception was used in the experiment, to prevent participants knowing the true purpose of the study and effect results, participants could not give informed consent.
- It is argued that the experiment has poor validity as the tasks used are unlikely to occur in everyday life.

ATTRIBUTION THEORY TO EXPLAIN BEHAVIOUR

Attribution: the process of attaching meaning to our behaviour, or the behaviour of others, by looking for causes to explain the behaviour.

Situational attribution: assigning the cause of behaviour to environmental factors external to the person, for example, social situations and social pressure.

Dispositional attribution: assigning the cause of behaviour to internal factors within the person, for example, personality characteristics, ability and motivation.

- People tend to attribute their own success dispositionally, while attributing their failures to situational factors.
- For example, a student may tell their parents that they received a high score on their psychology test because they studied hard for it, but that they did not pass their maths assessment because their teacher did not cover all the content in class.
- Another common bias leads people to create dispositional attributions for the behaviour of other people, however, for the same behaviour, produce situational attributions for themselves.
- When Jack observes his friend Jasper arriving late to class, Jack may assume Jasper slept in and was not organised (dispositional attribution). When Jack, however, arrives late to school the next day, he will likely blame it on a factor outside of himself, such as the bus driver missing his stop (situational attribution).

SOCIAL IDENTITY THEORY – TAJFEL AND TURNER (1979)

- Social identity theorists, Henri Tajfel and John Turner, surmised that being part of social groups allows people to feel a sense of social identity, and it makes up part of their self-image that comes from belonging to social categories.

Social identity: the sense of self in terms of group membership.

- Social identity can be positive or negative depending on societal evaluations. Many people in society may view individuals who attend World Youth Day with their local Church as having a positive social identity (Figure 8.4). Members of a violent street gang, however, may be judged as having a negative social identity.
- Positive social identity allows for increased self-esteem.



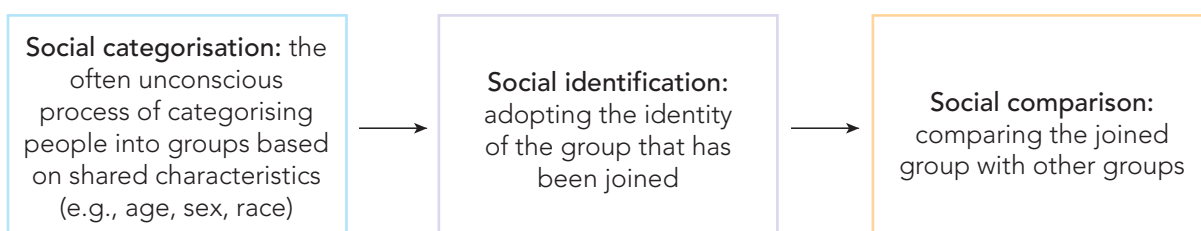
Figure 8.4

- **Social categorisation** is the innate process of placing people we come across into groups based on shared characteristics. We therefore determine whether a person we come across is similar to us and is part of our ingroup or is different to us and part of an outgroup.
- Social identity theory proposes that members of an ingroup will stereotype members of outgroups by assuming all members of the outgroup are similar and find ways to show them in a poor light to boost their own self-image. Additionally, people believe that their ingroup differs greatly from outgroups.

Ingroup: the group an individual associates with.

Outgroup: any group an individual does not belong to.

- Tajfel and Turner explained how people move through three cognitive stages when determining others as part of their ingroup, or part of an outgroup.



- Firstly, to save on perception and time-consuming cognitive processing, people utilise social categorisation to group people, including themselves, based on shared characteristics. This often-unconscious process helps people simplify and rapidly assess their social environment, but unfortunately leads to prejudice, stereotyping, and potentially, discrimination.
- People tend to be members of multiple social groups and social categorisation helps people discover which groups they are part of and have an affinity with. This is the second stage, called social identification. Taking on the identity of groups involves conforming to their particular social norms.
- Lastly, now that people have social identities for the groups they feel they belong to, they start to compare these groups with other comparable outgroups. Social comparison is critical as maintaining an ingroup profile that is more positive than comparable outgroups maintains self-esteem.
- Comparisons are made when people assign positive aspects of their ingroup and negative aspects of outgroups internally (dispositional attributions) and assign negative aspects of their ingroup and good things about outgroups externally (situational attributions).
- A consequence of social comparison is intergroup conflict whereby there is competition for desirable, but limited resources. The Robber's Cave experiment explained in chapter nine provides an example of intergroup conflict between two groups of boys who form prejudices against each other.

Intergroup conflict: disagreement between members of two or more groups.

Strengths of theory

- The theory helps explain why people tend to feel more empathy toward people they feel are similar to them (in the ingroup) and less empathy toward those they believe are different (those in an outgroup).
- Social identity theory can help explain how bias related to ingroups and outgroups in society often leads to intergroup conflict.

Limitations of theory

- Social identity theory claims comparable groups are likely to experience intergroup conflict, however, affiliation between groups similar in social status, for example, has also been shown to produce cooperation instead. For example, Australia and New Zealand use humour to make fun of each other, but intergroup conflict ceases to exist.
- While social identity theory can account for intergroup conflict based on trying to be seen more positively than another group, the theory does not address intergroup conflict caused by competition for resources such as jobs and land.

Application of theory to a real-world context

- Sectarian violence in Iraq between 2006 and 2008 can be analysed using social identity theory. Armed groups of Shias set up road checkpoints where they executed Sunnis, and vice versa. Each group was from a different sect of Islam and discriminated against each other based on religion.

Question 1

Rhianna had a meal delivered to her house and found the lid for her smoothie was not closed properly and had spilled over her food. Feeling frustrated, she requested a refund online and gave the restaurant a two-star rating.

- (a) Identify whether her attitude toward the restaurant was implicit or explicit and explain the reason for your response. (3 marks)

- (b) Name the **three** components of the tripartite model and apply each to Rhianna's attitude toward the restaurant. (6 marks)

The next day the restaurant manager called Rhianna to discuss the spilled drink. She was highly apologetic for the incident and explained their family-run restaurant was short staffed, so her nephew was helping pack orders. Rhianna insisted that she was very happy with the service and was satisfied with her full refund. After hanging up, Rhianna changed the two-star rating to five stars online.

- (c) Explain the source of the cognitive dissonance Rhianna experienced. (3 marks)

(d) Outline how Rhianna reduced the dissonance. (1 mark)

(e) Comment on the association between the magnitude of dissonance and the pressure felt to reduce it. (2 marks)

(f) Explain why the magnitude of dissonance between individuals for the same situation is never identical. (2 marks)

Question 2

(a) In correct order, list the **three** stages Tajfel and Turner proposed people move through when determining others as part of their ingroup, or part of the outgroup. (4 marks)

- ---
- ---
- ---

(b) Identify the name of the stage listed in part (a) that typically involves member conformity. (1 mark)

(c) Explain why having a positive social identity allows for increased self-esteem. (3 marks)

STEREOTYPES AND THE RELATIONSHIP BETWEEN ATTITUDES, PREJUDICE AND DISCRIMINATION



Key teaching points	Learn	Revise	Demonstrate
Attitudes and stereotypes			
• Stereotypes as a form of social categorisation			
◦ Function of stereotypes			
• Relationships between attitudes, prejudice and discrimination			
◦ Distinguish between prejudice and discrimination			
◦ Direct and indirect discrimination			
◦ Examples of prejudice and discrimination in society – gender, race, ethnicity, age, disability, mental illness			
◦ Causes of prejudice – social influence, intergroup competition, social categorisation, just world phenomenon			
◦ Reducing prejudice – contact hypothesis including intergroup contact, superordinate goals, mutual interdependence, equal-status contact			
◦ Study: Robber's Cave experiment (Sherif et al., 1961)			

STEREOTYPES AS A FORM OF SOCIAL CATEGORISATION

FUNCTION OF STEREOTYPES

- Stereotypes are cognitive schemata used to quickly and simply process large amounts of information, freeing up cognitive processing that can be used to perform other mental tasks.
- From an evolutionary perspective, stereotypes may have helped people assess social situations and consequently avoid danger.

Stereotype: an oversimplified belief about an outgroup pertaining to either positive or negative thoughts about its members.

RELATIONSHIP BETWEEN ATTITUDES, PREJUDICE AND DISCRIMINATION

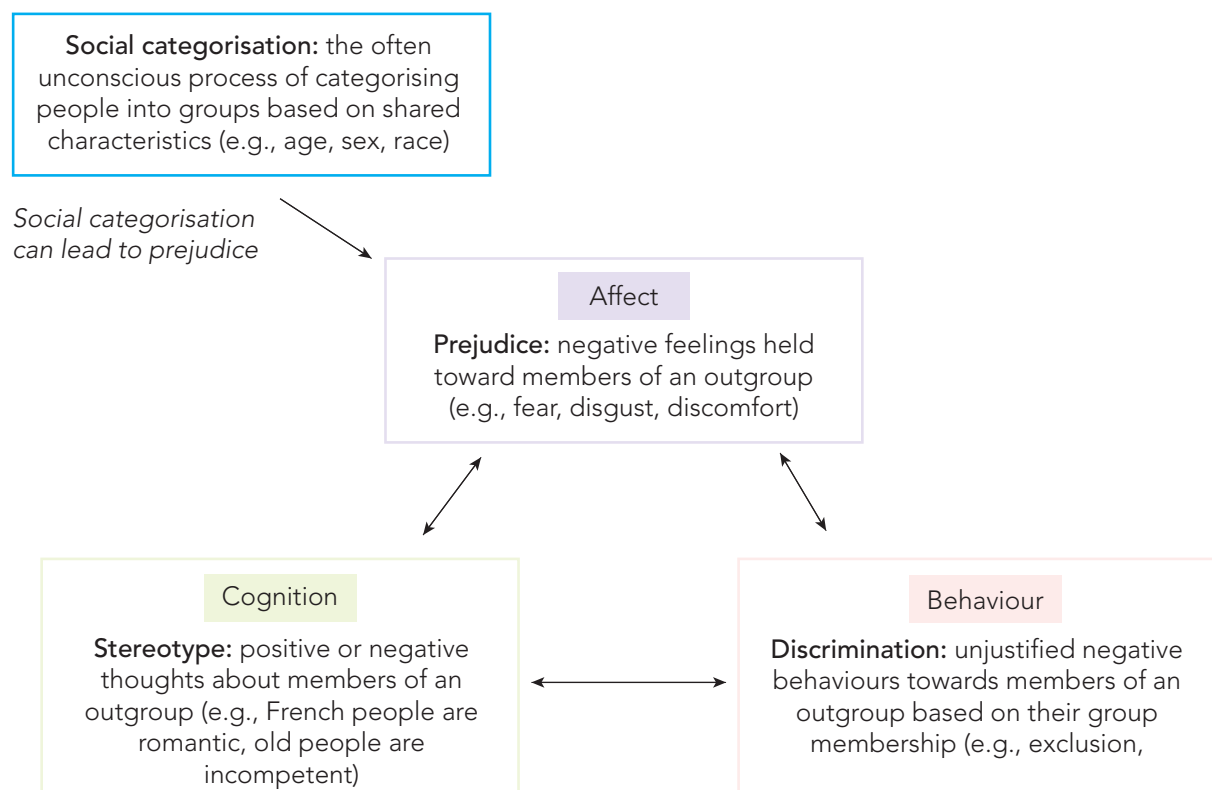


Figure 9.1

- The tripartite model of attitudes can be used to explain the relationship between social categorisation, prejudice, stereotypes and discrimination (Figure 9.1).
- The three aspects of social bias; prejudice, discrimination and stereotypes, are interrelated, but can also occur individually.
- Social categorisation can lead to prejudice, which is negative feelings held toward members of an outgroup (any group an individual does not belong to).
- Prejudice is often described as unjustified attitudes toward members of social groups and is made up of the three components of an attitude, however, people mainly focus on the affective component of prejudice. Discrimination, however, only involves behaviour.

- Prejudice does not inevitably lead to discrimination; an individual can discriminate against a group of people without holding negative feelings toward them. For example, a shop assistant could deny entry to a person with an assistance dog. This is discrimination based on disability, but the shop assistant may not feel negative emotions toward individuals with disabilities. Their behaviour is based on the belief that dogs are not allowed in the shop.
- Negative feelings or attitudes held toward others can develop into discrimination if these feelings are acted upon. Emotions are a strong component of attitudes; thus, prejudice can become a concern if emotions are so strong that they develop into unjust behaviours against members of an outgroup (discrimination).
- Once prejudices are learned, stereotypes tend to naturally develop. Stereotypes can also result in prejudice.
- Holding overgeneralised stereotypes about all members of a group, whether it be positive or negative, can lead to acts of discrimination. A teacher giving less time on a maths test to the Asian students in his class is an example of the stereotype that all Asians are superior in maths, leading to discriminatory behaviour. Conversely, discriminative behaviour can strengthen stereotypes. For example, if an English teacher believes that immigrants are bad at English, they are more likely to give their immigrant students poor marks. Those poor marks reinforce the belief that the students are bad at English.

DIRECT AND INDIRECT DISCRIMINATION

- **Direct discrimination** occurs when an individual is treated unfairly because of a characteristic they have or are assumed to have.
- Direct discrimination is intentional.
- For example, a real estate agent telling a single mother with two children that there are no rental properties available, but offering a rental property to a couple with no children.
- **Indirect discrimination** occurs when individuals who have a particular characteristic are unfairly disadvantaged due to conditions or regulations that apply to everyone.
- Indirect discrimination may be unintentional at times.
- For example, a public building with no ramp access disadvantages people who use wheelchairs as they are unable to enter the building.

EXAMPLES OF PREJUDICE AND DISCRIMINATION IN SOCIETY

Gender

- Prejudice and discrimination against people based on their gender is called **sexism**.
- Historically, women have experienced more sexism than men, due partly to women tending to have lower positions of power than men in employment, business and government sectors.

Age

- Prejudice and discrimination against people based on their age is called **ageism**.
- Ageism may be seen by social-service or health care providers who undertreat the elderly, or employers refusing to hire people over or below a particular age.

Race

- Prejudice and discrimination against people based on their race is called **racism**.
- Race is a social construct referring to the division of people into groups based on physical characteristics considered socially significant. Examples of race people might identify with include Asian Australian, Māori, Aboriginal Australian, African American, Black, Middle Eastern, European Australian and White.
- A person being denied service at a restaurant due to the colour of their skin is an example of racism.

Ethnicity

- Ethnicity refers to the culture of people based on their geographic location. Ethnicity includes the religion, customs, heritage and language spoken by people. People who originate from Latin America (either born there or with ancestors from Latin America) and who speak Spanish or Brazilian Portuguese may identify as Latino.
- An individual who is bilingual being told to always speak English at their job, including break times, is an example of ethnic discrimination.

Disability

- Feeling uneasy in the presence of a person with a physical disability is an example of prejudice.
- An example of discrimination based on disability is an individual being denied access to public transport or a taxi service because they have an assistance dog.



Figure 9.2

Mental illness

- While attitudes toward physical disabilities have improved over the last two decades, this has not been the case for those with mental/psychological illness.
- People tend to avoid or fear people who have a mental illness because they lack education in regard to mental health problems.
- An employer refusing to negotiate reduced work hours for an individual with a mental illness is an example of discrimination.

CAUSES OF PREJUDICE

Intergroup behaviour: interactions members from one group have with members of another group (also known as intergroup relations).

- While social categorisation is an innate process, prejudice develops from environmental influences.

Social influence

- Children learn prejudices from their family, teachers, peers and friends. Television, music and movies are examples of mass media that can reinforce the prejudices learned from the people around them.
- If a social group an individual seeks to be part of accepts prejudices as the social norm, the individual may be motivated to conform to these attitudes and develop the same prejudices.

Intergroup competition

- Economic competition over access to resources, wealth and jobs can lead to groups purposefully inciting prejudice against outgroups by portraying them as a threat.
- The chance of prejudice increases when the competing groups are of relatively equal status.
- An example of prejudice being caused by intergroup competition is the economic threat a social group feels from new immigrants arriving at a country where there is high competition over access to jobs.

Social categorisation

- People unconsciously identify individuals that are part of their ingroup, and those that are part of an outgroup.
- This process of social categorisation occurs immediately upon contact with a new person and is an important tool that minimises effort required to assess the multitude of characteristics each person possesses.
- Social categorisation is the natural way humans learn and there is nothing wrong with categorising people into differentiated groups if people keep an open mind to changing the categories created and try to avoid the development of prejudices and stereotypes.

Note: social categorisation is also described within social influence theory in chapter 8.

Just world phenomenon

Just world phenomenon: the assumption people make that everything that happens for a reason and that the world is just (fair).

- The just world phenomenon is a cognitive bias whereby people make dispositional attributions by blaming victims for the misfortune they are experiencing. For example, that victims of rape are responsible for being assaulted, and that people who have HIV or AIDS do not deserve high-quality healthcare because having the illness is their own fault.
- Making dispositional attributions for people who have had bad things happen to them may lead to negative emotions felt toward them, thus prejudice is caused.

REDUCING PREJUDICE

Intergroup contact: contact between members of different social groups.

- The contact hypothesis of prejudice reduction is the concept that the more people within social groups interact with each other, the less prejudice they will hold toward each other.

Contact hypothesis: intergroup contact can reduce prejudice and negative stereotypes held by members.

- Contact hypothesis takes time to produce beneficial results between group members and may not always be successful in reducing conflict. Additionally, contact hypothesis has conditions that must be met to effectively reduce prejudice; the groups need to achieve shared goals, groups should have equal status and mutual interdependence.

Superordinate goals: goals both groups want to achieve, but that can only be achieved if both groups cooperate.

- Intergroup conflict is only reduced if the groups succeed in achieving the superordinate goal and intergroup conflict can worsen when failure to reach the goal can be attributed to the actions of the outgroup.

Mutual interdependence: groups depend on each other to meet their goals; they have a co-dependent relationship.

Equal-status contact: members of both groups must have roughly equal power.

STUDY: ROBBERS CAVE EXPERIMENT (SHERIF ET AL., 1961)

- Muzafer Sherif believed that intergroup relations become hostile and conflict arises when groups compete for limited resources. Sherif and his fellow researchers ran field experiments over three summer camps in 1949, 1953 and 1954. The 1954 camp, located at Robbers Cave State Park near Robbers Cave, is described below.

Aim

To examine how intergroup competition leads to prejudice, stereotyping and discrimination towards an outgroup.

Method

Participants

Twenty-two boys aged eleven and twelve years old, who did not know each other previously. All were white, were of average intelligence, and came from stable and Protestant middle-class families.

Materials

Questionnaires measuring attitudes toward fellow participants.

Design

The independent variable was whether there was a competitive environment or a cooperative environment, and the dependent variables were the attitude towards members of the ingroup and outgroup, and number of friends (among others).

Procedure

The boys were invited to attend a summer camp and were not made aware that they were experimental participants, however their parents gave consent for their participation. Their behaviour was observed throughout the camp by researchers who were acting as camp staff. Hidden cameras and microphones aided in these observations.

Group formation

The boys arrived at camp in two separate buses and were initially kept apart. Over the next few days, each group shared experiences allowing them to work together. They were asked to write down the boys they considered to be their friends.

Intergroup competition

Researchers created tension and negative intergroup attitudes between the two groups by setting up competitive activities such as tug-of-war, baseball and a treasure hunt. The boys completed questionnaires recording their attitudes toward fellow group members and the outgroup, and were asked to name who they currently considered their friends.

Intergroup cooperation

Researchers then attempted to reduce the intergroup friction by creating contact situations where members between groups were in proximity (contact hypothesis). The groups were brought together to watch movies and eat meals together. The beliefs the boys had about their ingroup and outgroup were measured using ranked scales. It was decided that superordinate goals would be created to see if this would unite the two groups. The water supply was purposefully interrupted, without the boy's knowledge, and they worked together to have it running again. The boys were told the camp could not afford to rent a movie that the boys wanted to watch, so the groups contributed money then voted on the movie to rent. A truck set to drive into town to collect food was 'unable to start', so the boys pulled the truck together using a rope to help start it. All participants were asked again to write down who they were friends with.

Key findings

Group formation

- Having the two groups of boys separate and providing opportunities to develop teamwork enhanced cooperation and led to solidarity. A group leader for each group emerged, positive ingroup attitudes were formed and the boys developed friendships. The groups established their own ways to perform tasks, nicknames for each other, jokes, group symbols and a group name. One group named themselves The Eagles, and the other selected the name The Rattlers. Differing social norms became apparent, for example, The Rattlers often swore and were tougher than The Eagles, who did not swear and cried more when they got hurt.

Intergroup competition

- During intergroup activities, intergroup relations were observed. Each group planned and carried out raids against the other, threatening posters were made, and there was name-calling and physical scuffles. Through increased cooperation within each group, solidarity between members grew.
- Researchers were successful in forming prejudice and conflict between the two groups by having them compete against each other in games and activities. It was observed that when groups competed in a task that could only be achieved by one group, causing dismay for the other, over time, negative stereotypes and attitudes toward the outgroup formed. Questionnaires portrayed positive attitudes toward the ingroup, such as being brave and friendly, and negative attitudes toward the outgroup, including being sneaky and obnoxious.
- Results showed 7.5% of The Eagles' friends were members of The Rattlers, and 6.4% of The Rattlers' friends were members of The Eagles.

Intergroup cooperation

- Bringing the groups together to watch movies and eat meals led to further conflict.
- Intergroup contact (contact hypothesis) was not enough to reduce prejudice between the two groups. Having them work together to achieve superordinate goals was successful in reducing prejudice and forming positive relationships between them.
- Outgroup friendships increased significantly with 23.2% of The Eagles' friends being from The Rattlers, and 36.4% of The Rattlers' friends being members of The Eagles.



Figure 9.3 Members of The Rattler's with flags they made displaying their group name and group symbols.

Contribution of the study to psychology

- Results from the experiment can be applied to social identity theory whereby being part of a group is shown to greatly effect the behaviour and personal identity of members.
- The findings from the experiment gave rise to Sherif developing **realistic conflict theory**; hostility between groups resulting from competition for limited resources.
- Contact hypothesis was able to be evaluated and was shown to not be enough to reduce conflict, and that superordinate goals were instead successful in reducing intergroup conflict and prejudice.

Criticisms and limitations of the study

- Participants were white middle-class male boys, therefore results from the experiment cannot be generalised to females, and males of different ages in varying social classes.
- The experiments overall demonstrated poor reliability because while the 1954 camp demonstrated reduced intergroup conflict and prejudice, the camp run in 1953 did not show similar results (researchers were unsuccessful in creating intergroup conflict and participants worked out the true purpose of the study).
- As the boys were not aware that they were being observed, they were unable to give their informed consent or withdraw themselves from the study.

Question 1

- (a) Briefly outline the terms prejudice, stereotyping and discrimination, and apply each to the tripartite model of attitudes. (6 marks)

- (b) Outline **one** function of stereotypes. (1 mark)

- (c) Contrast between direct and indirect discrimination and provide **one** example of each in relation to age. (3 marks)

- (d) Identify the name given when people are subject to prejudice and are discriminated against based on their age. (1 mark)

- (e) Identify the biased belief that people get what they deserve in life because they somehow brought it on themselves. (1 mark)

Question 2

- (a) Outline the aim of the Robbers Cave experiment. (1 mark)

- (b) List the **three** stages of the Robbers Cave experiment in the correct order. (4 marks)

One: _____

Two: _____

Three: _____

- (c) Assess the outcome of the researchers bringing the two groups together for shared activities (intergroup contact). (2 marks)

- (d) Identify the term applied to tasks that required the joint cooperation between both groups of boys. (1 mark)

SOCIAL INFLUENCE THEORY, OBEDIENCE AND CONFORMITY



Key teaching points	Learn	Revise	Demonstrate
Social influences			
• Social influence theory (Kelman, 1958)			
◦ Compliance			
◦ Identification			
◦ Internalisation			
• Obedience			
◦ Social response to authority			
◦ Study: Behavioural study of obedience (Milgram, 1963)			
• Conformity			
◦ Factors affecting conformity – normative and informational influence, culture, group size, unanimity, deindividuation, social loafing			
◦ Study: Line judgement task (Asch, 1951)			

SOCIAL INFLUENCE THEORY (KELMAN, 1958)

Social influence: occurs when the real or implied presence of people influences the behaviour and attitudes of others.

- Obedience and conformity are types of social influence.
- According to psychologist Herbert Kelman, people change their attitudes and beliefs, and consequently their behaviour, due to social influence. There are three social influence processes and each of them can be viewed as a different level at which individuals accept that they have been influenced.
- Compliance, identification and internalisation are explained in terms of the reasoning people give for being influenced, the influencing agent who acts as the power source in society, and examples of each influencing process at play.

Compliance: form of social influence where behaviour is changed in response to a direct or indirect request by another person.

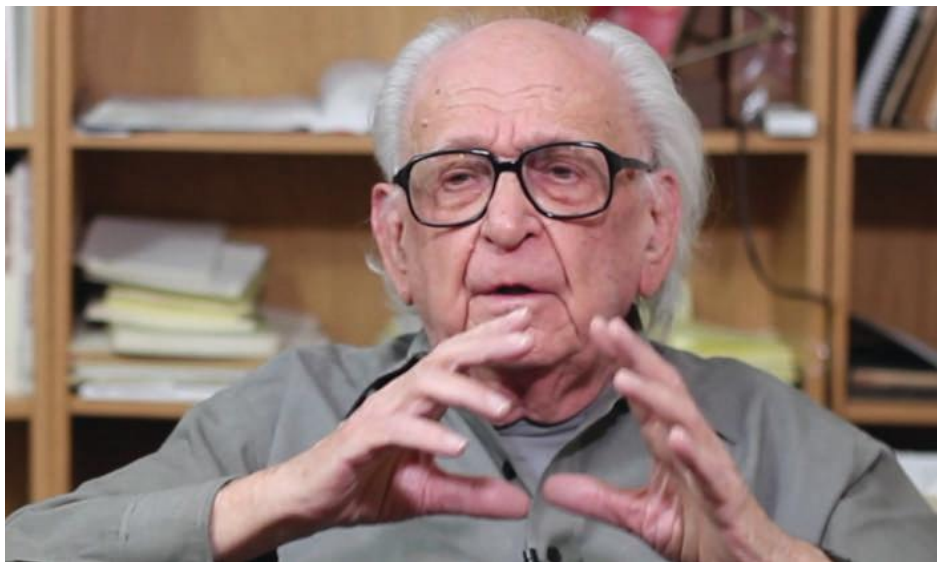


Figure 10.1 Herbert Kelman (1927–2022) was an Austrian-born American psychologist who is recognised for his work on conflict resolution in the Middle East.

Process of influence	Description	Influencing agent	Example
Compliance	<ul style="list-style-type: none"> An individual changes attitudes or behaviour with the aim of being rewarded by, or avoiding punishment from, a person or group, or to gain approval or avoid disapproval from them. The desire for approval or a reward, or avoidance of disapproval or punishment, is worth accepting influence, even though the individual does not follow the beliefs of the influencing agent. This form of influence mainly occurs when people are under surveillance or are identified. 	<ul style="list-style-type: none"> People who have the power to reward and punish (e.g., emergency services, banks or a boss at work). 	<ul style="list-style-type: none"> Slowing down when someone sees a speed camera on the freeway. The individual may not believe there should be set speed limits on the freeway, but they slow down to avoid receiving a fine. The influencing agent in this example would be the Government of Western Australia.
Identification	<ul style="list-style-type: none"> Identification arises when people change their attitudes or behaviours because they want to establish or sustain a satisfying relationship with another person. The relationship may be reciprocal, where there is a mutual exchange between them, or the person may want to be like the other person. Influence is accepted by an individual because the behaviour and attitudes are associated with the desired relationship. This sort of influence occurs when the desired relationship is attractive and satisfying. As soon as the relationships' purpose ceases to exist, the conforming behaviour will end. 	<ul style="list-style-type: none"> People that others believe having a relationship with would be attractive and important (e.g., a personal trainer helping someone reach their fitness goals, or a lawyer helping someone gain custody of their children). 	<ul style="list-style-type: none"> Students cooperating with their teachers and forming a positive rapport with them in order to receive resources, mentoring, and help with coursework.
Internalisation	<ul style="list-style-type: none"> The individual accepts influence because the attitude or behaviour of the group is in line with those of the individual. The individual internalises the attitude or behaviour because they are intrinsically satisfied with it being a part of them. As this type of influence is due to rational persuasion, the behaviour is performed whenever the relevant issue arises. 	<ul style="list-style-type: none"> People who have credibility due to being trustworthy and an expert in their field (e.g., a medical practitioner). 	<ul style="list-style-type: none"> People who take their cat to the vet for a yearly vaccination and check-up will follow the vets' health care advice if the client shares the same attitude of the vet, that preventative care is important.

Strengths of theory

- Kelman's processes of social influence (compliance, identification and internalisation) can be tested experimentally, and its effects can be observed and provide empirical evidence (information gathered through observation or through an experiment).
- Kelman went on to apply his theory to therapy and was able to explain how processes of influence can be directed to the patient's behaviour both within the therapy situation and applied to real-life situations outside of therapy.

Limitations of theory

- Close observation of behaviour and analysis of the interactions that people have in society is required for this model.
- Kelman's model is not intended to apply to all changes in attitude resulting from social interaction. For instance, acquiring new skills in a social learning environment is not an example of social influence – however any changes in attitude that come along with acquiring the skills would count as social influence.

Application of theory to a real-world context

- Developing policies for educational institutions such as universities.
- Students can be designated a highly experienced tutor or lecturer to be their mentor and provide advice and support during their time at university (identification and internalisation).
- Administrators can produce an assessment policy that states students will have consequences for plagiarism and cheating in assessments (compliance).

OBEDIENCE

Obedience: changing behaviour in response to a direct order by an authority figure.

SOCIAL RESPONSE TO AUTHORITY

- Obedience occurs within a hierarchy with authority figures higher up than those following their commands.
- People who obey an authority figure usually do so in order to avoid punishment, or because they have a strong belief in the authority figure.

STUDY: BEHAVIOURAL STUDY OF OBEDIENCE (MILGRAM, 1963)

- Stanley Milgram was a social psychologist working at Yale University who was influenced by the events of the Holocaust in Europe in the 1930s and 1940s. Milgram is seen below in Figure 10.2 with his simulated shock generator.



Figure 10.2

Aim

Investigating the lengths that people will go to obey direct commands from an authority figure.

Method

Participants

Each trial consisted of one participant, a man wearing a grey laboratory coat playing the role of experimenter, and an additional confederate who pretended to be a fellow participant.

Forty male participants between twenty and fifty years of age, from a range of occupations, responded to a newspaper advertisement of the study (self-selection sampling).

Materials

Simulated shock generator and a list of word-pairs.

Design

While Milgram called his study an experiment, it is in fact non-experimental research and there was no independent variable. Each participant was observed performing the same task under identical conditions. The dependent variable was the extent to which participants obeyed the experimenter (measured by the voltage administered).

Procedure

Participants agreed to be part of what they believed was a study of learning and memory at Yale University (deception was involved, as this was not the true purpose of the study). They were paid \$4.50 for showing up at the laboratory and were told they would keep this even if they did not participate in the experiment. Participants were told that the study was looking at the effect of punishment on learning and were given a sample shock of 45v on the wrist to convince them the shock generator was authentic.

The experimenter had the participant and confederate each draw out a piece of paper from a hat to see who would take the role of learner and who would be the teacher. This was rigged so that the participant was always chosen to be the teacher, and the confederate, the learner. In an adjacent room, the participant watched the experimenter strap the learner into a chair and place an electrode on one of his wrists and was told that the electrode was connected to an electric shock generator in the connecting room.

In the main room, the participant was seated in front of a simulated shock generator consisting of thirty lever switches ranging from 15 to 450 volts, and was asked to read a series of word pairs to the learner. Following this, the participant read each word in the series followed by four alternative words and the learner had to select which of the four options matched with the original word.

For each incorrect response given by the learner, the participant was required to administer an electric shock, increasing in 15 volt increments, by using the labelled switches on the simulated shock generator. The learner gave predetermined responses with no sign of distress until 300 and 315 volts were administered. On receiving these shocks, the learner pounds on the wall, which is heard by the participant. No further answers are provided from the learner from this point. If the participant was reluctant to continue the experiment, the experimenter responded with a series of standardised prompts, spoken in a firm tone, e.g., 'please continue'. The experiment was terminated once the final prompt was unsuccessful in pushing the participant to continue and once the experiment ended, participants were debriefed and interviewed.

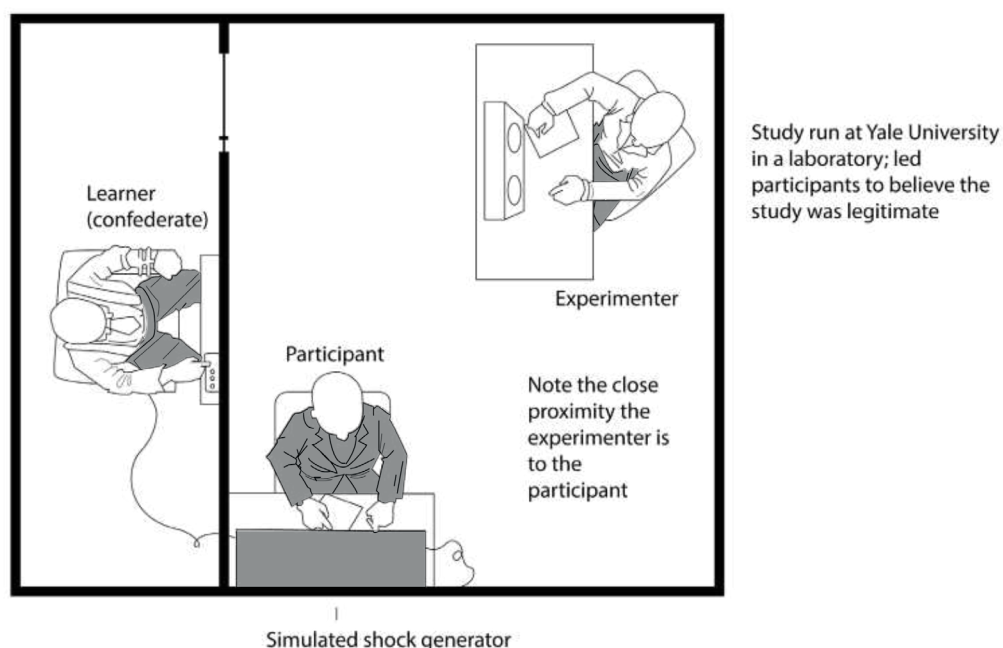


Figure 10.3 While the participant was close to the learner, the wall separating them meant the participant was not aware that the learner was not in fact receiving electric shocks.

Key findings

- All participants administered a minimum of 300 volts.
- Sixty-five percent of participants obeyed orders all the way through until administering the maximum 450 volts.
- Fourteen participants eventually refused to obey the experimenter and stopped administering shocks. Of these participants, some were very angry, highly agitated and some stood up and stated they wanted to leave.

Contribution of the study to psychology

- At the time of the study there was minimal scientific research on how people reacted to authority figures. His study inspired researchers, such as Philip Zimbardo, to develop their own studies based on obedience.
- Due to the standardised procedure Milgram used for each participant, the study was able to be replicated by others.

Criticisms and limitations of the study

- While participants voluntarily chose to be part of the experiment, they did not give informed consent as the true purpose of the study was not disclosed to them.
- Numerous participants indicated they did not want to continue with the experiment, but were firmly told to continue, therefore there was a violation of withdrawal rights.
- Many participants experienced intense stress during the study with physical symptoms such as trembling, sweating, stuttering and nervous laughing fits. In addition to the anxiety, participants were led to believe they had the capacity to harm other people, and this caused psychological harm. Even though there was debriefing at the end of the study, and the participant was reconciled with the learner (confederate) to show he was not harmed, many claim the study was highly unethical.

Public Announcement

WE WILL PAY YOU \$4.00 FOR ONE HOUR OF YOUR TIME

Persons Needed for a Study of Memory

*We will pay five hundred New Haven men to help us complete a scientific study of memory and learning. The study is being done at Yale University.

*Each person who participates will be paid \$4.00 (plus 50c carfare) for approximately 1 hour's time. We need you for only one hour: there are no further obligations. You may choose the time you would like to come (evenings, weekdays, or weekends).

*No special training, education, or experience is needed. We want:

Factory workers	Businessmen	Construction workers
City employees	Clerks	Salespeople
Laborers	Professional people	White-collar workers
Barbers	Telephone workers	Others

All persons must be between the ages of 20 and 50. High school and college students cannot be used.

*If you meet these qualifications, fill out the coupon below and mail it now to Professor Stanley Milgram, Department of Psychology, Yale University, New Haven. You will be notified later of the specific time and place of the study. We reserve the right to decline any application.

*You will be paid \$4.00 (plus 50c carfare) as soon as you arrive at the laboratory.

Figure 10.4 The advertisement recruiting participants states the study is on memory and learning.

CONFORMITY

Conformity: changing behaviour to align with those of a group due to real or implied pressure.

- Conformity occurs between people in the same social status and when explaining behaviour, people tend to take personal responsibility, rather than admit that they conformed.

FACTORS AFFECTING CONFORMITY

Normative and informational influence

- **Normative influence** occurs when people conform because they want to be accepted by the group and not stand out.
- In this type of social influence, individuals do not necessarily share the same belief as the majority, but choose to disregard this fact in order to fit in.
- **Informational influence** occurs when people conform because they would like to be correct and currently lack the information needed to be sure of their opinion or belief.
- Individuals seek the knowledge held by those in the group when deciding how best to behave.

Culture

- Individualism and collectivism are both societal structures based on whether people's identities rely on their personal choices, or on the society as a collective.
- **Individualistic cultures** value people standing out as an individual, and individual needs over the group, and believe independence and self-reliance are important. People in these cultures are less likely to conform to group norms than people from collectivist cultures.
- Examples of individualistic cultures are the United States of America, Australia, New Zealand, and countries in North-western Europe, such as the United Kingdom, the Netherlands, Italy, Germany, and France.
- **Collectivist cultures** value the needs of the group over individual interests and view individuals putting themselves first as selfish behaviour. Conformity is more likely to be seen in these cultures and is viewed favourably.
- Examples of collectivist cultures are in Asia, including China, Singapore and Indonesia, in South America, such as Ecuador, Colombia and Peru, and in Africa, including Nigeria and Ghana.

Group size

- Numerous researchers have found that rates of conformity increase as the group size increases, with groups of three to five members having the highest conformity level.
- Once the group size increases beyond five members, little impact is made to the degree of conformity between members.

Unanimity

Unanimity: when people all agree about the same thing.

- When all members of a group behave a certain way, or share the same attitude, it is more likely that an individual will conform. When a group lacks unanimity the level of conformity, specifically normative conformity, decreases because individuals no longer feel the need to be accepted by the group.

Deindividuation

Deindividuation: the process whereby people have reduced self-awareness and feel less inhibited in group situations.

- Self-awareness shifts away from the self to the group situation and a mentality of ‘everyone is doing it so I can do it too’ occurs.
- Acting as part of a group rather than as an individual happens because the excitement of the situation leads individuals to feel anonymous and less self-conscious. The probable consequences of the behaviour are not considered and people in the group feel less responsibility for their own behaviour as it is shared among the group.
- Deindividuation often occurs when members of the group act antisocially, such as loudly swearing and booing during a sporting match, looting during a riot, although there are instances when deindividuation can occur in groups behaving prosocially, such as helping clean up after a natural disaster, or participating in a charity event like Telethon.
- Deindividuation can be reduced by making people feel that they are identifiable. For example, giant screens displaying live audience footage during sporting matches can reduce the chance that individuals will become vulnerable to social influences and act violently.
- In a situation when people experience deindividuation in a group setting, individuals are likely to conform to the group norms of the particular group they find themselves in.

Social loafing

Social loafing: the tendency for an individual to reduce their effort when working in a group.

- Social loafing increases when the group size increases, most significantly within a group with the maximum size of eight members.
- Collectivist cultures place more value on groups than individuals therefore social loafing occurs less often in collectivist cultures.
- There are two types of social loafing, the sucker effect, and the free-rider effect.

Sucker effect: an individual reducing their effort when working in a group after realising other group members are not putting in effort. Individuals avoid being a ‘sucker’ and doing more work than the other members in the group.

- In the case of the sucker effect, the group norm is to put in minimal effort, therefore when an individual in the group decides to also reduce their effort, it may be considered an act of conformity.

Free-rider effect: an individual reducing their effort when working in a group because they believe other group members can successfully complete the task without their input.

- The man on his mobile phone in Figure 10.5 has decided the two other group members are able to complete the job to a satisfactory level without his help, this is an example of the free-rider effect.
- Social loafing can be reduced by having the group made up of friends instead of strangers, by giving the task a high level of importance, and by making individuals accountable for their actions in the group by measuring their output and effort. Making group members accountable means they are identifiable.



Figure 10.5

STUDY: LINE JUDGEMENT TASK (ASCH, 1951)

Aim

To explore the conditions that would cause individuals to either resist or succumb to group pressures.

Method

Participants

Eighty-seven male college students.

Materials

Series of cards each showing a standard line and three comparison lines.

Design

The independent variable was whether or not there was group pressure caused by unanimity, and the dependent variable was the level of conformity measured by the number of errors made.

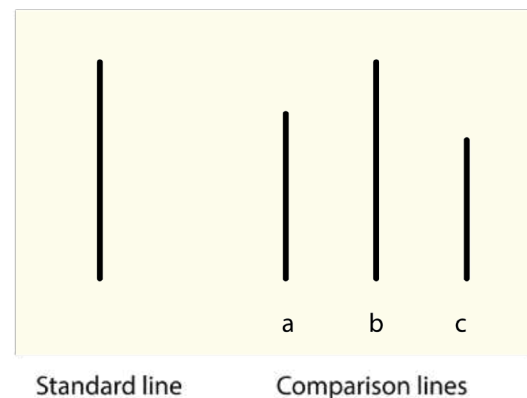


Figure 10.6

Procedure

Fifty participants were allocated to the experimental condition and thirty-seven to the control group. The participant sat around a table alongside seven male college students, all were told that they were taking part in a visual discrimination task (deception).

The participant was unaware that the other students at the table were confederates of the experimenter and had been given instructions prior to the experiment. The participant was seated at the sixth position of the table, then the experimenter showed the participants a series of cards that showed a standard line on the left and three comparison lines on the right. One by one, the students would publicly announce which comparison line was the same length as the standard line.

This was repeated six times with confederates giving the correct answers and during the last twelve trials (critical trials), the confederates gave obviously incorrect answers. Those in the control group followed the same procedure but wrote down their response rather than verbally stating it to the group. Participants were individually interviewed and then debriefed in such a way that participants were made aware of the purpose of the study, and the role that they, and the confederates played.

Key findings

- Table 10.1 shows the last twelve critical trials for each of the fifty participants in the experimental group, and the thirty-seven participants in the control group. All the errors made were in the direction of the majority estimates.
- Thirty-seven participants in the experimental group conformed on at least one of the critical trials (74%), leaving thirteen participants in the experimental group who did not conform in any of the twelve critical trials (26%). In the control group, two participants from the thirty-seven conformed on one critical trial (5.4%).

Distribution of errors made in the critical trials for experimental and control groups

Number of errors made on the critical trials	Experimental group (50 participants)	Control group (37 participants)
0	13	35
1	4	1
2	5	1
3	6	
4	3	
5	4	
6	1	
7	2	
8	5	
9	3	
10	3	
11	1	
12	0	

Table 10.1

- Participants provided differing reasons for conforming. A very small group of participants experienced a distortion of perception and conformed, although they did not believe they had done so.
- Most recognised that they conformed because the way they wanted to respond was different to that of the group, and believed the group was correct and that their perception was faulty. In this case, informative influence can be said to have occurred.
- Other participants were sure that the group were incorrect but gave the same responses to avoid standing out; normative conformity was evident.
- Asch ran alternative variations of the study whereby one or two confederates seated before the participant gave correct responses during the critical trials, thus the group was no longer unanimous. Results showed that conformity levels dropped significantly.

Contribution of the study to psychology

- Asch's line study provided insight into the conditions in which people conform, and the reasons why people conform.

Criticisms and limitations of the study

- Asch used a biased sample as all participants were male college students in the same age group, therefore limiting the ability to generalise results to the wider population.
- While deception was required in the experiment, there are people who feel some participants may have been embarrassed after finding out they conformed to the majority view. This may be considered a breach of the participant right to be protected from psychological harm.

Question 1

Janelle is not a huge fan of soccer but plays on the school soccer team because Louise is also on the team and Janelle wants to become her close friend.

- (a) (i) Identify the process of influence Janelle is exhibiting according to Kelman's social influence theory. (1 mark)

- (ii) Describe what would need to happen for Janelle to leave the soccer team and stop playing. (1 mark)

Name the process of influence evident for the following scenarios.

- (b) (i) Wearing your school uniform to school but then changing immediately upon arriving home. (1 mark)

- (ii) Moving to another country and retaining cultural customs from your native land. (1 mark)

- (iii) Voting for your friend to be head boy in year 12. (1 mark)

- (iv) Cleaning the bathroom because your parents asked you to. (1 mark)

Question 2

- (a) Identify the dependent variable in Milgram's shock experiment. (1 mark)

- (b) Explain **three** features of Milgram's shock experiment that might explain why the participants obeyed. (6 marks)

One: _____

Two: _____

Three: _____

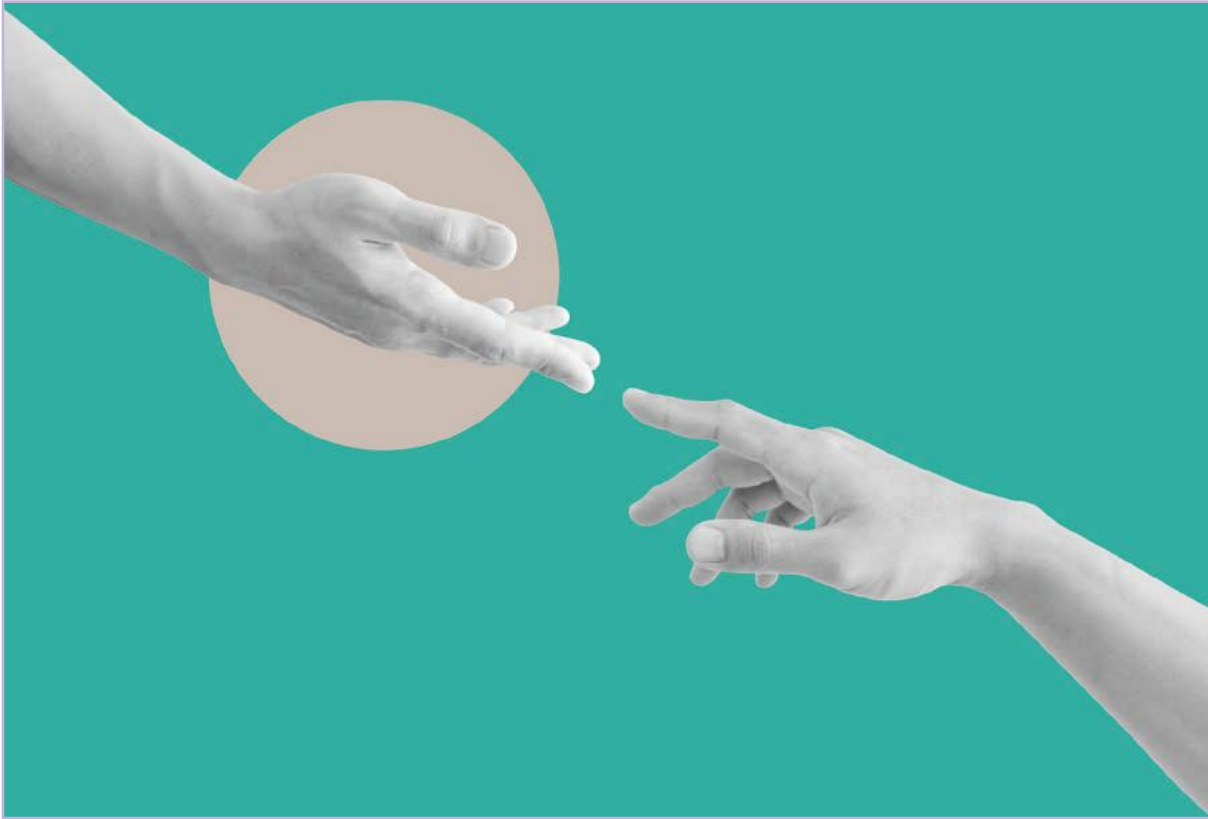
Question 3

- (a) Outline the reason people are susceptible to normative conformity. (1 mark)

- (b) (i) Comment on the results of Asch's line judgement task when group unanimity was eliminated in a variation of the study. (1 mark)

- (ii) Describe the method used to eliminate group unanimity in the variation of the study. (1 mark)

ANTISOCIAL AND PRO-SOCIAL BEHAVIOUR IN RESPONSE TO SOCIAL INFLUENCE



Key teaching points	Learn	Revise	Demonstrate
Social influences			
• Antisocial behaviour in response to social influence			
◦ Factors influencing antisocial behaviour – bystander effect (audience inhibition, social influence, diffusion of responsibility, cost- benefit analysis), groupthink			
◦ Study: Group inhibition of bystander intervention in emergencies – smoke filled room (Latané and Darley, 1968)			
◦ Bullying as an example of antisocial behaviour			
• Pro-social behaviour in response to social influence			
◦ Factors influencing pro-social behaviour – reciprocity principle, social responsibility, personal characteristics (empathy, mood, competence), altruism			
◦ Helping as an example of pro-social behaviour			

ANTISOCIAL BEHAVIOUR IN RESPONSE TO SOCIAL INFLUENCE

Antisocial behaviour: behaviour that harms society and its members by intentionally violating the rights of others.

Beyond the syllabus

In the early morning on March 13, 1964, twenty-eight-year-old Catherine (Kitty) Genovese was raped and stabbed by a man named Winston Moseley after driving home from the bar where she worked. Walking to her apartment complex, Moseley, who had followed her home in his car, approached Genovese with a hunting knife.

After chasing Genovese, who ran to the front of her apartment block, Moseley stabbed her twice in the back. A few neighbours heard her scream and a male neighbour shouted for Moseley to leave Genovese alone, to which he ran away.

Moseley got back into his car and was seen by witnesses ten minutes later searching for Genovese who he eventually found barely conscious on the floor of a hallway in the back of the building where she was locked out. He continued to stab her, raped her, stole the money she had on her, and then ran away. He was arrested six days after the murder and eventually admitted to killing Genovese in addition to two other women.

An article published in *The New York Times* on March 27 claimed thirty-eight witnesses saw the murder and none called the police.

The horrific case prompted social psychologists Latané and Darley to research the bystander effect and the diffusion of responsibility. This case also led to the implementation of the 911 system as there was no centralised emergency telephone number at the time.

An article published in 2004, for the 40th anniversary of the murder, purposed the original article in *The New York Times* included inaccuracies. The number of witnesses was highly exaggerated, the article stated witnesses had seen the murder whereas none had seen the whole attack (as it occurred in two locations). It appears that some witnesses only heard what they thought was a couple arguing, two witnesses called police, and Kitty's elderly neighbour found her soon after the second attack and held her in her arms until police arrived. Kitty died on the way to hospital.



Figure 11.1 Police photograph of Kitty Genovese from an arrest for bookmaking (accepting bets on horse races) in 1961.

Factors influencing antisocial behaviour

- The murder of Kitty Genovese by Winston Moseley was explicitly antisocial behaviour, however having the ability to help a person in danger and deciding not to is also considered antisocial behaviour.
- Bibb Latané and John Darley studied multiple cases, including that of Kitty Genovese, where bystanders failed to help someone in need when in the presence of others and named this phenomenon the **bystander effect**.

Bystander: person present at an event but not taking part.

- The bystander effect proposes that the more people present, the less likely help will be offered by any of the individuals.
- They concluded that multiple psychological processes lead to the bystander effect and that there are steps that must be taken before a bystander will help in an emergency (Figure 11.2).

- Firstly, the bystander becomes aware of a potential emergency but may decide to not act because the event might not be an emergency after all, and they do not want to risk embarrassing themselves in front of others. Or, what if the bystander's offer to help is rejected and they are left feeling like a fool?

Audience inhibition: failure to intervene in an emergency in the presence of others due to fear of being negatively judged.

- The more people present, the greater the risk of audience inhibition.
- When a bystander is unsure of how to behave in an emergency, they will look to fellow bystanders for cues on how to act. This process is known as **social influence** and explains why inactive bystanders inhibit the helping of others and believe that if others are not intervening in this situation, then it must not be an emergency.
- Emergencies tend to be ambiguous situations for people who have not experienced them before, therefore most bystanders will not know the appropriate action to take resulting in no bystanders intervening.
- Lastly, there must be a diffusion of responsibility where the bystander assumes that someone else will act.

Diffusion of responsibility: a reduction in personal responsibility when in a group, resulting in the individual being less likely to act.

- Personal responsibility is divided amongst the bystanders therefore the more people witnessing an event, the less likely any of the bystanders will act.
- Throughout the entire process, bystanders perform numerous cost-benefit analyses. The **cost-benefit analysis** is the psychological process of weighing up the benefit of performing a behaviour, with the potential cost of the behaviour.
- As previously mentioned, the bystander may feel embarrassed if they misinterpreted the situation as an emergency and intervened. Putting themselves at risk to help someone else is also a cost to consider. Additionally, the bystander may feel guilty or ashamed for not helping.
- A limitation of the concept of bystander effect is that there are instances during real-life emergencies where bystanders are very helpful, thus, the presence of others is not always detrimental to prosocial behaviour.

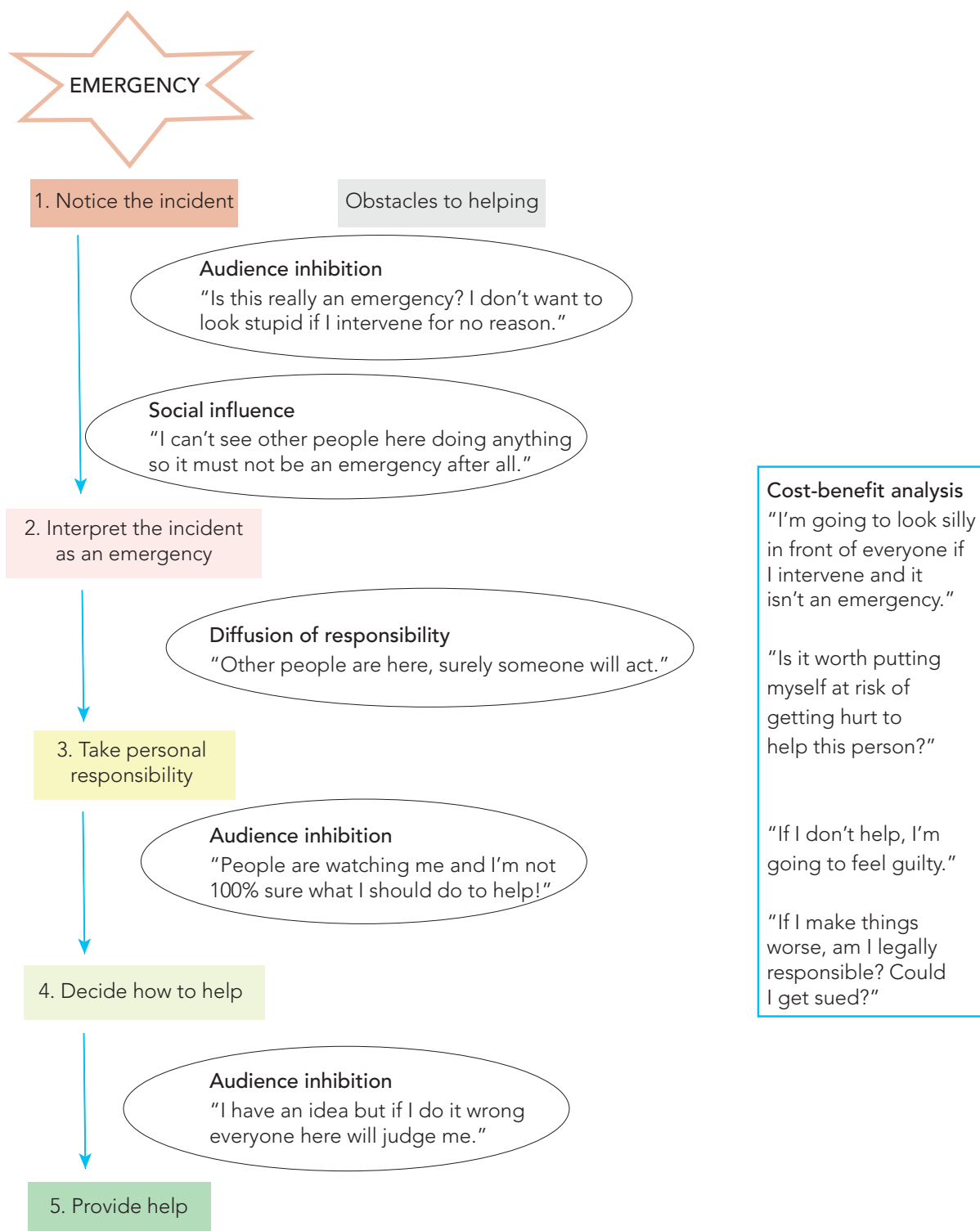


Figure 11.2 Diagram is based on Latané and Darley's model for bystander intervention.

STUDY: GROUP INHIBITION OF BYSTANDER INTERVENTION IN EMERGENCIES – SMOKE FILLED ROOM (LATANÉ AND DARLEY, 1968)

- Studies prior to 1968 indicated that crowd behaviour can incite a ‘contagion of panic’ where each member of the crowd overreacts to the perceived emergency, leading to increased risk of harm to all present. The possibility of a passive crowd, as opposed to one acting in panic, producing minimal response to a perceived emergency was investigated by Bibb Latané and John Darley.

Aim

To observe the behaviour of bystanders in an emergency.

Method

Participants

Eighty-seven male college students living on campus at Columbia University were selected via convenience sampling (Latané taught at Columbia University).

Materials

Preliminary questionnaire and titanium dioxide (used to create smoke).

Design

The independent variable was whether participants were alone, in a group with other participants, or in a group with confederates. The dependent variable was the time the participant stayed in the room before leaving to report the smoke.

Procedure

Participants were contacted over the phone and asked to be interviewed about the disadvantages of attending an urban university (deception). Those who voluntarily attended were divided into three conditions; sitting alone, sitting with two other participants, or sitting with two confederates. For each trial, the participant was directed by the secretary or signs to a waiting room that had a few chairs and a one-way mirror and filled out a preliminary questionnaire as requested by a sign in the room. After participants had finished two pages of their questionnaires, the experimenter released a stream of titanium dioxide particles through a vent in the wall, producing what looked like smoke from a fire.

The confederates were instructed to only momentarily take notice of the smoke, then resume filling out their questionnaire. They were also asked to avoid conversing with the participant, only responding with ‘I don’t know’ if queried about the smoke. The experiment was concluded once the participant left the room to report the smoke, or six minutes from the time the participant noticed the smoke. At the end of the experiment, the participants were individually asked to sit with the interviewer in his office and asked by the interviewer if they had any difficulty completing their questionnaire. Once mentioning the ‘smoke’, the interviewer asked the participant to describe their thought process during this incident.

Key findings

- Results showed that 75% of participants who were alone reported the smoke, 10% of participants who were in a group with two passive confederates reported the smoke, and 38% of participants who were in a group of three reported the smoke.
- During the final interviews, participants stated that they took little notice of the reaction of others in the room, and did not admit, or were unaware, that the people in the room influenced their behaviour. Most explained that they did not act, because they did not believe there was an emergency.

Contribution of the study to psychology

- Research at the time of the experiment focused on the relationship between bystanders and the victim, results from the experiment encouraged further research to explore the relationship amongst the bystanders.
- Understanding how the presence of others in an emergency affects bystander behaviour can help reduce the negative outcomes of such events.

Criticisms and limitations of the study

- Acting in a calm and collected fashion during stressful situations is the culturally accepted social script for American males. Results could have been different if females, or participants from another culture were selected. Generalising results to the population of male and females across different cultures is not possible.
- One condition in the study included confederates who were told to not respond to the smoke. It is likely individuals would respond to smoke in a similar situation and share their attitudes within the group. This study was therefore not realistic.
- Today titanium dioxide is classified as a carcinogen as exposure to the fumes can cause burns to the eyes, throat, nose and lungs. The physical safety of the participants was not upheld.

GROUPTHINK

- When people place importance on group unanimity at the expense of independent opinions and critical thinking, extreme and often poor decisions are made.

Groupthink: group members conform to make unanimous decisions without using critical reasoning.

- Groups that experience groupthink may develop harmful stereotypes by considering their beliefs to be correct, that they are the ingroup and everyone else is part of the outgroup.
- Groupthink can cause antisocial behaviour when group members unquestioningly follow orders from a leader that involve physically and/or psychologically harming others.

Beyond the syllabus

A **cult** is a social movement or group with a shared commitment to a typically extreme ideology. Cults are usually directed by a manipulative, charismatic and authoritarian leader who demands obedience and unquestioning devotion from their members. While most members in cults do not suffer from psychological disorders, cult leaders typically display narcissistic traits, lack empathy and may have delusions of grandeur whereby they believe they have a special power, have a great talent or have made a significant discovery.

Cults take advantage of the fact that many people are susceptible to groupthink. They use brainwashing, also known as indoctrination, to teach members to uncritically accept a set of beliefs. When powerful cult leaders strongly dissuade or punish followers who question the teachings of the group, members may eventually self-censor to avoid judgement from the group. Over time, cult members may come to assume the silence of the group suggests unanimity among them.

Members may be isolated from family and friends who are not part of the cult and are coerced into stereotyping people outside of the cult as dangerous and part of the outgroup.

Members of cults could experience cognitive dissonance during indoctrination when, for example, cutting off contact with their family and friends is inconsistent with their family values. The dissonance may be reduced by deciding that the cult leader is generously taking care of their needs, therefore it is justifiable to be asked to distance themselves from people who are not part of the cult.

Before founding The Heaven's Gate, Marshall Applewhite (1931-1997) claimed he experienced visions where he was told that he was a chosen prophet for a divine assignment. His teachings developed into a mix of astrology and Biblical prophecy (specifically the second coming of Christ), and he led his followers to believe that Earth was going to be wiped clean and he would be sent a sign from the 'Evolutionary Level Above Human' when it was time for them to leave Earth and be born into this 'Next Level'.

As they needed to change over their bodies to be incarnated into the Next Level, Applewhite convinced his followers that when he is given the signal, they must commit mass suicide to board a spacecraft transporting them to the Next Level. In March 1997, the Hale-Bopp comet was seen from Earth, and believing this was the signal to leave Earth, Applewhite persuaded thirty-eight out of his thirty-nine followers to commit the collective suicide they had been preparing for.

Unwavering group unanimity caused a loss of independence and critical thinking, ultimately leading to the death of Marshall Applewhite and thirty-eight devoted members.



Figure 11.3 Applewhite sharing teachings of Heaven's Gate in one of many videos that he made.

BULLYING AS AN EXAMPLE OF ANTISOCIAL BEHAVIOUR

Bullying: the purposeful use of a difference in power to repeatedly cause physical, psychological or social harm.

- Bullying is not a single episode but is repeated behaviour and can occur through social media apps (such as Snapchat), online or in person.

PRO-SOCIAL BEHAVIOUR IN RESPONSE TO SOCIAL INFLUENCE

Pro-social behaviour: voluntary actions that promote social acceptance and benefit society and its members.

FACTORS INFLUENCING PRO-SOCIAL BEHAVIOUR

Reciprocity principle: the social norm where a person feels obligated to return the favour to a person that does something for them.

- Reciprocity concerning the exchange of helpful behaviour between people is related to altruism. In this case, there is no expectation of a returned favour due to the assumption that the person being helped would do the same thing for them.

Social responsibility: the theory that individuals are accountable for acting in a way that benefits society.

- Individuals with a higher level of social responsibility perform more pro-social behaviours than those with lower levels of social responsibility.

PERSONAL CHARACTERISTICS OF THE PERSON ENGAGING IN PRO-SOCIAL BEHAVIOURS

Empathy

Empathy: the ability to sense and share the thoughts or feelings of another person.

- Individuals that can empathise with an individual in distress are more likely to act pro-socially in response because they can view the perspective of the other person.

Mood

- When an individual is experiencing a low mood, they are less likely to help others. If an individual is in a positive mood, one theory suggests that they carry out pro-social behaviours to maintain it (known as 'the feel-good, do-good effect').

Competence

- There is a positive correlation between the competence someone feels, and the way they positively impact others. An individual who believes they have the ability to help others is more likely to do so.

Altruism as a type of prosocial behaviour

Altruism: helping others without expecting any personal reward.

- Altruistic behaviour is unselfish and may result in the person doing the helping putting themselves at risk or paying some sort of cost.
- There is a positive correlation between empathy and altruism, the more empathy felt by an individual, the more likely they are to display altruistic behaviour (helping for the other person's benefit rather than for their own personal benefit). This is known as the empathy-altruism hypothesis.
- The man in Figure 11.4 has volunteered his time to deliver food to elderly neighbours in his community. He empathises with them and remembers when his mother was unable to leave the home to buy groceries during a Covid lockdown.

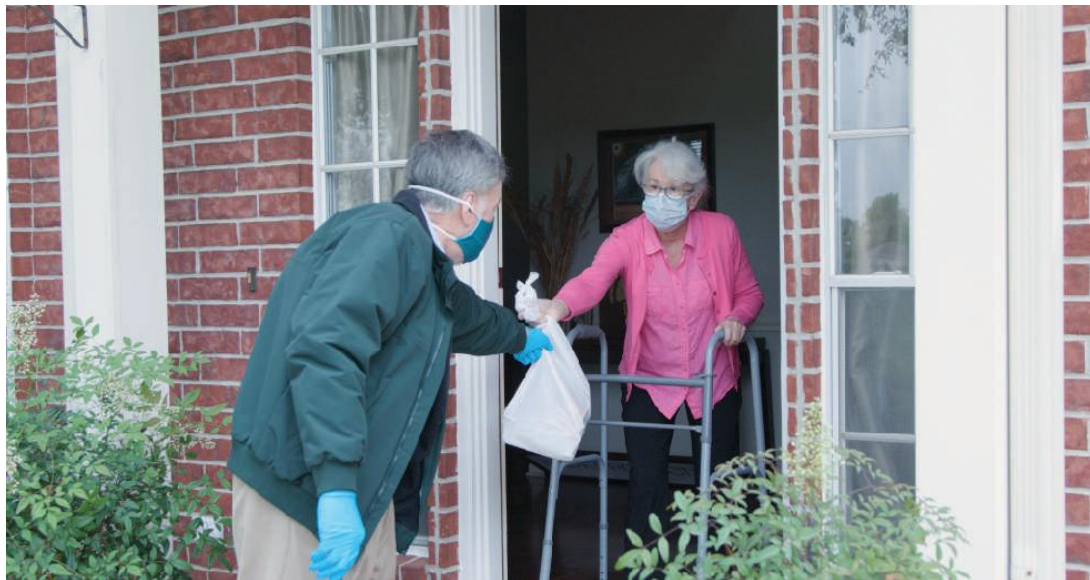


Figure 11.4

HELPING AS AN EXAMPLE OF PROSOCIAL BEHAVIOUR

Helping: voluntary actions that benefit others.

- Psychologists have determined several reasons why people help others.
 - One theory is that people are more likely to help others they find similar to themselves (especially close relatives) to strengthen the gene pool and increase the chances that future generations will survive.
 - Helping others can be for altruistic reasons, such as feeling empathy for another person.
 - Personal benefits including an increase in their own positive mood, self-image, or the hope that the person being helped reciprocates the behaviour in the future.
 - Helping behaviour can be taught to young children and reinforced throughout childhood.
- Acts of kindness have become a social media trend where people in need are exploited by YouTubers who post videos showing them giving people money to profit from videos going viral. While it is helping behaviour, which is pro-social, it is typically not altruistic.

Question 1

- (a) Describe the relationship between the number of people and likelihood of providing help in relation to the bystander effect. (2 marks)

- (b) (i) Audience inhibition, social influence and diffusion of responsibility are psychological processes that lead to the bystander effect. Define the **three** processes. (3 marks)

Audience inhibition: _____

Social influence: _____

Diffusion of responsibility: _____

While boarding the hired party bus taking Joel and around fifteen of his friends to the casino, he notices a young woman slumped on the ground near the entrance of a nightclub on the busy street. She seems to have lost her shoes and she might be drunk.

- (ii) Assuming that the bystander effect was to occur in this situation, apply the **three** processes defined in part (b) (i) to the above scenario. (6 marks)

Audience inhibition: _____

Social influence: _____

Diffusion of responsibility: _____

Question 2

(a) Consider the relationship between mood and pro-social behaviour. (2 marks)

(b) Consider the relationship between altruism and empathy. (2 marks)

(c) Identify the type of behaviour that includes actions that benefits others and the self at the same time. (1 mark)

ETHICAL GUIDELINES



Key teaching points	Learn	Revise	Demonstrate
Ethical guidelines and practices for psychological research			
• The role of ethics/ethical guidelines in psychological research			
◦ The role of ethics committee approval and monitoring of conduct for all psychological research			
• Understand and apply ethical guidelines and practices related to human participants			
◦ Protection from harm (physical and psychological)			
◦ Informed consent			
◦ Withdrawal rights			
◦ Deception			
◦ Confidentiality			
◦ Privacy			
◦ Voluntary participation			
◦ Debriefing			
• Use of animals in research			
◦ Replacement, reduction, refinement			

THE ROLE OF ETHICS/ETHICAL GUIDELINES IN PSYCHOLOGICAL RESEARCH

- **Ethical guidelines** are codes of practice that are designed to be followed as a guide by people involved in psychological research. They allow people to understand what is deemed right or wrong and how to apply this knowledge to their research procedures.

THE ROLE OF ETHICS COMMITTEE APPROVAL AND MONITORING OF CONDUCT FOR ALL PSYCHOLOGICAL RESEARCH

- There are more than two hundred human research ethics committees (HREC) in Australia. Most research organisations, such as hospitals and universities, have one.
- The role of these ethics committees is to review research proposals that plan to use human participants in order to make sure that they meet the guidelines in the Australian code of ethics.
- The ethics committee will decide whether there has already been similar completed research that nullifies the purpose of the current proposal, and whether the risk to participant welfare outweighs any benefit the research would have to society.
- Once approved, the ethics committee will monitor the research study and is able to step in and stop the study from continuing if they suspect that any ethical guidelines have been breached.

UNDERSTAND AND APPLY ETHICAL GUIDELINES AND PRACTICES RELATED TO HUMAN PARTICIPANTS

Protection from harm: researchers must protect the physical and psychological wellbeing of participants, following ethical guidelines can help accomplish this.

- One way to reduce the risk of continued psychological harm after a study is to debrief participants.

Informed consent: researchers must obtain written consent from participants (using a consent form).

- Participants under eighteen-years-of-age, or those lacking the intellectual ability to give informed consent, need to have their legal guardian provide consent on their behalf.
- The consent form should include the purpose of the study, what the participant is required to do, whether there are potential risks of participating in the study, the length of time the study will take and explain the withdrawal rights of the participant.

Withdrawal rights: participants can end their participation in a study, or have their results removed during or at the completion of the study without pressure or penalty.

- Withdrawal rights must be explained within the informed consent procedure.

Confidentiality: information collected from participants must be stored in a secure manner and then disposed of when no longer required.

- Confidentiality is concerned with **HOW** information collected from participants is safeguarded.
- If the researcher wishes to publish or share results, participant names are not able to be used (a number may be allocated to each participant), and written consent from the participant (or legal guardian if the participant is under eighteen years of age) must be obtained.

Privacy: only information relevant to the study should be collected from participants.

- Privacy is concerned with **WHAT** information from participants is collected.

Voluntary participation: participants partake in a study because it is their choice to do so.

- Participants cannot be bribed to participate or be at risk of failing a course (at university, for example) if they do not take part.

Deception: this is used when the participants knowing the true purpose of the study would affect the results.

- If using deception causes the risks to participants to outweigh the potential benefits of the research to society, it should not be used.

Debriefing: an explanation given to participants at the conclusion of a study.

- If there was deception in the study, participants need to be informed of this, an opportunity for counselling should be provided, any mistaken beliefs participants may have formed during the study must be dispelled, and the participant's right to remove their results from the study needs to be upheld.

USE OF ANIMALS IN RESEARCH

- Just like there is a code of ethics for the use of human participants in research in Australia, there is also a code for the care and use of animals for scientific processes.
- The priority when making decisions involving the use of animals for scientific purposes is respect for the animals.
- At every stage of animal care and use, respect can be demonstrated by applying the 3Rs; replacement, reduction and refinement.

Replacement: the use of alternative methods that eliminate the need for animals in research.

Reduction: obtaining more information from the number of animals planned for research or using alternative methods to gather similar information by using fewer animals.

Refinement: utilising methods that will minimise potential distress or pain for animals in research.



Question 1

A lecturer at a university placed posters around the university campus inviting students to be involved in a study testing whether hemp seed oil increased sleepiness in students. One group of students ingested one capsule of hemp seed oil just before bed for two weeks while a second group of students took a capsule containing hemp-flavoured water before bed for two weeks. The length of time it took for students to fall asleep was recorded each night for two weeks.

- (a) 'Participants exercised their right to voluntary participation.' Provide evidence of this statement from the research scenario provided. (2 marks)

- (b) Describe **two** ways in which the participant right of confidentiality could be applied in this study. (2 marks)

One: _____

Two: _____

- (c) Describe **one** way in which the participant right of privacy could be applied in this study. (1 mark)

- (d) Explain how withdrawal rights can be adhered to both during and after conducting this study. (2 marks)

- (e) The lecturer debriefed the participants at the conclusion of the study. List **two** pieces of information that should be included in their debrief. (2 marks)

One: _____

Two: _____

- (f) (i) The lecturer would not have been able to run their study without approval from which group? (1 mark)

- (ii) Describe **two** additional roles the group named in part (f) (i) are responsible for. (2 marks)

One: _____

Two: _____

Question 2

When possible, scientists use computer programs based on extensive chemical databases to predict the toxicity of a chemical rather than using animals such as mice.

- (a) Name and describe the process applied by the scientists. (2 marks)

FORMULATING RESEARCH AND METHODOLOGY



Key teaching points	Learn	Revise	Demonstrate
Formulating research			
• Identify the aim/s of the research			
• Develop a research question based on the aim/s			
• Identify variables (independent, dependent, control, extraneous)			
• Construct/formulate a hypothesis or inquiry question			
◦ Directional and non-directional hypothesis (quantitative)			
◦ Inquiry questions (qualitative)			
Methodology			
• Types of research designs – application, method, strengths and limitations			
◦ Experimental (control and experimental group) and non-experimental			
◦ Observational			
◦ Case study			
◦ Correlational			
◦ Longitudinal			
◦ Cross-sectional			

Key teaching points	Learn	Revise	Demonstrate
• Selection of participants			
◦ Identification of sample and population			
◦ Methods to sample participants – application, method, strengths and limitations			
• Convenience sampling			
• Snowballing			
• Random sampling			
• Stratified sampling			
• Allocation of participants – application, method, strengths and limitations			
◦ Random allocation			
• Variables			
◦ Independent			
◦ Dependent			
◦ Control			
◦ Extraneous – participant, environment, researcher			
◦ Confounding			
• Sources and effects of extraneous variables and confounding variables			
◦ Experimenter effect			
◦ Demand characteristics			
• Minimise the effects of extraneous and confounding variables			
◦ Random allocation of participants			
◦ Single-blind procedures			
◦ Standardisation of procedures and instructions			

FORMULATING RESEARCH

EXAMPLE RESEARCH STUDY

A lecturer at a university placed posters around the university campus inviting students to be involved in a study testing whether hemp seed oil increased sleepiness in students. One group of students ingested one capsule of hemp seed oil just before bed for two weeks while a second group of students took a capsule containing hemp-flavoured water before bed for two weeks. The length of time it took for students to fall asleep was recorded each night for two weeks.



Figure 13.1 Hemp seed oil capsules were ingested by participants in the experimental group.

Steps	Example
Identify the aim of the research The aim of the research is written as a general statement explaining the purpose of the research.	To investigate whether hemp seed oil affects sleepiness in students.
Develop a research question based on the aim A well-defined question based on background information, such as a literature review or covered in concepts in the syllabus, that are intended to be answered by collecting and analysing data. While it may include an independent and dependent variable, it is not required. The population of research interest is specified.	What effects will hemp seed oil have on sleepiness in students?
Identify variables In order to develop a testable hypothesis, operational definitions of both independent and dependent variables are required. An operational definition specifies the activities of the researcher in measuring and/or manipulating a variable.	Hemp seed oil is provided in capsule form. Independent variable (IV): ingesting hemp seed oil versus not taking hemp seed oil. An operational definition of sleepiness is 'length of time it takes to fall asleep over two weeks'. Dependent variable (DV): length of time it takes to fall asleep each night for two weeks. Controlled variable: capsule taken at the same time of day by participants. Extraneous variable: the amount of screentime participants have before they go to bed (participant variable).

Steps	Example
<p>Construct a hypothesis (quantitative)</p> <p>A hypothesis is used in research that produces quantitative data and informs the methodology that will be followed.</p> <p>Construct a hypothesis by taking the research question and using it to specify the kind of relationship between the two variables.</p> <p>The hypothesis should include the population of research interest (it does not require details of the sample), as well as the way in which the IV and DV will be measured (operational definitions).</p> <p>Directional hypothesis: a statement that compares the predicted outcome of each condition.</p> <p>This type of hypothesis is used when past research provides a clue as to what results will show.</p> <p>Non-directional hypothesis: a statement that declares there is a difference between conditions but does not specify the type of difference.</p> <p>This type of hypothesis is used when there is no previous research, or previous research has provided contradictory results.</p>	<p>It is hypothesised that students who take hemp seed oil before bed for two weeks will take LESS time to fall asleep compared to students who do not take hemp seed oil.</p> <p>It is hypothesised that students who take hemp seed oil before bed for two weeks will DIFFER in the time taken to fall asleep compared to students who do not take hemp seed oil.</p>
<p>Construct an inquiry question (qualitative)</p> <p>Instead of a formulating a hypothesis, an inquiry question can be constructed.</p> <p>Unlike a hypothesis, an inquiry question does not make research outcome predictions, instead it prompts broad exploration of the research topic.</p> <p>Inquiry questions are used in research that produces qualitative data and informs the methodology that will be followed.</p> <p>The inquiry question is an open-ended question, starting with a question word, that the research is aiming to answer.</p>	<p>Will hemp seed oil decrease the time it takes to fall asleep?</p>

Note: at times it may be more suitable to start research by developing a research question and then using this to write a hypothesis and aim. This is because the aim, research question and hypothesis are interrelated.

Note: both 'research questions' and 'inquiry questions' guide the investigatory process of research, so unless a clear distinction is warranted (the former being a focused question narrowing the scope of research and the latter a general, open-ended question), the terms can be used interchangeably.

METHODOLOGY

TYPES OF RESEARCH DESIGNS

	Description	Strengths	Limitations
Experimental	<ul style="list-style-type: none"> Research where the independent variable can be manipulated, a cause-and-effect relationship can be found, and participants can be randomly allocated. <p>Control group: group of participants exposed to all conditions except the independent variable.</p> <p>Experimental group: group of participants exposed to the independent variable.</p> <ul style="list-style-type: none"> E.g., Harlow's use of infant rhesus monkeys to test whether contact comfort or the provision of food was more important in the development of infant-mother attachment. 	<ul style="list-style-type: none"> Researchers can have control over variables. Cause-and-effect relationships can be found. 	<ul style="list-style-type: none"> Having a controlled environment (such as a laboratory environment), reduces realism and may impact participant behaviour. In trying to control variables in research, there is risk of human error occurring.
Non-experimental	<ul style="list-style-type: none"> Research where the independent variable cannot be manipulated, a cause-and-effect relationship cannot be found, and participants cannot be randomly allocated. Examples of non-experimental research methods include case studies, observational research, and correlational studies. E.g., Milgram's behavioural study of obedience (shock experiment) is non-experimental as there is no independent variable being manipulated. 	<ul style="list-style-type: none"> Observing what occurs naturally in the environment means a controlled setting does not have to be created. Allows for research applications in which the manipulation of variables would be unethical for participants. 	<ul style="list-style-type: none"> Reliable causal conclusions are not able to be made because there is no evidence of a cause-and-effect relationship. As there is no variable manipulation, larger sample sizes are required so more participants are able to be observed.

Importance of having a control group

- Enables the researcher to determine whether the independent variable has had an effect on the dependent variable.
- The control group provides a basis for comparison with the experimental group.

Beyond the syllabus

There are different types of observational research, two of which are naturalistic observation and controlled observation.

Naturalistic observation: researchers observe participants in their natural setting in an unobtrusive manner. Advantages of naturalistic observation is that they have a high external validity and are suitable for studying concepts not able to be studied in a laboratory setting. Limitations to naturalistic observation include observer effect where the awareness of being watched causes participants to alter their behaviour, and observer bias where the observer's expectations or beliefs influence what they record during observational research. The Robbers Cave study utilised this type of observation.

Controlled observation: researchers observe participants in an environment that is structured, such as a laboratory. While this method allows for increased accuracy in observations due to greater environmental control, participants may alter their behaviour because they know they are being watched. Ainsworth's strange situation studies and Milgram's behavioural study of obedience both utilised controlled observations.

	Application	Method	Strengths	Limitations
Observational	<ul style="list-style-type: none"> • Type of technique used to study behaviour. • E.g., Ainsworth's Strange Situation studies. 	<ul style="list-style-type: none"> • Researchers monitor participants and record notes. 	<ul style="list-style-type: none"> • Controlled observations can be replicated by other researchers. • Participants are more likely to behave naturally rather than consciously or unconsciously act in a way that is socially appealing. 	<ul style="list-style-type: none"> • When the researcher only sees what they expect to see, or records selected details, observer bias may occur. • Participants may change their behaviour if they are aware of being observed. • Voluntary participation and informed consent are ethical guidelines that may be breached when participants are unknowingly observed in research.
Case study	<ul style="list-style-type: none"> • An in-depth investigation of an individual person, group of people or a single event. • Case studies are useful for examining unusual events that cannot be replicated in a laboratory. • E.g., Case study of Phineas Gage. 	<ul style="list-style-type: none"> • A large amount of data (mostly qualitative) is collected, providing information on one person, a group of people or an event. 	<ul style="list-style-type: none"> • Detailed information is collected. • Information is gathered from a range of perspectives. 	<ul style="list-style-type: none"> • Results are unable to be generalised to the population the sample was taken from. • Conclusions drawn from case studies are limited due to the lack of formal control groups.
Correlational	<ul style="list-style-type: none"> • Measures the linear relationship between two variables. • E.g., A positive correlation was found between birth weight and childhood intelligence in a 2020 study of 1719 children from the Danish National Birth Cohort. 	<ul style="list-style-type: none"> • The relationship between two variables is measured. 	<ul style="list-style-type: none"> • Potential hypothesis based on correlation can be tested using an experimental design. • Can be used when manipulating variables in experimental research is unethical. 	<ul style="list-style-type: none"> • Correlations do not show how variables are related because there is no cause and effect between two variables (correlation does not infer causation). • Extraneous variables are not controlled and could intervene with the relationship between the variables making it hard to know if the relationship would exist otherwise.

	Description	Strengths	Limitations
Longitudinal	<ul style="list-style-type: none"> • Data is collected more than once, using the same participants. • This period could be several days, weeks, years or even decades. This type of study is often used in psychology to study development trends across the lifespan. • E.g., Harvard Study of Adult Development that followed 268 participants for almost eighty years. 	<ul style="list-style-type: none"> • Developmental trends can be studied over a lifetime. • The frequency, timing or duration of events can be assessed. E.g., when depressive symptoms of an individual began and how long they lasted for. 	<ul style="list-style-type: none"> • It takes a longer time to get results than with cross-sectional studies. • Participants may drop out of the study along the way.
Cross-sectional	<ul style="list-style-type: none"> • Data from participants is collected at one point in time. Participants may be from one sample or from a number of samples. • E.g., the Australian Census gathers information via a survey from every Australian household at one point in time. 	<ul style="list-style-type: none"> • It is quicker to conduct than longitudinal studies as there are no follow-up periods required. • It costs less to conduct than longitudinal studies. 	<ul style="list-style-type: none"> • Only a snapshot in time is chosen and results may differ if another time for collecting data was chosen. • The sample size may not be large enough to generalise results to the population that the sample was taken from.

SELECTION OF PARTICIPANTS

Population: the entire group of people that is of interest to the researcher.

Sample: subsection of the population.

- The sample should be representative of the population it was taken from.

Sampling: the process of selecting participants from a population of research interest that will be used in a study.



METHODS TO SAMPLE PARTICIPANTS

Convenience sampling

Method

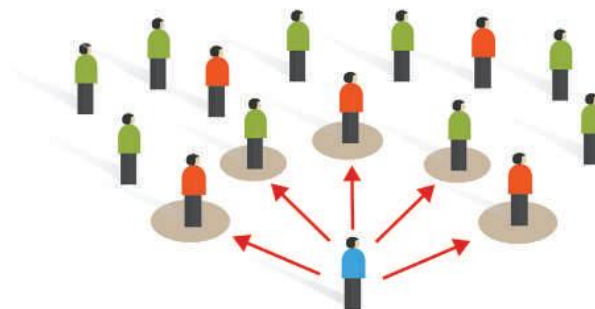
- Participants who are easily accessible are selected.

Strengths

- The time and effort required to collect the sample is low compared to random and stratified sampling.
- Costs associated with gathering the sample are low.

Limitations

- There may be a high level of researcher bias.
- The sample is unlikely to be representative of the population it was taken from.



Snowball sampling

Method

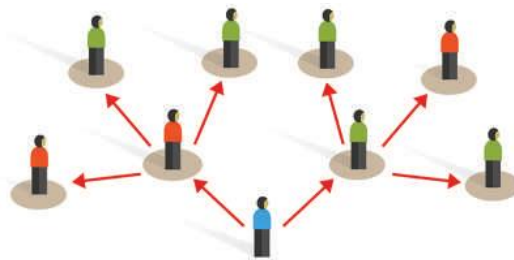
1. Initial participants are chosen.
2. Each participant encourages other people to contact the researcher and join the sample.

Strengths

- Allows researchers to find a sample that may otherwise be difficult to recruit due to the nature of the study, for example research looking at drug users or sex workers.
- Time needed for the researcher to gather a sample is reduced because initial participants recruit additional participants.

Limitations

- The sample is unlikely to be representative of the population it was taken from because researchers are minimally involved in participant recruitment.
- The sample may be biased as only those who are in direct contact with the original participants can be recruited.



Random sampling

Method

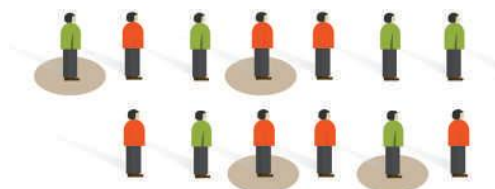
1. Names of all members in a population are collated.
2. Names are randomly selected by drawing them out of a hat or using a computer-generated program.

Strengths

- Researcher bias is minimised.
- Each participant has an equal chance of being selected to be part of the sample.

Limitations

- The time and effort required to conduct this type of sampling is high.
- The sample is unlikely to be representative of the population it was taken from if the sample size is not adequate.



Stratified sampling

Method

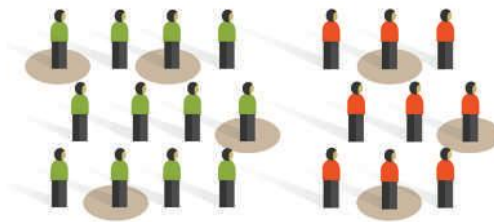
1. The population is broken into subgroups based on characteristics relevant to the study.
2. Participants from each subgroup are randomly selected in the same proportions they appear in the population.

Strengths

- The sample is likely to be representative of the population it was taken from.
- Researcher bias is minimised.

Limitations

- The time and effort required to conduct this type of sampling is high
- Researchers may not always be able to classify each participant of the population into subgroups.



Random allocation

Random allocation: random distribution of participants into experimental and control groups to reduce researcher bias and increase generalisability of results.

Method

1. Names of participants in the sample are collated.
 2. Names are randomly selected by drawing them out of a hat or using a computer-generated program and assigned to groups.
- Alternatively, participants can be randomly selected using a computer-generated program programmed to select a participant at regular intervals from a list of participants. E.g., every fifth participant is selected.

Strengths

- It can allow for good generalisability of results because equivalent groups of participants are created.
- Prevents selection bias because each participant has an equal chance of being placed in the different conditions.

Limitations

- It is not possible to use this form of allocation when the independent variable is not able to be manipulated by the researcher.
- While unbiased groups are created, equality of groups in relation to participant characteristics is not guaranteed.

VARIABLES

Independent variable: variable that is being manipulated by the experimenter to observe its effect on the dependent variable.

Dependent variable: variable that is being measured by the experimenter.

Controlled variables: variables that stay consistent throughout an experiment.

Extraneous variables: unwanted variables that may impact the dependent variable.

- Researchers may not be aware of extraneous variables in a study until after the study is completed.
- Any extraneous variables that the researcher controls turns into controlled variables.

TYPES OF EXTRANEOUS VARIABLES

Participant variables: type of extraneous variables relating to the individual characteristics of participants.

- It is important that the researcher controls participant variables as they can potentially confound results from an experiment.
- Researchers can help control participant variables by making sure participants selected for the sample have similar personal characteristics suitable for the study, or by using random allocation to ensure equivalent groups are created.
- E.g., motivation, educational background, age, gender, self-esteem, intelligence, memory, prior experience, personality characteristics, health, physical ability and mood.



Environment variables: type of extraneous variables relating to the environment the study takes place in and how this affects participant responses.

- E.g., testing venue, background noise, air temperature of the room the test is taken in, time of day of that testing takes place and testing conditions.

Researcher variables: type of extraneous variables relating to the personality characteristics, appearance and conduct of the researcher that unintentionally impact participant response.

- E.g., the accent, gender, attractiveness, personality characteristics, health, age of the researcher as well as how the researcher interacts with and treats participants.

Confounding variables

Confounding variable: variables that impact the dependent variable and also have a causal or correlational relationship with the independent variable.

- Confounding variables alter the relationship between independent and dependent variables and can complicate results making them difficult to interpret.
- There is a possibility for some extraneous variables that are not controlled to become confounding variables.
- In the study described later in this chapter (on page 142), the independent variable was whether participants took an antidepressant daily over six weeks, and the dependent variable was the experience of depressive symptoms, measured using a rating scale that provided a depression score.
- Potential extraneous variables for this study included the participants' diet, consumption of alcohol, and amount of exercise they did. These are examples of participant variables.
- The time of day participants completed the pre and post rating scales was an environment variable, while the way in which instructions were given to participants was a possible researcher variable.
- The reason why the above-mentioned variables are extraneous variables is because they all have an impact on the dependent variable (the experience of depressive symptoms).
- From these extraneous variables, alcohol use is one that could become a confounding variable if not carefully controlled. This is because alcohol consumption can influence depressive symptoms (dependent variable) and additionally impact the effectiveness of antidepressants (independent variable).

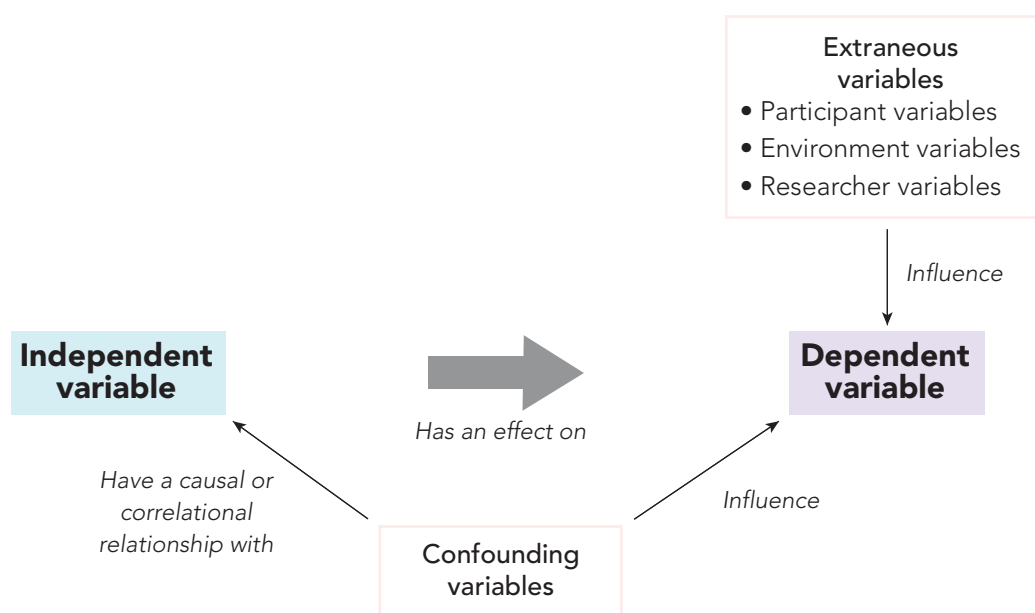


Figure 13.2. Diagram comparing extraneous and confounding variables.

SOURCES AND EFFECTS OF EXTRANEOUS VARIABLES AND CONFOUNDING VARIABLES

Experimenter effect: the expectations and behaviours of the researcher that may bias results.

- The researcher could consciously or unconsciously give away the desired outcome of the research, or unconsciously influence participants.
- When a researcher has expectations for the results a study should produce, they may unintentionally behave in a way that participants interpret as clues as to how they should behave.
- The researcher may also unconsciously influence participants by presenting instructions differently to different groups or participants, or they may inaccurately record or interpret data.
- Running a **double-blind procedure**, where the researcher, as well as the participants are unaware of the experimental conditions, can help to reduce experimenter effects.

Demand characteristics: cues participants perceive during a study that lead them to believe they have discovered the aim of the study or expectations of the researcher.

- Demand characteristics can cause participants to behave (oftentimes unconsciously) in ways that support the hypothesis or help achieve what they believe to be the desired results.
- These cues may not come from the methodology or the researcher's behaviour, but from a rumour they heard about the study, or even the location of the laboratory.
- While demand characteristics can occur because the participant wants to please the researcher and be viewed positively by them, they may alternatively occur because participants want to purposefully disprove the hypothesis and ruin the credibility of the study.
- Even if the researcher standardised the procedure and instructions, used a single-blind procedure, controlled research variables, and there was no experimenter effect, participants could still change their behaviour to meet what they perceive to be the aim of the study or expectations of the researcher.

Experimenter effect is the researcher consciously or unconsciously sharing their expected outcome, or inaccurately carrying out the procedure or recording data

Whereas ...

Demand characteristics are when participants discover, or believe they have discovered, the aim of the study and change their behaviour

- The experimenter effect can at times allow for demand characteristics; the researcher unintentionally sharing their expectations of the study may lead some participants to believe they now know the researchers' desired outcomes and change their behaviour to help create them.

MINIMISE THE EFFECTS OF EXTRANEOUS AND CONFOUNDING VARIABLES

Random allocation of participants

- Random allocation of participants to an experimental group or control group is commonly used in psychological research.
- The main purpose of random allocation of participants is to ensure each participant in the sample has an equal chance of being chosen for the control group as for the experimental group.
- Participant variables can be minimised through random allocation of participants because it ensures participants with personal characteristics are spread between experimental and control groups.
- The researcher wants to ensure that the dependent variable is caused by the independent variable and not due to personal characteristics.
- Random allocation of participants also minimises researcher effects whereby the researcher could distribute participants into groups and personally decide who is going to be in the experimental group.

Single-blind procedure

Single-blind procedure: the experimenter is aware of the experimental conditions (which participants are in the control and experimental group) while the participants are unaware of them.

- The researcher is aware of the aim and the conditions being conducted but the participants are not told which condition of the experiment they are in, and at times, not even the aim of the research.
- Knowing the aim of the research may affect the behaviour of the participants and result in extraneous variables such as demand characteristics. In such cases, deception would be used and participants would have the true purpose of the study and reason for deception explained to them during debriefing.
- In relation to the example experiment, the participants would not be aware of whether they are receiving the hemp capsule, or the hemp-flavoured water capsule (placebo). The participants are 'blind' to whether they are receiving the active treatment or not. The experimenter does know which group the participants belong to.
- While demand characteristics cannot be completely eliminated from research, single-blind procedures can help control their effects as participants do not know what condition of the experiment they are in (whether they are in a control group receiving a placebo, or in an experimental group being given an active substance).

Experimenter is aware of the experimental conditions



Participants are not aware of the experimental conditions

Figure 13.3 The experimenter in a single-blind procedure administering treatment to a participant.

Beyond the syllabus

If a participant diagnosed with major depressive disorder is given medication and told it will reduce depressive symptoms, they may report a decrease in depressive symptoms due to the placebo effect.

The **placebo effect** is a positive result that occurs due to the participant's belief that a treatment will be effective.

To be sure that the medication (independent variable) influences depressive symptoms (dependent variable), a placebo can be used.

A **placebo** is a neutral treatment that looks the same as the real treatment being evaluated and is delivered in the same way.

The graph in Figure 13.4 shows results from a third phase trial of an antidepressant with the active drugs dextromethorphan and bupropion (commercial name Auvelity). Rather than a single-blind study where the experimenter would be aware of which participants were given the active treatment and which were given the placebo, a **double-blind study** for this research was used.

In a double-blind study, neither the participants nor the experimenter knows which condition of the independent variable the participants are allocated into.

Double-blind studies reduce experimenter effect as the experimenter is less able to unconsciously treat participants differently based on the group they are in.

Participants were randomly allocated into an experimental and control group, and those in the experimental group received Auvelity orally, twice daily, for six weeks. Participants in the control group received sugar tablets (placebo) that looked identical to dextromethorphan-bupropion tablets.

All participants completed the Montgomery-Asberg Depression Rating Scale (MADRS) at the start of the experiment, and again at the end of the six weeks. The difference in results between the control and experimental group demonstrates Auvelity had an effect on depressive symptoms, in this case, the antidepressant was found to significantly decrease the symptoms over a six-week period.

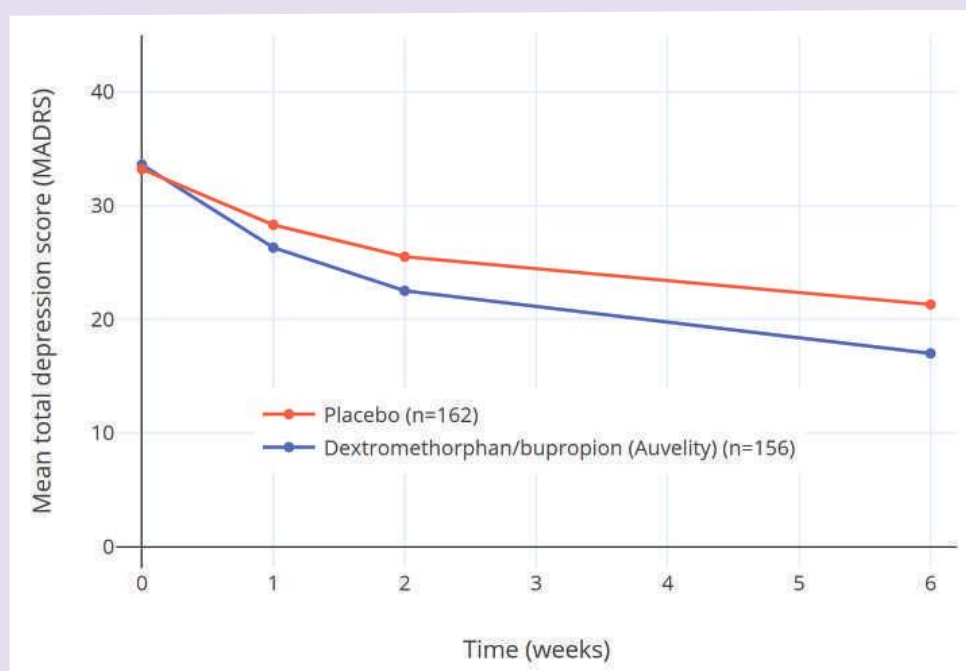


Figure 13.4

STANDARDISATION OF PROCEDURES AND INSTRUCTIONS

- Environment variables can be minimised by providing the same location and conditions for all participants, for example, conducting an experiment in a laboratory setting.
- Providing the same instructions to each group of participants can minimise researcher variables and experimenter effects.

Referring to the example experiment at the start of this chapter; participants were split into an experimental and control group with those in the experimental group ingesting hemp seed oil capsules before bed every night for two weeks and those in the control group ingesting hemp-flavoured water (placebo).

The researcher would know which participants were in the control or experimental group, but the participants would not know, thus being a single-blind procedure. Ideally, the environment in which participants took the capsules and slept would be controlled, but as it was not, this would be an uncontrolled extraneous variable (specifically, an environment variable).

It would be preferable if the procedure was standardised for all participants, for example, participants being instructed to not consume any alcohol or caffeine after 3pm. If there were participants in the experimental group who happened to meditate to help them fall asleep, then meditating would be confounded with the independent variable.

Whether participants took hemp seed oil before bed, as well as whether they meditated before bed, would covary in a way that it would not be possible to know which caused the change in sleepiness (dependent variable). Confounding variables can be avoided by keeping all conditions identical except for the independent variable.



Figure 13.5 Practising meditation before bed is a potential confounding variable affecting sleepiness and covarying with hemp seed oil consumption.

Question 1

Researchers wanted to investigate whether body weight had an impact on the likelihood of help being given by students at Murdoch University. One group of actors walked around the university campus wearing an obesity prosthetic (to give the illusion they were obese with a BMI of 30 or higher) while another group of actors walked around wearing no obesity prosthetics. The results are shown in the table below.

Appearance	Average number of times help is received in 30 minutes
Obese	6
Not obese	17

- (a) State the sample in the experiment. (1 mark)

- (b) Write a directional hypothesis the researchers could have written for this experiment. (4 marks)

- (c) As data was collected once in this experiment, what type of research design was implemented? (1 mark)

Question 2

Researchers wanted to see which toys that young children found the most enticing to play with. They placed an assortment of toys in a room and allowed a group of 5-year-old children to play uninterrupted while watching from the back corner of the room.

- (a) (i) Name the type of research being used. (1 mark)

- (ii) Outline **one** strength of this type of research. (1 mark)

- (iii) Outline **one** limitation of this type of type of research. (1 mark)

- (b) Identify whether the research is experimental or non-experimental and provide justification for your response. (2 marks)

- (c) List **three** participant variables that may impact the interactions the children have with the toys. (3 marks)

One: _____

Two: _____

Three: _____

- (d) Name the type of variable that participant variables may develop into if they are not controlled by the researchers. (1 mark)



Key teaching points	Learn	Revise	Demonstrate
Data collection			
• Types of data			
◦ Qualitative data			
◦ Quantitative data			
• Methods of data collection – application, strengths and limitations			
◦ Qualitative			
• Interviews – focus group and individual; structured, semi-structured			
• Open-ended survey			
◦ Quantitative			
• Objective physiological measures – heart rate, breathing rate, galvanic skin response (GSR)			
• Subjective measures – checklists and rating scales, such as Likert scales			
◦ Mixed methods – data collection may be a combination of qualitative and quantitative data			
• Differences between subjective and objective data			

TYPES OF DATA

- **Qualitative data:** descriptive information in the form of words.
- **Quantitative data:** information in the form of numbers that can be counted.

	Qualitative data	Quantitative data
Data format	<ul style="list-style-type: none"> • Written words 	<ul style="list-style-type: none"> • Numerical
Data display	<ul style="list-style-type: none"> • Flow charts, taxonomy (showing classification or organisation of information), modified Venn diagrams (displaying shared concepts), and summary tables. 	<ul style="list-style-type: none"> • Graphs and summary tables (e.g., frequency tables).
Question format used to obtain data	<ul style="list-style-type: none"> • Open-ended questions that allow free-form answers to be provided. 	<ul style="list-style-type: none"> • Closed-ended questions that limit answers to set responses.
Method of collection	<ul style="list-style-type: none"> • Interviews (structured or semi-structured), focus groups, open-ended surveys and observation (naturalistic). 	<ul style="list-style-type: none"> • Checklists, rating scales (e.g., Likert scales), observation (controlled), and using equipment in physiological measures (e.g., thermometer to measure body temperature).
Analysis	<ul style="list-style-type: none"> • The large amount of descriptive data is assessed for patterns and organised into categories. • Categories of data are created by grouping collated descriptive information. 	<ul style="list-style-type: none"> • Data is quantifiable (able to be counted) so can be statistically analysed. • Data can determine a cause-and-effect relationship or correlation.
Strengths	<ul style="list-style-type: none"> • In-depth information can be collected as participants may have the opportunity to explain their responses. • There is flexibility in aspects of the methods used to collect the data. E.g., the inclusion or exclusion of interview questions, or the wording of interview questions. 	<ul style="list-style-type: none"> • Generalisability of results can be assessed. • Numerical data is easier to replicate through repetition of the research allowing for reliability to be assessed.
Limitations	<ul style="list-style-type: none"> • There is a reduced generalisability of results due to information being gathered from a smaller sample size (compared to larger sample sizes typical of quantitative research). • To interpret the data, researchers require a deep understanding of the studied concept. 	<ul style="list-style-type: none"> • There is a requirement for researchers to have a strong knowledge of statistical analysis. • For results to have high generalisability, large sample sizes are required.
Example	<ul style="list-style-type: none"> • Family, friends and colleagues of Phineas Gage were interviewed and asked to describe his personality before and after his accident. 	<ul style="list-style-type: none"> • The time taken for participants to report smoke in Latané and Darley's smoke filled room study.

METHODS OF DATA COLLECTION

QUALITATIVE

- Interviews can be administered to an individual or to a group of people at one time (focus group).

	Application	Strengths	Limitations
Structured interview	<ul style="list-style-type: none"> Set of pre-established questions is asked in real time face-to-face or over the phone. 	<ul style="list-style-type: none"> Many individuals, or focus groups, can be asked the same set of standardised questions reducing differences between interviewers. Participants do not need to rely on their reading ability in order to participate. 	<ul style="list-style-type: none"> Interviewers are not able to ask participants to further explain their responses thus limiting the richness of collected data. Analysing data collected from interviews is complicated so drawing general conclusions is difficult.
Semi-structured interview	<ul style="list-style-type: none"> Set of pre-established questions that can be asked but participants can also be asked follow-up questions based on earlier responses. This sort of interview is suitable for a job interview. 	<ul style="list-style-type: none"> Extensive data can be collected and the option for interviewers to ask participants to further explain their reasons leads to deeper understanding. Participants do not need to rely on their reading ability in order to participate. 	<ul style="list-style-type: none"> Due to the face-to-face or over the phone format, participants may feel less comfortable revealing sensitive information to the interviewer thus limiting data that can be collected. Analysing data collected from interviews is complicated so drawing general conclusions is difficult.
Open-ended survey	<ul style="list-style-type: none"> Participants are provided with questions on paper or online with space to respond in open-text format with as much detail as they like. Open-ended surveys are often used in exploratory studies of issues requiring deep insight. 	<ul style="list-style-type: none"> Detailed information (including attitudes and emotions) can be collected on complicated topics. Participants are not restricted by limited options. 	<ul style="list-style-type: none"> Participants must rely on their reading and writing ability to participate. Differences in the amount of detail provided by participants makes analysing the collected data difficult.

How to run a focus group

- Develop a set of questions for participants to answer based on the aim of the research.
- Gather a sample from the population of research interest using an appropriate sampling technique.
- Provide an information letter and consent form for participants to complete. Participants under the age of eighteen require a legal guardian to provide informed consent on their behalf.
- Facilitate a focus group with a manageable number of participants from the sample (numerous focus groups using different participants can be run). Ask follow-up questions based on participant responses to pre-established questions and record verbal discussions between participants and comments made to the facilitators using a recording device.
- After participants have been debriefed, collate, then analyse the written and recorded data.

QUANTITATIVE

	Application	Strengths	Limitations
Objective physiological measures Heart rate Breathing rate	<ul style="list-style-type: none"> Changes in emotional stress, physical effort and consciousness can be recorded. 	<ul style="list-style-type: none"> Participants are less likely to be able to affect data collected (risk of participant bias is limited). Measures can be recorded in real-time. 	<ul style="list-style-type: none"> Exercise can easily cause changes to the measurement, which is a disadvantage if the state of consciousness, for example, is being identified. Factors such as exercise or heat can affect the measurement. Participants may feel anxious when having the measure taken and this can alter results.
Galvanic skin response (GSR)	<ul style="list-style-type: none"> Measures changes in the electrical conductivity of the skin and can detect anxiety, guilt, fear or excitement. It can be used to help determine state of consciousness and to measure and reduce stress using biofeedback training. 		
Subjective measures Checklist	<ul style="list-style-type: none"> Collects yes/no information on statements. Yes <input type="checkbox"/> No <input type="checkbox"/> Checklists can be used to measure attitudes. 	<ul style="list-style-type: none"> Data can be statistically analysed. Data collected from a large sample size can occur in a relatively short time (compared with conducting an interview). Can be conducted remotely such as online or via mail. 	<ul style="list-style-type: none"> Responses are limited to the options provided. It does not allow participants to give reasons for their responses. Participants must rely on their reading ability to participate. Phrasing and order of statements can affect people's responses.
Rating scale (e.g., Likert scale) Rating scales require participants to rate concepts.	<ul style="list-style-type: none"> The Likert scale is a type of rating scale where participants indicate their strength of agreement to statements. Rating scales can be used to measure attitudes. 		

- Rating scales can be used to quantify abstract concepts, such as the level of pain someone is experiencing. Figure 14.1 shows an example of a pain measurement scale that can be used for children and adults alike. The patient can either provide a number to represent their pain intensity, or they can point to the picture of the face that best visually matches how they are feeling.

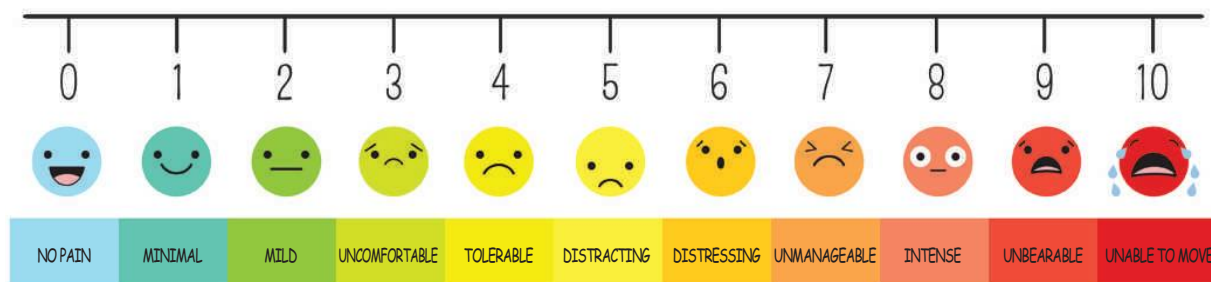


Figure 14.1

- A Likert scale, named after social scientist Rensis Likert, is a type of rating scale often used to measure attitudes. Each question uses a five or seven-point scale, usually including a neutral option.
- Each point on the scale is allocated a numerical score used for determining whether an overall attitude is positive or negative, or to provide a score on a diagnostic test.
- Likert scales can be used to measure levels of agreement, importance or frequency, just to name a few (Figure 14.2).

1. University should be free for students in Australia.

Strongly disagree	Disagree	Undecided	Agree	Strongly agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. The way my teacher presents content is important to me.

Not at all important	Slightly important	Moderately important	Important	Very important
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. I study on weekdays after school.

Never	Rarely	Sometimes	Often	Always
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Figure 14.2

MIXED METHODS

Mixed methods: qualitative and quantitative data are collected from participants in the same study.

- Utilising both interviews and rating scales in a study is an example using a mixed method design.

	Application	Strengths	Limitations
Mixed methods	<ul style="list-style-type: none"> • Qualitative and quantitative data are collected from participants in the same study. • Utilising both interviews and rating scales in a study. 	<ul style="list-style-type: none"> • A greater understanding of the research problem can be provided than using either a qualitative or quantitative method alone. • Both qualitative and quantitative methods can be used to complement each other, for example, an interview can lead to the development of a checklist. 	<ul style="list-style-type: none"> • Greater expertise from researchers is required to collect and analyse data. • The time required to collect and analyse data is greater than in just qualitative or just quantitative methods.

DIFFERENCES BETWEEN SUBJECTIVE AND OBJECTIVE DATA

Subjective data: data based on personal opinions and judgement.

- Example: self-reported measures such as a checklist or Likert scale.

Objective data: data based on facts that can be supported through observation and measurements.

- Example: physiological measures such as heart rate and breathing rate. Physiological measures are usually taken with a piece of equipment that measures physical activity in the body.

Question 1

(a) Complete the table below showing different types of research methods. (6 marks)

Method	Data collected: quantitative, qualitative or both
Open-ended survey	
Rating scale	
Physiological measures	
Mixed methods	
Checklist	
Structured interview	

(b) Explain why the amount of detailed data able to be collected in structured interviews is limited. (2 marks)

Question 2

Below is an example of a self-report measure.

Do you agree that capital punishment should be re-introduced in Australia?

Yes ☐ No ☐

(a) (i) Identify the name given to the type of self-report measure above. (1 mark)

(ii) Describe **one** problem with the particular question above. (1 mark)

(iii) Outline **one** limitation of this type of self-report measure in general. (1 mark)

(iv) Identify whether the type of self-report measure is collecting subjective or objective data and provide a reason for your response. (2 marks)

Jenna was interested in investigating the effect exam conditions have on the emotional stress levels of her year 11 Psychology students.

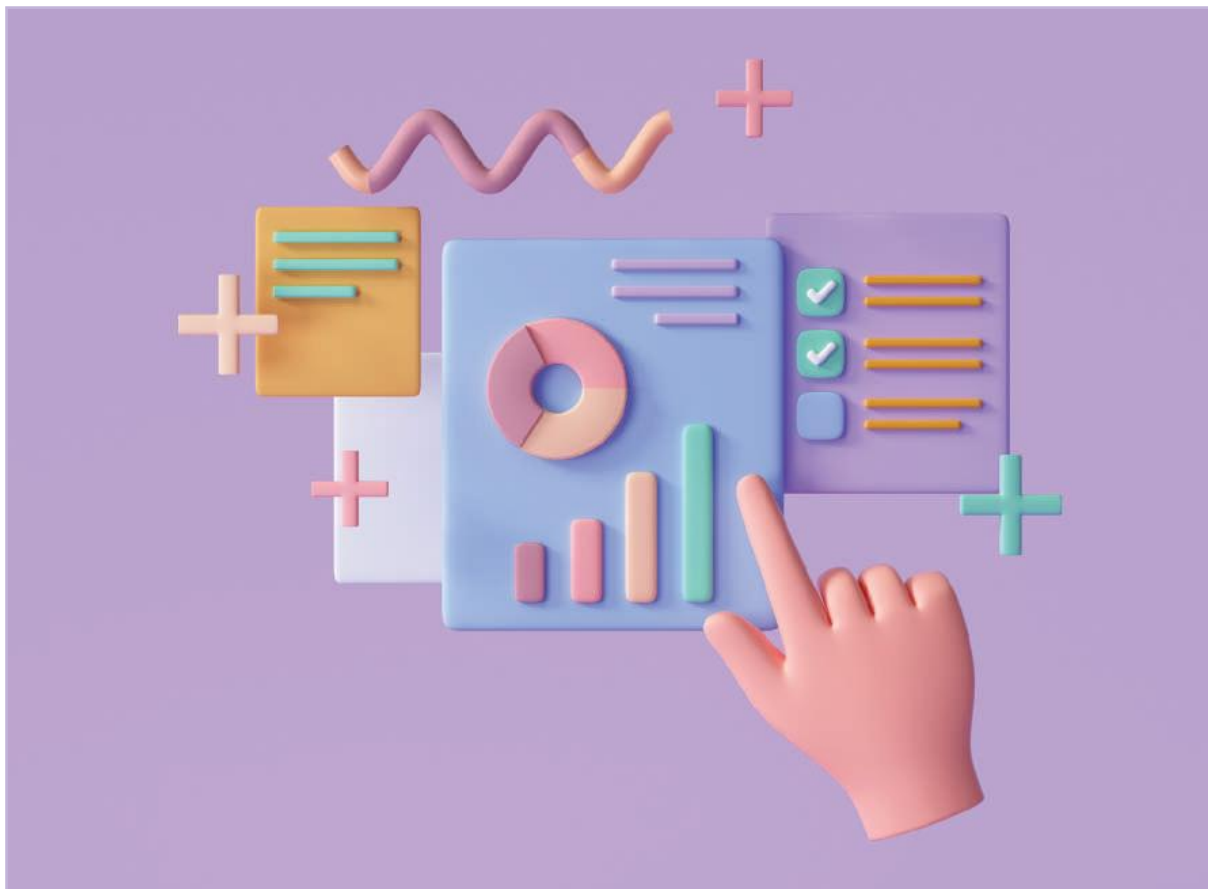
(b) (i) List **three** physiological measures Jenna can use in her study. (3 marks)

- ---
- ---
- ---

(ii) Outline **one** benefit of using physiological measures in Jenna's study. (1 mark)

(iii) Jenna would like to use a mixed methods design for her study. Name **one** additional method of data collection she could use alongside physiological measures to produce a mixed methods design. (1 mark)

PROCESSING AND ANALYSING DATA

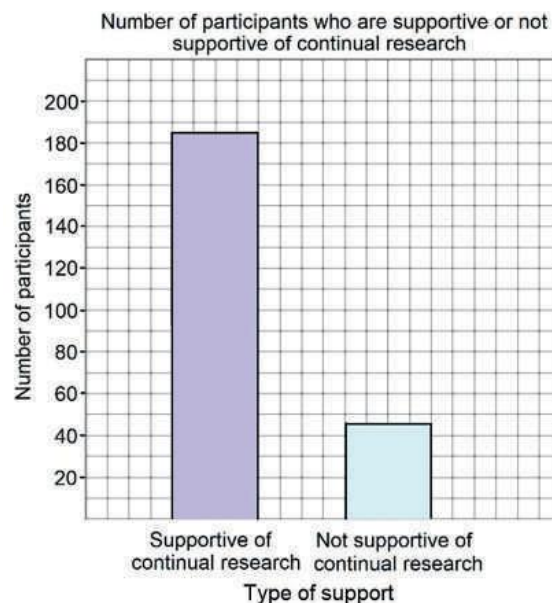


Key teaching points	Learn	Revise	Demonstrate
Processing and analysing data			
• Construct and interpret data displays			
◦ Graphs – column, bar, line, histogram, scatterplot			
◦ Tables – summary, frequency			
• Calculate and interpret the mean and median as measures of central tendency			
• Interpret Pearson's correlation coefficient as a measure of strength and direction of linear relationships			

CONSTRUCT AND INTERPRET DATA DISPLAYS

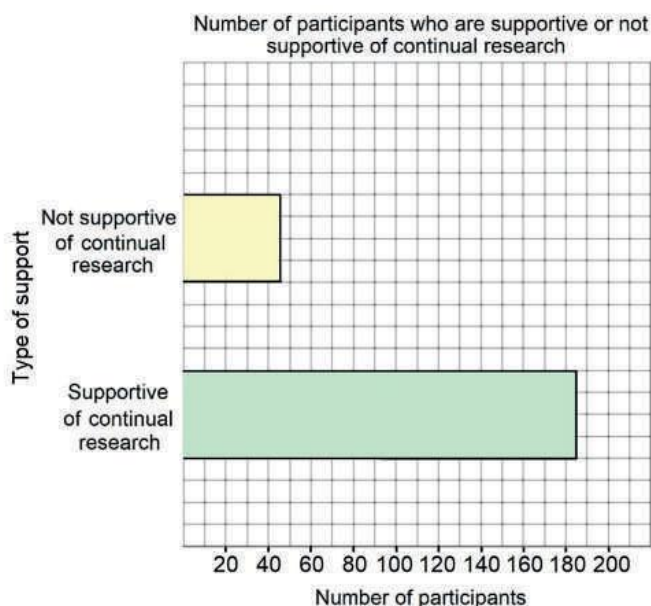
COLUMN GRAPH

- Commonly used to display results from experimental research (the independent variable and dependent variables are plotted).
- Bars are oriented vertically.
- There are gaps between each bar.
- Bars used to compare different categories of data.
- Data is discrete.



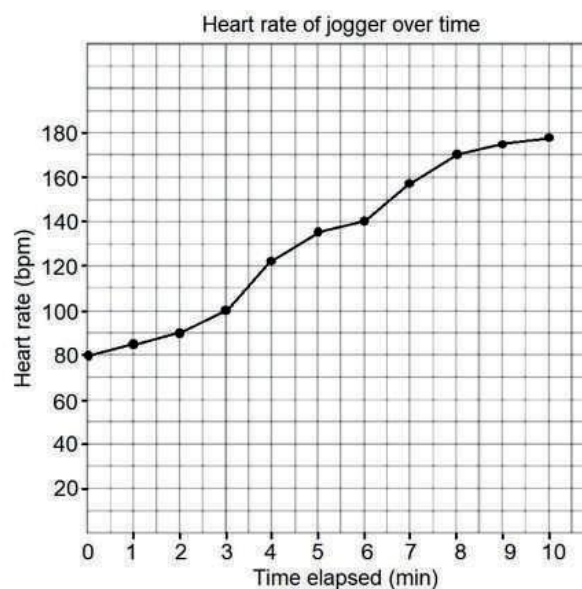
BAR GRAPH

- Commonly used to display results from experimental research (the independent variable and dependent variables are plotted).
- Bars are oriented horizontally.
- There are gaps between each bar.
- Bars used to compare different categories of data.
- Data is discrete.



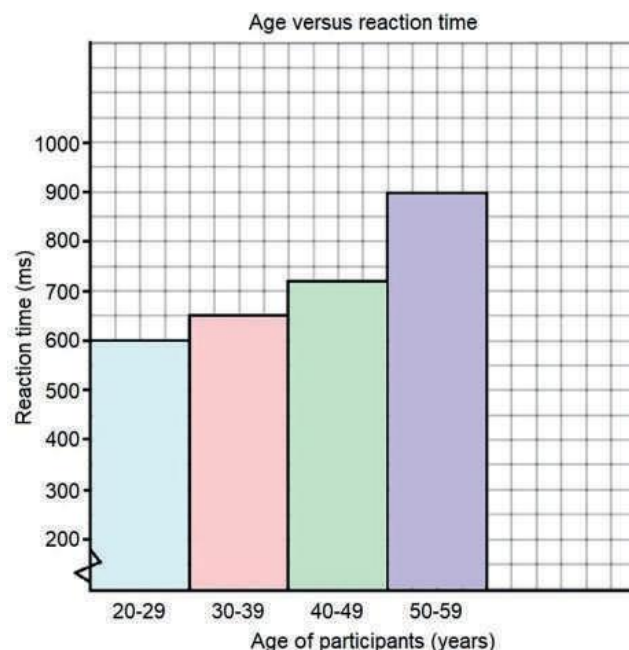
LINE GRAPH

- Commonly used to display results from experimental research (the independent variable and dependent variables are plotted).
- Both variables are either increasing or decreasing at regular increments.
- Almost always used to show change over time with time being plotted on the x-axis.
- Data is continuous for both variables.



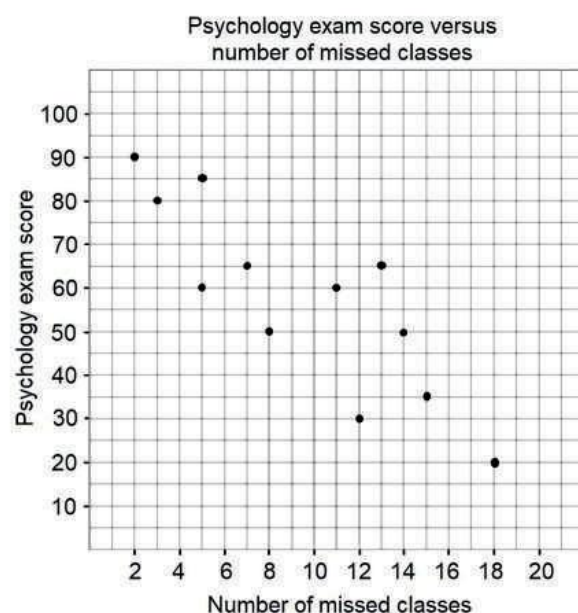
HISTOGRAM

- Typically used to display frequency distributions.
- Class intervals are on the horizontal axis, frequency is on the vertical axis.
- The bars touch each other.
- Data is continuous.



SCATTERPLOT

- Used to display results from correlational research.
- There are no independent or dependent variables, only pre-existing variables.
- Can plot variables on either axis.
- Shows the degree of correlation between two variables.



Continuous data

Data that can be measured, has an infinite number of possible values, and values can be broken down into smaller parts. E.g., temperature, weight, time.

Discrete data

Data that can be counted, has a finite number of possible values, and values are unable to be broken down into smaller parts. E.g., number of participants or items.

TABLES

Summary table: a table that visually summarises the key findings of a study.

- Table 15.1 is a summary table showing the level of sleepiness for a group of participants who spend less than ten hours per week playing games, and a group who spend more than ten hours per week playing games. The table includes statistical comparisons between them (mean and standard deviation).

	Hours spent playing games (per week)	Sleepiness (measured using the ESS)	
		Mean	Standard deviation
Group A	Less than 10 hours	10	5
Group B	More than 10 hours	16	2

Table 15.1

Frequency table: a table listing values and the number of times each value occurs in a data set.

- Frequency tables are a type of summary table.
- The frequency of a value is the number of times it occurs in a data set.
- The number of aggressive acts observed by male and female children is collated in Table 15.2.

	Number of aggressive acts
Males	22
Females	14

Table 15.2

Assumed prior mathematical skills developed through year 7–10

Percentage: the amount of a number shown in parts per hundred.

To calculate the percentage of a number, divide the number by the whole value and then multiply the result by 100.

Example: a research study included a sample of 72 adults who napped once a day and 108 who did not nap. Calculate the percentage of adults who did not nap.

Total sample size: $72 + 108 = 180$ $108 \div 180 = 0.6$ $0.6 \times 100 = 60\%$

Frequency distribution table: a tabulated representation of the number of times values occur within a data set, grouped in sections called class intervals.

Example: the below are raw test scores for a year 10 science class. Place the data within a frequency distribution table.

45, 24, 34, 19, 24, 37, 49, 11, 26, 46, 23, 14, 8, 33, 24, 36, 45, 33, 18, 46, 23, 27, 38, 18

Class interval (raw test scores)	Frequency (number of students in class interval)
0 – 9	1
10 – 19	5
20 – 29	7
30 – 39	6
40 – 49	5

Data from a frequency distribution table would be graphically displayed in the form of a histogram.

CALCULATE AND INTERPRET THE MEAN AND MEDIAN AS MEASURES OF CENTRAL TENDENCY

Measures of central tendency: descriptive statistics that produce the average value of a set of scores.

Mean: calculated by adding together values in a set of scores, then dividing by the number of values in the data set.

45, 76, 34, 8, 13, 54, 67

$$45+76+34+8+13+54+67 = 297$$

$$297 \div 7 = 42.4$$

Advantage

- All values in raw data are accounted for.

Disadvantage

- The mean is sensitive to outliers (extreme scores).

Median: calculated by listing the values in a set of scores in numerical order and selecting the value that is located in the middle of the list.

- If there are two numbers in the middle, add them together then divide by two.

45, 76, 34, 8, 13, 54, 67

8, 13, 34, 45, 54, 67, 76

Median = 45

Advantage

- The median is not affected by outliers.

Disadvantage

- The median calculated may not be a number in the original data set if an average of two middle numbers was produced.

INTERPRET PEARSON'S CORRELATION COEFFICIENT AS A MEASURE OF STRENGTH AND DIRECTION OF LINEAR RELATIONSHIPS

Correlation: a statistical technique used to measure the linear relationship between two pre-existing variables.

- There are two possible directions in a correlation.
- **Positive**
 - Both variables either increase or decrease (↓↓ or ↑↑)
 - For example, the amount of school work and stress.
 - Data points plotted on a scatterplot slope upwards.
- **Negative**
 - One variable increases as the other decreases (↓↑)
 - For example, the amount of sleep and level of fatigue.
 - Data points plotted on a scatterplot slope downwards.

There can also be zero or no correlation. This means there is no relationship between the two variables.

- Pearson's correlation coefficient: strength and direction of a linear relationship showed in numerical form (also known as Pearson's r).
- Pearson's correlation coefficient can fall between -1.0 and +1.0 with -1.0 being a perfect negative relationship, +1.0 being a perfect positive relationship and 0 having no relationship (Figure 15.1).
- The closer the coefficient is to either -1.00 or +1.00, the stronger the relationship is between the two variables. The closer the coefficient is to 0, the weaker the relationship between the variables.
- The strength of relationship can be classified as weak, moderate or strong, as shown in Figure 15.1 and Table 15.3.

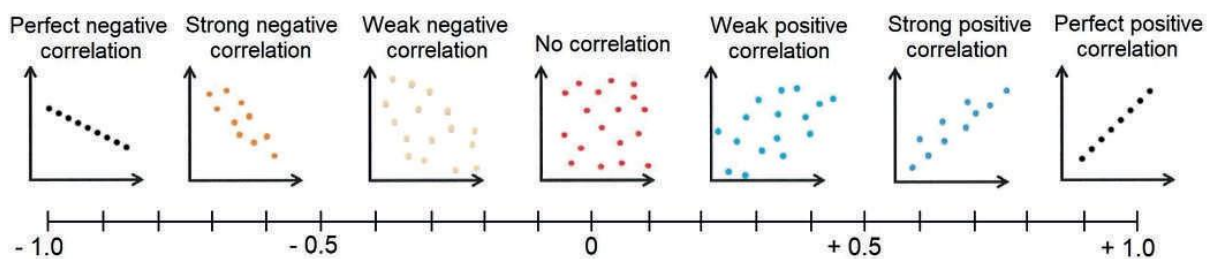


Figure 15.1

Correlation coefficient (r)	Strength of relationship
$\pm 0.00 - 0.29$	None (0.00) to weak
$\pm 0.30 - 0.69$	Moderate
$\pm 0.70 - 1.00$	Strong to perfect (1.00)

Table 15.3

Question 1

The reaction time of individuals of varying ages were measured using a Stop and Go Switch Task over the telephone. This task required individuals to respond with the word 'stop' whenever they heard the word 'red' and to respond with the word 'go' whenever they heard the word 'green'. Results were collated and showed that participants aged between 20-29 had an average reaction time of 600 ms, participants between 30-39 had an average reaction time of 650 ms participants between 40-49 had an average reaction time of 725 ms and participants aged between 50-59 had an average reaction time of 900 ms.

- (a) Graph the results from the information above in the grid below. (5 marks)



- (b) Compare column graphs and bar graphs (include **one** difference and **one** similarity). (2 marks)

Question 2

A secondary teacher wanted to investigate the relationship between the number of psychology lessons missed by her Year 12 students throughout the year and their end of year Psychology exam marks. The results are shown in the table below.

Number of missed classes	Exam score %
5	79
7	74
7	70
10	72
11	64
14	53
20	51
22	32
25	20
30	22

- (a) (i) Identify whether the data demonstrates a negative or a positive correlation and explain your response. (3 marks)

- (ii) Name the type of graph you would draw with this data. (1 mark)

- (iii) Calculate the mean number of missed classes. (1 mark)

- (iv) Calculate the median exam score percentage. (1 mark)

- (v) Is it possible to conclude that more missed classes causes lower exam scores?
Provide a justification for your response. (2 marks)

Question 3

- (a) State the direction and strength of a correlation with the correlation coefficient of 0.45. (2 marks)

- (b) State the direction and strength of a correlation with the correlation coefficient of -0.82 . (2 marks)

- (c) Write the following correlation coefficients in order from weakest to strongest. (1 mark)

0.34 -0.12 -0.98 0.04 0.82

DRAWING CONCLUSIONS AND EVALUATION OF RESEARCH



Key teaching points	Learn	Revise	Demonstrate
Drawing conclusions			
• Evidence-based conclusions consistent with psychological evidence and relevance to the research question			
Evaluation of research			
• Application and use of the concept of validity as a measure of evaluating research			
• Application and use of the concept of reliability as a measure of evaluating research			
• Generalisability of sample to the population			
• Suggest relevant improvements to address limitations of research			
• Ethical implications			
• Critical evaluation of information from a range of scientific sources			

DRAWING EVIDENCE BASED CONCLUSIONS

Evidence-based conclusion: a conclusion derived from objective evidence, such as research from credible sources.

- When drawing an evidence-based conclusion, it needs to be supported with evidence aligning to the theory it relates to in the syllabus. In addition to this, both the conclusion and evidence must also align with the research question that has been asked.
- For the research question 'individuals are more likely to obey someone they perceive to be an authority figure,' Milgram's 1963 behavioural study of obedience can be used as psychological evidence. The key findings of the study can be discussed, as well as limitations of the study that should be taken into consideration when drawing a conclusion.

EVALUATION OF RESEARCH

VALIDITY AND RELIABILITY

Validity: the degree to which a measurement tool evaluates what it is designed to measure.

- If a mood rating scale included statements that allowed for mood to be measured, then the mood rating scale would have high validity.
- If the statements in the mood rating scale did not allow for mood to be measured, then the mood rating scale would have low validity.

Reliability: the degree to which a measurement tool produces consistent results.

- If an individual completes a mood rating scale once a month for three months and the results are similar each time, then the mood rating scale would have high reliability.
- If the results were very different each time, then the mood rating scale would have low reliability.

Beyond the syllabus

The validity of a study can be examined in terms of its internal and external validity. **Internal validity** examines whether a study was designed, conducted, and analysed without bias and whether researchers can be sure changes in the dependent variable were due to the independent variable and not confounding variables.

External validity assesses whether produced results can be generalised to the population the sample is taken from. The higher the generalisability of results, the greater the external validity of the study. Conducting a study in an environment similar to that of the population the sample was taken from increases external validity.

Validity can also be analysed in terms of the measurement tool used in a study. **Construct validity**, for example, involves checking whether the questions within a measurement tool assess the underlying theoretical construct it is claiming to measure. E.g., a mood rating scale consists of questions pertaining to emotions.

The **internal reliability** of a study can be used to gauge the extent to which a test is consistent within itself. The **split-half method** can be used to measure the internal consistency of a test by comparing one half of the test with the other. The test would have high internal reliability if both halves of the test produced similar results.

External reliability enables researchers to assess the degree to which a measurement tool produces consistent results each time it is administered. An easy way to assess external reliability is by repeating a test a second time and comparing the results produced. If results are similar, then there is high **test-retest reliability**.

GENERALISABILITY OF SAMPLE TO THE POPULATION

- A study with good generalisability means that the results collected from the sample can be applied to the population. Hypothetically, a new sample should be able to be selected from the population, the research be replicated, and the results be similar to those found in the original sample.

Generalisability: the extent to which results gathered from a sample in research can be applied to other situations.

- For a study to have good generalisability, the sample needs to be representative of the population. Choosing a suitable sampling method that allows for the sample to be representative of the population is therefore critical, however it is important to note that obtaining a perfectly representative sample is rare.
- While convenience and random sampling does not tend to allow for the sample to be representative, stratified sampling does because participants are selected from groups in the same proportions that they appear in the population.

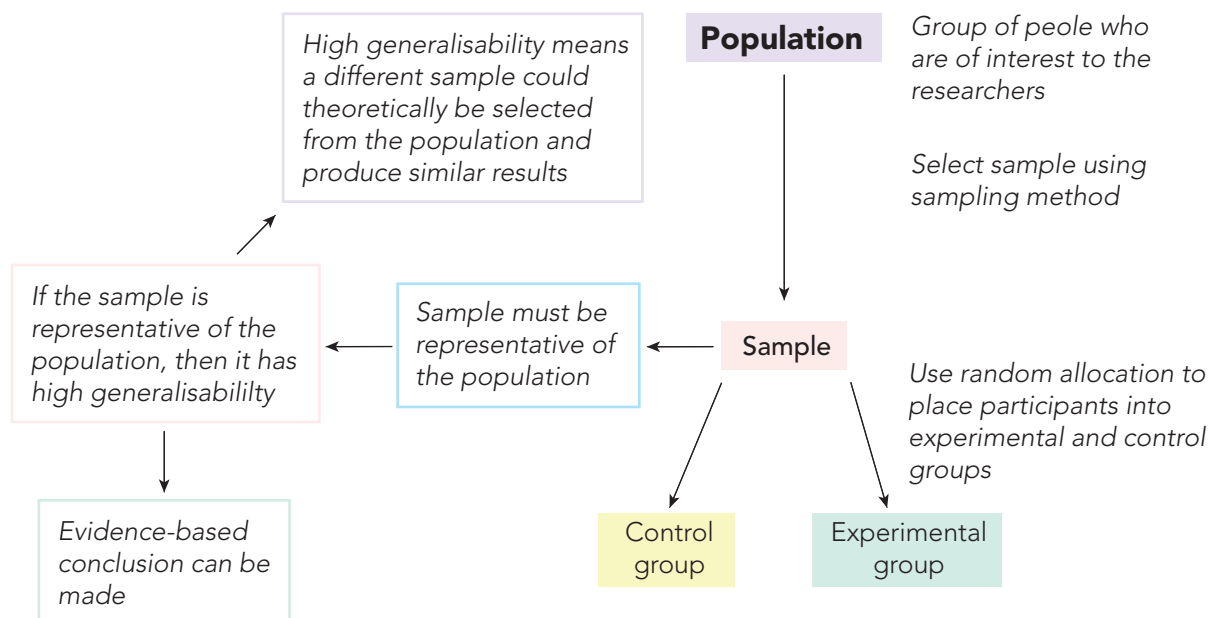


Figure 16.1 The development of a study with high generalisability.

ADDRESSING LIMITATIONS OF RESEARCH

Limitation	How to address limitation
Not knowing if the independent influenced the dependent variable	<ul style="list-style-type: none"> • Use a control group to act as a comparison for the experimental group. A control group indicates whether it is the independent variable affecting the dependent variable, or another variable.
Extraneous variables	<ul style="list-style-type: none"> • Use random allocation when placing participants into control and experimental groups. • Be sure participants are not aware of which group they have been allocated to. • Eliminate the experimenter effect. • Monitor variables to ensure they are controlled. • Use standardised instructions and procedures. • Conduct the experiment in a controlled environment (such as a laboratory).
Confounding variables	<ul style="list-style-type: none"> • Control extraneous variables so they do not develop into confounding variables.
Demand characteristics	<ul style="list-style-type: none"> • Use a placebo (fake treatment with no active effect). • Eliminate the experimenter effect. • Use a single-blind procedure so participants are unaware of what group they are in. • Use deception to prevent participants from knowing the aim of the study.
Experimenter effects	<ul style="list-style-type: none"> • Instead of using a single-blind procedure, use a double-blind procedure where neither experimenter nor participants are aware of which conditions participants are in, or the hypothesis. • Use a sampling technique involving the least amount of researcher bias – such as stratified sampling.
Low reliability	<ul style="list-style-type: none"> • Use measurement tools that have been empirically measured to show they collect reliable results. • Replicate the study and carefully analyse it to detect and reduce random errors.
Low validity	<ul style="list-style-type: none"> • Control extraneous variables. • Improve measurement techniques. • Use a single or double-blind procedure. • Including a control group. • Use random allocation when placing participants into control and experimental groups.
Sample is not able to be generalised to the population	<ul style="list-style-type: none"> • Use a stratified sampling method rather than convenience or random to create a sample representative of the population. • Use the same number of participants in each group. • Use random allocation when placing participants into control and experimental groups. • Be sure participants are not aware of which group they have been allocated to. • Extraneous variables need to be controlled.

ADDRESSING ETHICAL IMPLICATIONS

Ethical implications	How to address ethical implication
Participants not being fully aware of the purpose of the study, what they are required to do, or potential risks associated with participating	Participants must give informed consent.
Participants feeling pressured to be part of a study	Uphold the ethical guideline of voluntary participation.
Participants feeling distressed during a study	Remind participants of their withdrawal rights.
Participants changing their behaviour due to knowing the aim of the study	Use deception so participants are unaware of the aim of the study.
Extensive and unrequired personal information being collected from participants	Maintain privacy whereby only required information relevant to the study is collected from participants.
Participant information accessible to individuals other than the researcher	Maintain confidentiality where participant information is securely stored then disposed of when no longer needed.
Participants having mistaken ideas about themselves, the purpose of the study or other participants in the study	Provide debriefing at the conclusion of the study.

CRITICAL EVALUATION OF INFORMATION FROM A RANGE OF SCIENTIFIC SOURCES

- When looking at scientific sources such as published journal articles, be sure to look if they have been peer-reviewed. Peer-reviewed articles have been published in a scholarly journal and reviewed by experts on the topic. These articles will have high validity.
- Check for the credibility of the source by looking at the qualifications of the author and, whether the author has an affiliation with a government agency, university, non-for-profit organisation or corporation.
- Evaluate the accuracy and the reliability of the source by making sure there are references that support the information provided. Make sure that included statistical data or facts can be confirmed by other sources.
- Assess whether the information is subjective (based on opinion) or objective (based on fact). Consider that subjective information may be biased.

Question 1

Forensic psychologists are concerned that administering a polygraph test (lie detector test) to potential criminal suspects is measuring their level of anxiety and not whether the suspects are being honest in their responses.

- (a) Identify whether it is the reliability or the validity of the polygraph test that is being compromised and provide justification for your response. (3 marks)

- (b) Define the term 'reliability'. (1 mark)

- (c) Define the term 'validity'. (1 mark)

Question 2

Jaime is planning a research study for her university course and wants to make sure that the sample she selects can be generalised to the population.

- (a) Identify the sampling method that best allows for the sample to be representative of the population it was selected from. (1 mark)

- (b) Aside from the sampling method she should use, outline **two** ways she can minimise the risk of her sample having low generalisability. (2 marks)

One: _____

Two: _____

Provide solutions for the following concerns that Jaime has.

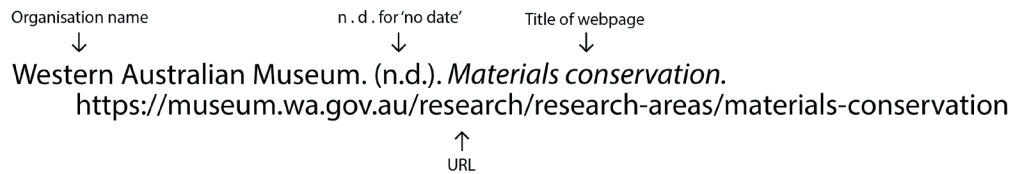
- (c) (i) 'I want to avoid my participants feeling pressured to be part of my study.' (1 mark)

- (ii) 'How can I avoid my participants being unsure of the risks associated with the study, or not understanding what they are required to do?' (1 mark)

- (iii) 'What do I do if my participants develop mistaken ideas about the purpose of the study or other participants in the study?' (1 mark)

- (iv) 'I am worried that I will not be able to know if the independent variable in my study has influenced the dependent variable.' (1 mark)

WEBSITE WITH NO AUTHOR OR DATE



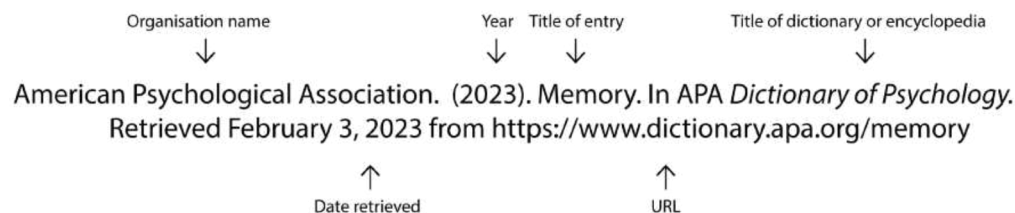
In text citation: One role of the department is to preserve collections for future research (Western Australian Museum, n.d.).

VIDEO FILE

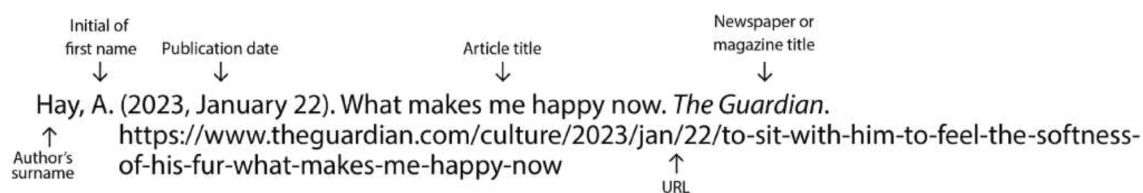
If there is an author, start with their surname, initial of their first name. [Screen name].



ONLINE DICTIONARY OR ENCYCLOPEDIA

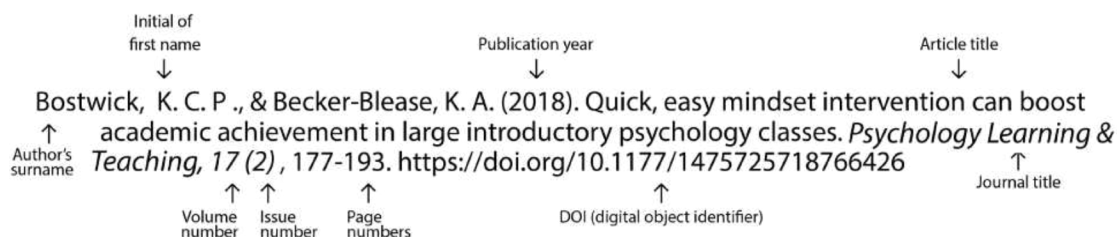


NEWSPAPER ARTICLE: PRINT AND ONLINE



For a printed article, write the newspaper or magazine title, comma, and then the page number..

JOURNAL ARTICLE WITH LESS THAN THREE AUTHORS



In text citation: Having a growth mindset produces greater academic performance (Bostwick & Becker-Blease, 2018).

As Bostwick and Becker-Blease (2018) states, having a growth mindset produces greater academic performance.

JOURNAL ARTICLE WITH THREE OR MORE AUTHORS



In text citation: Hoyek et al. (2012) explained how further investigations should focus on gender differences.

Further investigations should focus on gender differences (Hoyek et al., 2012).

If quoting: 'We further concluded that the VMRT and 2D MR tests may not be well-designed for elementary-school children.' (Hoyek et al., 2012, p. 1).

GUIDE TO WRITING AN EXTENDED RESPONSE



In exams, four marks are typically allocated to the inclusion of psychological terminology to demonstrate psychological knowledge, structure of written content, as well as grammar, spelling, and punctuation.

- Writing English-style essays is not a necessity of the ATAR Psychology course – this means an introduction and conclusion is not required, nor are introductory and concluding sentences in each paragraph.
- Group information into paragraphs and write them in a logical order.
- Begin each paragraph at the top of a new page to provide space at the bottom to add information remembered later. It also creates space for your teacher to provide feedback.
- Start each paragraph with the definition of a key term mentioned in the question as this provides opportunities to utilise psychological terminology.
- Marks are not allocated for dates of research.
- Marks are not allocated for the first name of researchers and theorists; last names are sufficient.
- Write the full term and include the acronym in brackets immediately after. For the rest of the extended response, write the acronym only. E.g., electroencephalogram (EEG).
- It is acceptable to include appropriate diagrams or drawings within your response, however, they must be explained within the relevant paragraphs.
- You are not required to include research or content not explicitly included in the syllabus. Extended response questions in WACE exams are designed to enable full marks to be achieved from syllabus content alone.

The following is a sample extended response question, a written response that would achieve full marks, and the sample marking key.

Question 11

(24 marks)

Brody was a passenger in a car crash where a stolen car smashed into the car his friend was driving, causing injuries to him and his friend, and the car to be damaged beyond repair.

Due to the accident, Brody consequently suffered brain injuries when his head hit the airbag in front of him. His family and friends noticed that he was more aggressive after the accident and when given a bottle of water and a glass, he was not able to pour the water into the glass without spilling the water. The emergency doctor ran tests to see whether Brody could verbally respond, then sent him to get a brain scan.

In your answer you should:

- explain Brody's symptoms in relation to the pair of lobes damaged (5 marks)
- explain the reason the doctor ran the tests referred to in the scenario (3 marks)
- deduce the scanning method most suitable for checking if Brody has fractured his skull and outline how the scanning method works (3 marks)
- apply the case study of Phineas Gage to Brody's accident (6 marks)
- name and describe the type of brain plasticity that will occur in Brody's brain (3 marks)
- use relevant psychological language to clearly demonstrate psychological knowledge. (4 marks)

The accident caused damage to Brody's frontal lobes (✓). The frontal lobes are responsible for the expression of personality (✓) which explains why Brody has had a change in personality and is now behaving in a more aggressive way than he did before the accident (✓). Brody also has difficulty pouring a bottle of water (✓), most likely because his ability to control his motor movements has been affected (✓) – another function of the frontal lobes. Adaptive brain plasticity (✓) will begin to take place in Brody's brain. The neural connections in the brain will reorganise in response to his brain injury (✓) and functions of the damaged areas may be taken over by intact areas of the brain (✓).

The emergency doctor ran verbal language tests to assess whether Brody damaged his Broca's area (✓). Broca's area is in the left frontal lobe (✓) and damage to this region of the brain, also known as Broca's aphasia, is characterised by an impairment in the ability to create articulate speech (✓). The scanning method most suitable for Brody to have in the hospital is a computed tomography scan (CT) (✓). The CT scan involves a rotating x-ray beam that moves 360 degrees around the patient (✓) while taking multiple x-ray images (✓).

Phineas Gage was working as a foreman building a railroad when his tamping iron hit rock and exploded up through his head (✓). He miraculously survived the accident, even after a large part of his left frontal lobe was destroyed (✓). Before the accident Gage was known as a well organised, polite man who was able to run a team of workers, but after the accident he was described as rude, disorganised, and impulsive (✓) (✓). Gage and Brody have a few similarities in that both sustained damage to their frontal lobes (✓) and they both experienced a change in personality (✓).

use of psychological language to demonstrate psychological knowledge (4)

Description	Marks
Symptoms	
Frontal lobes	1
Brody had a change in personality / is more aggressive than he was before the accident	1
The frontal lobes are responsible for the expression of personality	1
Brody had difficulty pouring a bottle of water	1
The frontal lobes are responsible for controlling motor movements	1
Subtotal	5
Tests	
Doctor was checking to see if Brody's Broca's area was damaged	1
Broca's area is in the left frontal lobe	1
Damage to Broca's area (Broca's aphasia) is characterised by an impairment in the ability to produce articulate / clear speech	1
Subtotal	3
Scanning method	
Computed tomography scan / CT scan	1
Rotating x-ray moves 360 degrees / around the patient	1
Multiple x-ray images are taken	1
Subtotal	3
Phineas Gage	
Gage was in an accident during which a tamping iron shot through his head	1
His left frontal lobe was severely damaged	1
Two characteristics before and after accident (e.g., before: efficient, polite, calm, well organised, after: impatient, uncaring for others, impulsive, would often swear)	1-2
Similarity with Brody – Gage also damaged the frontal lobes	1
Similarity with Brody – Gage also experienced a change in personality	1
Subtotal	6
Brain plasticity	
Adaptive plasticity	1
Reorganisation of neural connections in the brain	1
Functions of damaged area may be taken over by other areas of the brain	1
Subtotal	3
Use of psychological language to demonstrate psychological understanding	
Coherent paragraphs that are in logical order. Consistent, extensive, and correct use of relevant psychological terminology. Meaning of content is not hindered by grammar and punctuation.	4
Coherent paragraphs that are in logical order. Range of mostly correct psychological terminology used. Meaning of content is not hindered by grammar and punctuation, although there may be some errors.	3
Paragraphs are used. Simple psychological terminology used. Meaning of content is not hindered by grammar and punctuation, however there may be some errors.	2
Paragraphs are not used. Some psychological terminology is correct. Limited correct spelling, grammar and punctuation that may hinder meaning of content.	1
Subtotal	4
Overall total	24

ANSWERS TO REVIEW QUESTIONS

CHAPTER ONE

Question 1

(a) (i)

Description	Marks
Cable of nerve fibres / thick bundle of nerve fibres	1
Total	1

(ii)

Description	Marks
Central	1
Total	1

(b) (i)

Description	Marks
The brain	1
Total	1

(ii)

Description	Marks
Allow for information to pass between sensory and motor neurons	1
Total	1

(c) (i)

Description	Marks
Electrically	1
Total	1

(ii)

Description	Marks
Chemically	1
Total	1

Question 2

(a) (i)

Description	Marks
Pupils will dilate	1
Total	1

(ii)

Description	Marks
Heart will pump blood faster / heart rate will increase	1
Total	1

(iii)

Description	Marks
Sympathetic nervous system	1
Total	1

(iv)

Description	Marks
Autonomic nervous system	1
Total	1

(v)

Description	Marks
Somatic nervous system	1
Total	1

Question 3

(a) (i)

Description	Marks
Reticular formation	1
Total	1

(ii)

Description	Marks
Hypothalamus	1
Total	1

(b) (i)

Description	Marks
Wernicke's area	1
Total	1

(ii)

Description	Marks
Left hemisphere	1
Temporal lobe	1
Total	2

(iii)

Description	Marks
Understanding spoken language	1
Total	1

(c)

Description	Marks
Primary sensory cortex: parietal lobe	1
Primary motor cortex: frontal lobe	1
Total	2

(d)

Description	Marks
The left hemisphere controls the right side of the body	1
Example: the left hemisphere controls movement of the right side of the body	1
The right hemisphere controls the left side of the body	1
Example: the right hemisphere controls movement of the left side of the body	1
Total	4
<i>Accept other relevant examples</i>	

CHAPTER TWO

Question 1

(a)

Description	Marks
Case study	1
Total	1

(b)

Description	Marks
No	1
Detailed information from only one person has been collected	1
Total	2
<i>Accept other relevant reason</i>	

(c)

Description	Marks
The left frontal lobe was damaged	1
Phineas had a change in personality, and developed difficulties problem solving and controlling impulses	1
Developed understanding that the frontal lobes are responsible for expression of personality, problem solving and impulse control	1
Total	3

Question 2

(a)

Description	Marks
Participants who had undergone split-brain surgery / who had a severed corpus callosum	1
Total	1

(b)

Description	Marks
The left hemisphere is responsible for speech production	1

The right hemisphere is unable to produce speech	1
Total	2

(c)

Description	Marks
The corpus callosum is required for full functioning of the brain	1
Total	1

Question 3

(a)

Description	Marks
Freeman and Watts wanted to be able to assess the function of the brain	1
The patient would be conscious and able to answer questions / complete tests	1
Speaking during the procedure allowed them to know once nerve fibres were successfully severed	1
Total	3

(b)

Description	Marks
The patients had overactive emotions	1
The pre-frontal cortex is partly responsible for the expression of personality / expression of emotions	1
Severing the pre-frontal cortex from the thalamus would reduce overactive emotions / agitation in patients	1
Total	3

(c)

Description	Marks
Developed a lack of interest (apathy)	1
Decreased concentration	1
Numbness in emotional response	1
Total	3
<i>Accept other relevant side effects</i>	

CHAPTER THREE

Question 1

(a)

Description	Marks
Any one difference: <ul style="list-style-type: none"> • MRI produces still images whereas fMRI produces dynamic images • MRI is a structural neuroimaging technique whereas fMRI is a functional neuroimaging technique 	1

Any two similarities:	1-2
• both procedures use a strong magnetic field and radio waves	
• neither expose the patient to ionising radiation	
• patients cannot have magnetic metal on or in the body	
Total	3

(b)

Description	Marks
MRI produces more detailed pictures than those produced by CT scans	1
If there is a brain tumour or aneurysm, the MRI will show this clearer than a CT scan as it is better at detecting soft tissues	1
Casey will not be exposed to ionising radiation during an MRI, but would be during a CT scan	1
Her unborn child is less likely to be negatively affected by the MRI than CT scan	1
Total	4

(c)

Description	Marks
Brain waves / electrical activity of the brain	1
Total	1

Question 2

(a)

Description	Marks
Oxygen	1
Total	1

(b)

Description	Marks
Ability to differentiate which specific part of the brain is active	1
Total	1

(c)

Description	Marks
Ability to detect when brain activity occurred	1
Total	1

(d)

Description	Marks
Any two of the following:	1-2
• conductive gel	
• scalp	
• the thick membrane surrounding the brain (dura mater)	
Total	2

CHAPTER FOUR

Question 1

(a)

Description	Marks
Remaining neural connections can strengthen	1
Remaining neural connections can grow in complexity	1
Total	2

(b)

Description	Marks
Emotional regulation and impulse control are mainly controlled by the pre-frontal cortex	1
The pre-frontal cortex is still growing and changing during adolescence and early adulthood	1
Total	2

(c)

Description	Marks
The ability of neural connections to grow and reorganise	1
Total	1

(d)

Description	Marks
Five months of age	1
Total	1

(e)

Description	Marks
Greater brain plasticity occurs during infancy	1
Brain regions not specialised in the infant brain can take over the function of damaged areas	1
Brain regions in the adult brain are already specialised making it more difficult for them to take over the function of damaged areas	1
Total	3

CHAPTER FIVE

Question 1

(a)

Description	Marks
The study of continuity and change throughout the lifespan	1
Total	1

(b) (i)

Description	Marks
Childhood	1
Total	1

(ii)

Description	Marks
Early adulthood	1
Total	1

(iii)

Description	Marks
Adolescence	1
Total	1

(iv)

Description	Marks
Early adulthood	1
Total	1

(c)

Description	Marks
Gross motor skills involve large muscle movements of the body	1
Example of gross motor skill: throwing a ball uses the muscles in the arms	1
Fine motor skills involve small muscle movements of the body	1
Example of fine motor skill: frowning uses the muscles in the face	1
Total	4
<i>Accept other relevant examples</i>	

(d)(i)

Description	Marks
An individual knows what they would like to say	1
But are unable to recall the specific word required	1
Total	2

(ii)

Description	Marks
Middle age	1
Total	1

(c) (i)

Description	Marks
Starting to learn speech sounds	1
By listening to their mother speak	1
Total	2

(ii)

Description	Marks
Cognitive	1
Total	1

CHAPTER SIX

Question 1

(a) (i)

Description	Marks
Assimilation	1
Accommodation	1
Total	2

(ii)

Description	Marks
Accommodation	1
Total	1

(b) (i)

Description	Marks
Her son would look for the rattle under the blanket.	1
Total	1

(ii)

Description	Marks
Sensorimotor stage	1
Total	1

Question 2

(a) (i)

Description	Marks
Animism	1
Total	1

(ii)

Description	Marks
Preoperational stage	1
Total	1

(iii)

Description	Marks
Egocentrism	1
Total	1

Question 3

(a) (i)

Description	Marks
Examples include: • the child pretends an orange is a ball and throws it • the child holds a banana up to their ear, pretending it is a phone	1
Total	1
<i>Accept other relevant example</i>	

(b)

Description	Marks
Preoperational stage	1
Total	1

(c)

Description	Marks
Pretend play / fantasy play	1
Total	1

(d)

Description	Marks
<p><i>Answers could include, but are not limited to:</i></p> <ul style="list-style-type: none"> • Piaget did not acknowledge that not everyone reaches the final stage of cognitive development (the formal operational stage) • the children were asked the same questions multiple times during each task which may have caused them to doubt their first response and change it to please the researcher • the tasks that the children were given to complete were unfamiliar to them so they were unable to demonstrate their true abilities for their age • Piaget underplayed the role that social and cultural factors had on children (Piaget's concepts are taught within a Western oriented educational setting thus cultural bias exists) • the sample of children Piaget used to develop the stages were made up of his own three children and the children of his colleagues. The parents of the children were well educated professionals of high socioeconomic status therefore results are unable to be generalised to the population of children 	1-2
Total	2

CHAPTER SEVEN

Question 1

(a)

Description	Marks
Whether the milk bottle was attached to the cloth covered or wire-mesh surrogate	1
Total	1

(b)

Description	Marks
Amount of time the monkeys spent on the surrogates	1
Total	1

Question 2

(a)

Description	Marks
Proximity seeking: Molly did not seek proximity with her mother	1
Exploration and secure-base behaviour: Molly was happy to play unsupervised / Molly did not use child care workers as a secure base	1
Stranger anxiety: Molly was not distressed by strangers coming up to her	1
Separation anxiety: Molly did not show any distress when her mother left	1
Response to reunion: when Molly's mother picked her up, Molly did not seek her comfort	1
Total	5

(b)

Description	Marks
Insecure-avoidant / Type A	1
Total	5

(c) (i)

Description	Marks
Children have a biological (innate) need to form an attachment with one main attachment figure / primary caregiver	1
Total	2

(ii)

Description	Marks
It is likely that Molly experienced maternal deprivation	1
<p><i>Any one of the following:</i></p> <ul style="list-style-type: none"> • Molly is having difficulty socialising with others • Molly does not display affection • Molly shows very little emotion 	1
Total	2
<i>Accept other relevant evidence</i>	

(iii)

Description	Marks
Internal working model	1
Total	1

(iv)

Description	Marks
Molly plays with toys on her own / Molly plays by herself	1
Total	1

CHAPTER EIGHT

Question 1

(a)

Description	Marks
Explicit	1
Explicit attitudes are made consciously	1
Rhianna completed an online rating of the restaurant	1
Total	1

(b)

Description	Marks
Affect (1) Rhianna felt frustrated that her meal was ruined (1)	1-2
Cognition (1) Rhianna believed she had not been provided with adequate service (1)	1-2
Behaviour (1) Rhianna gave the restaurant a low rating (1)	1-2
Total	6

(c)

Description	Marks
Giving the restaurant a low rating online	1
Was in conflict with	1
Her behaviour of convincing the owner she was happy with the service	1
Total	3

(d)

Description	Marks
She changed the low rating to a high rating	1
Total	1

(e)

Description	Marks
The greater the magnitude of dissonance	1
The greater the pressure felt to reduce it	1
Total	2

(f)

Description	Marks
The amount of discomfort experienced	1
Is subjective / personal to each individual	1
Total	2

Question 2

(a)

Description	Marks
Social categorisation	1
Social identification	1
Social comparison	1

Correct order of stages	1
Total	4

(b)

Description	Marks
Social identification	1
Total	1

(c)

Description	Marks
People care what others think about them	1
If people in society value members of a group favourably	1
Then individuals in the group will feel good about themselves	1
Total	3

CHAPTER NINE

Question 1

(a)

Description	Marks
Prejudice is negative feelings toward members of an outgroup.	1
Prejudice can be applied to the 'affect' component of the tripartite model.	1
Stereotypes are positive or negative thoughts about members of an outgroup.	1
Stereotypes can be applied to the 'cognition' component of the tripartite model.	1
Discrimination involves unjustified negative behaviours toward members of an outgroup.	1
Discrimination can be applied to the 'behaviour' component of the tripartite model.	1
Total	6

(b)

Description	Marks
Any one of the following: <ul style="list-style-type: none"> • frees up cognitive processing that can be used to perform other mental tasks • allows for large amount of information to be quickly and simply processed • help people assess social situations and avoid danger (evolutionary perspective) 	1
Total	1
Accept other relevant evidence	

(c)

Description	Marks
Direct discrimination is intentional whereas indirect discrimination may be unintentional at times.	1
Example of direct discrimination: an employer requiring a photo of job applicants on their CV and not considering interviewing applicants who look 'old'.	1
Example of indirect discrimination: an employer requiring all job applicants to pass a physical fitness test for a position not requiring high levels of physical fitness (younger applicants will be more likely to pass than older ones).	1
Total	3
<i>Accept other relevant differences and examples</i>	

(d)

Description	Marks
Ageism	1
Total	1

(e)

Description	Marks
Just world phenomenon	1
Total	1

Question 2

(a)

Description	Marks
To study group behaviour of boys during controlled situations	1
Total	1
<i>Accept other relevant aim (e.g., related to reducing intergroup conflict)</i>	

(b)

Description	Marks
Group formation	1
Intergroup competition	1
Intergroup cooperation	1
Correct order	1
Total	4

(c)

Description	Marks
The proximity led to further conflict between the two groups	1
It was not successful in uniting the two groups	1
Total	2

(d)

Description	Marks
Superordinate goals	1
Total	1

CHAPTER TEN

Question 1

(a) (i)

Description	Marks
Identification	1
Total	1

(ii)

Description	Marks
Janelle would need to no longer like Louise or want to be her friend	1
Total	1

(b) (i)

Description	Marks
Compliance	1
Total	1

(ii)

Description	Marks
Internalisation	1
Total	1

(iii)

Description	Marks
Identification	1
Total	1

(iii)

Description	Marks
Compliance	1
Total	1

Question 2

(a)

Description	Marks
Level of compliance / level of obedience	1
Total	1

(b)

Description	Marks
Any three of the following: <ul style="list-style-type: none"> the experiment was set at a prestigious university (1) and seemed legitimate to the participants (1) small increments in voltage were given (1) making it easier for participants to continue to obey (1) the experimenter used verbal prompts (1) which encouraged participants to continue to obey due to their perceived authority (1) the experimenter spoke with a stern voice (1) which led participants to perceive him as an authority figure (1) the participant was unable to see the learner in the other room (1) making it easier to obey as consequences of administering the shocks were not visible (1) the experimenter wore a lab coat (1) and was therefore perceived as a figure of authority at the university (1) the participant was in the same room as the experimenter (1) and this proximity increased the level of compliance (1) 	1-6
Total	6
Accept other relevant explanations	

(b) (i)

Description	Marks
Compliance	1
Total	1

Question 3

(a)

Description	Marks
People want to be accepted by others	1
Total	1

(b) (i)

Description	Marks
Conformity levels dropped significantly	1
Total	1

(ii)

Description	Marks
Another one or two confederates gave the correct answers during the trials	1
Total	1

CHAPTER ELEVEN

Question 1

(a)

Description	Marks
The greater the number of people	1
The less likely that help will be offered by the bystanders	1
Total	2

(b) (i)

Description	Marks
Audience inhibition: people not helping a person in need for fear of feeling embarrassed in front of other people	1
Social influence: people looking to fellow bystanders for cues on how to act	1
Diffusion of responsibility: bystanders assume other people will act	1
Total	3

(ii)

Description	Marks
Audience inhibition: Joel and his friends are on their way to the casino (1) and would likely be ostracized by their fellow friends if they held up the bus to see if the woman was alright or to call for an ambulance.	1-2
Social influence: the situation is ambiguous (1) and when Joel and his friends looked at people on the street for cues to how to react in this situation, they saw no one else seemed concerned. (1)	1-2
Diffusion of responsibility: as there were plenty of people walking past and driving on the street (1) Joel and his friends may have thought someone already called for help. (1) They may have also thought it was the responsibility of the nightclub staff to help the woman.	1-2
Total	6

Question 2

(a)

Description	Marks
People with high mood	1
Are more likely to carry out pro-social behaviours	1
Total	2

(b)

Description	Marks
When an individual feels empathy toward another person	1
They are more likely to behave in an altruistic way toward them	1
Total	2

(c)

Description	Marks
Helping behaviour	1
Total	1

CHAPTER TWELVE

Question 1

(a)

Description	Marks
Participants responded to the posters around the campus	1
Participants chose to participate from their own will	1
Total	2

(b)

Description	Marks
Any two of the following:	1-2
• the personal details about the experiment would not be shared publicly without written consent from the participant	
• the data collected should be securely stored	
• the data collected should be disposed of when no longer required	
Total	2

(c)

Description	Marks
Only information relevant to the study should be collected from the participants.	1
Total	1

(d)

Description	Marks
During the study: participants can leave the study or have their results removed without pressure or penalty.	1
After the study: participants can have their results removed.	1
Total	2

(e)

Description	Marks
Any two of the following:	1-2
• whether they were provided with the hemp seed oil or the placebo	
• access to counselling services	
• a reminder that participants have the right to remove their results from the study	
Total	2

(f) (i)

Description	Marks
Ethics committee	1
Total	1

(ii)

Description	Marks
Any two of the following:	1-2
• decide whether there has already been similar completed research that nullifies the purpose of the current proposal	
• decide whether the risk to participant welfare outweighs any benefit the research would have to society	
• monitor the research study and step in if there is suspicion that ethical guidelines have been breached	
Total	2
Accept other relevant roles	

Question 2

(a)

Description	Marks
Replacement	1
Using an alternative method to using animals in a study	1
Total	2

CHAPTER THIRTEEN

Question 1

(a)

Description	Marks
Students from Murdoch University	1
Total	1

(b)

Description	Marks
Population (students)	1
Independent variable	1
Dependent variable	1
Predicted direction	1
<i>E.g., It is hypothesised that students (1) will be more likely to provide help to people who are not obese with a BMI of less than 30 (1), measured by the average number of times help is received in 30 minutes (1), compared to people who are obese with a BMI of 30 or higher (1).</i>	
Total	4

(c)

Description	Marks
Cross-sectional	1
Total	1

Question 2

(a) (i)

Description	Marks
Observational	1
Total	1

(ii)

Description	Marks
Answer could include, but is not limited to: • increased validity compared to other methods	1
Total	1

(iii)

Description	Marks
Answer could include, but is not limited to: • observer bias may occur if the researcher only sees what they expect to see • participants may change their behaviour if they are aware of being observed	1
Total	1

(b)

Description	Marks
Non-experimental	1
Any one of the following: • the independent variable is not able to be manipulated • a cause-and-effect relationship cannot be found • participants are not able to be randomly allocated	1
Total	2

(c)

Description	Marks
Any three of the following: • intelligence • gender • mood • personality characteristics • motivation • physical ability	1-3
Total	3
Accept other relevant participant variables	

(d)

Description	Marks
Confounding variable	1
Total	1

CHAPTER FOURTEEN

Question 1

(a)

Description	Marks
Open-ended survey: qualitative	1
Rating scale: quantitative	1
Physiological measures: quantitative	1
Mixed methods: both	1
Checklist: quantitative	1
Structured interview: qualitative	1
Total	6

(b)

Description	Marks
The set of questions are pre-determined before the interview	1
The interviewer is unable to ask participants to further explain their responses	1
Total	2

Question 2

(a) (i)

Description	Marks
Checklist	1
Total	1

(ii)

Description	Marks
The way it is written is designed to encourage participants to agree with the statement	1
Students could also talk about 'wording effect' or how the question is a leading question	
Total	1

(iii)

Description	Marks
Answers could include, but are not limited to: • it does not allow participants to give reasons for their responses • participants have the ability to exaggerate their responses • responses are limited to the two options provided • a representative sample must be tested	1
Total	1

(iv)

Description	Marks
Subjective	1
The response is based on personal opinion/interpretations	1
Total	2

(b) (i)

Description	Marks
Any three of the following: <ul style="list-style-type: none"> heart rate breathing rate galvanic skin response 	1-3
Total	3
Accept other relevant measure (must be suitable for measuring stress level)	

(ii)

Description	Marks
Any one of the following: <ul style="list-style-type: none"> participants are less likely to affect data collected (risk of participant bias is limited) measures can be recorded in real-time 	1
Total	1
Accept other relevant benefit	

(iii)

Description	Marks
Any one of the following: <ul style="list-style-type: none"> structured interview semi-structured interview open-ended survey 	1
Total	1
Accept other relevant qualitative method of data collection	

CHAPTER FIFTEEN

Question 1

(a)

Description	Marks
Must be a histogram (due to class-intervals being provided)	1
Title includes both independent and dependent variable	1
Appropriate scales on both axes (needs to include compression symbol if scale is compressed)	1
Y-axis has correct label and unit of measurement	1
X-axis has correct label and unit of measurement	1
Total	5

(b)

Description	Marks
Difference: column graph has bars oriented vertically whereas bars are oriented horizontally in a bar graph	1
Any one similarity: <ul style="list-style-type: none"> there are gaps between each bar bars are used to compare different categories of data data is discrete 	1
Total	2

Question 2

(a) (i)

Description	Marks
Negative correlation	1
As one variable increases / as the number of missed classes increases	1
The other variable decreases / the exam score decreases	1
Total	3

(ii)

Description	Marks
Scatterplot / scattergraph / scattergram	1
Total	1

(iii)

Description	Marks
$5 + 7 + 7 + 10 + 11 + 14 + 20 + 22 + 25 + 30 = 151$ $151 \div 10 = 15.1 / 15$ (rounded to whole number)	1
Total	1

(iv)

Description	Marks
20, 22, 32, 51, 53, 64, 70, 72, 74, 79 $53 + 64 = 117$ $117 \div 2 = 58.5\% / 59\%$ (rounded to whole number)	1
Total	1

(v)

Description	Marks
No	1
Correlation does not imply causation	1
Total	2

Question 3

(a)

Description	Marks
Positive	1
Moderate	1
Total	2

(b)

Description	Marks
Negative	1
Strong	1
Total	1

(c)

Description	Marks
0.04, -0.12, 0.34, 0.82, -0.98	1
Total	1

CHAPTER SIXTEEN

Question 1

(a)

Description	Marks
Validity	1
The polygraph test should be measuring whether suspects are answering questions truthfully	1
It is currently not possible to guarantee the polygraph test is measuring what it is designed to measure	1
Total	3

(b)

Description	Marks
The degree to which an assessment tool produces consistent results	1
Total	1

(c)

Description	Marks
The degree to which an assessment tool measures what it is designed to measure	1
Total	1

Question 2

(a)

Description	Marks
Stratified sampling	1
Total	1

(b)

Description	Marks
Any two of the following: <ul style="list-style-type: none"> • use the same number of participants in each group • control extraneous variables • use random allocation when placing participants into control and experimental groups • be sure participants are not aware of which group they have been allocated to 	1-2
Total	2
Accept other relevant response	

(c) (i)

Description	Marks
Uphold the ethical guideline of voluntary participation	1
Total	1

(ii)

Description	Marks
Be sure participants give informed consent	1
Total	1

(iii)

Description	Marks
Debrief participants at the conclusion of the study	1
Total	1

(iv)

Description	Marks
Use a control group in addition to experimental groups	1
Total	1

GLOSSARY

Extended content – not explicitly written in the syllabus

Abstract thinking: using the mind to visualise and consider complex concepts that are not tangible.

Accommodation: changing existing schemata to integrate new information, or the creation of a new schema when integration is not possible.

Action potential: the electrical impulse that travels along the axon of neurons toward the axon terminals where it causes the release of neurotransmitters into the synaptic cleft.

Adaptive plasticity: the ability of neural connections in the brain to reorganise in response to learning new information, or to compensate for lost functions and take advantage of remaining functions.

Ageism: prejudice and discrimination against people based on their age.

Alien hand syndrome: neurological condition where a limb makes involuntary movements without conscious control.

Altruism: helping others without expecting any personal reward.

Amygdala: a collection of nuclei deep within each temporal lobe that play a role in emotional responses and modulates the fear response.

Animism: the belief that an inanimate object is alive and has feelings.

Antisocial behaviour: behaviour that harms society and its members by intentionally violating the rights of others.

Assimilation: integrating new information into existing schemata without the schemata being altered.

Attachment: the strong emotional connection between an infant and their main attachment figure.

Attitude: an evaluation made up of the feelings, beliefs and behaviours toward a person, social group, event or object.

Attitude object: the target of judgement related to an attitude, such as an object, person, event or social group.

Attribution: the process of attaching meaning to our behaviour or the behaviour of others, by looking for causes to explain the behaviour.

Audience inhibition: failure to intervene in an emergency in the presence of others due to fear of being negatively judged.

Autonomic nervous system (ANS): branch of the PNS that carries motor messages from the brain to internal glands and organs via motor neurons, causing their involuntary activity, and carries sensory messages to the brain about the activity level of glands and organs via sensory neurons.

Axon: the long projection of a neuron that conducts electrical nerve impulses.

Axon terminals: the enlarged end points of axon branches that store neurotransmitters and release them into the synapse.

Bar graph: graph with horizontal bars used to display different categories of data.

Blood oxygen level dependent signal (BOLD): technique used in fMRI scans to display magnetism differences depicting oxygen levels in the blood.

Brain: organ of the CNS made up of nerve tissue that controls the functions of the body.

Brain plasticity: the ability of neural connections to grow and reorganise.

Broca's aphasia: impairment in the ability to produce articulate speech due to damage of Broca's area.

Broca's area: region within the left frontal lobe that controls the fine muscles responsible for the production of articulate speech.

Bullying: the purposeful use of a difference in power to repeatedly cause physical, psychological, or social harm.

Bystander: person present at an event but not taking part.

Bystander effect: phenomenon where bystanders fail to help someone in need when in the presence of others.

Case study: in-depth investigation of an individual person, group of people or a single event.

Cell body (soma): contains a nucleus that controls the activities of the neuron.

Central nervous system (CNS): part of the nervous system made up of the brain and spinal cord that carries sensory information up the spinal cord to the brain via sensory neurons and carries motor messages to the PNS via motor neurons.

Centration: the ability to only focus on one aspect of a situation at any given time, while disregarding the rest.

Cerebellum: structure underneath the cerebrum involved in balance, judging distance and coordination of fine motor movement.

Cerebral cortex: the outermost layer of the brain made up of nerve cell tissue that is responsible for higher order processes.

Cerebrum: largest part of the brain consisting of white matter on the inside, and the cerebral cortex on the outside.

Checklist: collection of yes/no information on statements.

Circuit formation: electrochemical messages sent between neurons forming connections.

Cognitive dissonance: a feeling of mental discomfort when contradictory information is perceived by a person.

Collectivist culture: societal group that values the needs of the group over individual interests.

Column graph: graph with vertical bars used to display different categories of data.

Compliance: form of social influence where behaviour is changed in response to a direct or indirect request by another person.

Computed tomography (CT): scanning technique where multiple x-rays create three-dimensional images of the body.

Confederate: an individual who plays a rehearsed role as a participant in an experiment.

Confidentiality: information collected from participants must be stored in a secure manner and then disposed of when no longer required.

Conformity: changing behaviour to align with those of a group due to real or implied pressure.

Confounding variables: variables that impact the dependent variable and also have a causal or correlational relationship with the independent variable.

Conservation: mass and volume remain unchanged when the form of an object is altered.

Construct validity: the degree to which a measurement tool measures the concept it was designed to assess.

Contact hypothesis: intergroup contact can reduce prejudice and negative stereotypes held by members.

Continuous data: data that can be measured and has an infinite number of possible values that can be broken down into smaller parts.

Control group: group of participants exposed to all conditions except the independent variable.

Controlled observation: researchers observe participants in an environment that is structured, such as a laboratory.

Controlled variables: variables that stay consistent throughout an experiment.

Convenience sampling: sampling method in which the researcher chooses people who are convenient for them to reach..

Corpus callosum: the thick band of nerve fibres connecting the cerebral hemispheres of the brain and allowing the transfer of information between them.

Correlational research: research that measures the linear relationship between two variables.

Cost-benefit analysis: psychological process of weighing up the benefit of performing a behaviour, with the cost that the consequence of the behaviour may entail.

Critical period: a lifespan stage during which individuals are more sensitive to environmental influences and normal development relies on these particular life experiences occurring.

Cross-sectional study: data is collected once from participants.

Cult: social movement or group with a shared commitment to a typically extreme ideology.

Debriefing: an explanation given to participants at the conclusion of a study.

Deception: this is used when the participants knowing the true purpose of the study would affect the results.

Deindividuation: the process whereby people have reduced self-awareness and feel less inhibited in group situations.

Demand characteristics: cues participants perceive during a study that lead them to believe they have discovered the aim of the study or expectations of the researcher.

Dendrites: extensions of the cell body that receive neurotransmitters from pre-synaptic neurons and convert them into electrical nerve impulses that are conducted toward the cell body.

Dependent variable: variable that is being measured by the experimenter.

Deprived environment: an absence of conditions that stimulate the senses and facilitate intellectual growth.

Developmental plasticity: the ability of neural connections in the brain to reorganise in response to sensory input from the environment.

Diffusion of responsibility: a reduction in personal responsibility when in a group, resulting in the individual being less likely to act.

Direct discrimination: unfair and intentional treatment of an individual because of a characteristic they have or are assumed to have.

Directional hypothesis: statement comparing the predicted outcome of each condition.

Disequilibrium: the state experienced when existing schemas are unable to account for new information.

Discrete data: data that can be counted and has a finite number of possible values that are unable to be broken down into smaller parts.

Discrimination: unjustified negative behaviours towards members of an outgroup based on their group membership.

Dispositional attribution: assigning the cause of behaviour to internal factors within the person (also known as an internal attribution).

Double-blind procedure: the researcher, as well as the participants are unaware of the experimental conditions.

Dynamic pictures: three-dimensional images that change in real time.

Egocentrism: the inability to understand the perspective of another person.

Electroencephalogram (EEG): external technique detecting and displaying brain waves via electrodes placed on the scalp.

Electro-chemical signal: the combination of electrical nerve impulses and neurotransmitters found within and between neurons.

Empathy: the ability to sense and share the thoughts or feelings of another person.

Empirical evidence: evidence that uses observations rather than being based on theories and hypotheses (theoretical).

Enriched environment: social and physical surroundings that facilitate intellectual and sensory stimulation.

Environment variables: type of extraneous variables relating to the environment the study takes place in and how this affects participant responses.

Ethical guidelines: codes of practice that are designed to be followed as a guide by people involved in psychological research.

Equal-status contact: members of both groups must have roughly equal power.

Equilibrium: the state experienced when existing

schemata can account for new information.

Evidence-based conclusion: a conclusion derived from objective evidence, such as research from credible sources.

Explicit attitudes: conscious judgements held toward an attitude object.

Experimental group: group of participants exposed to the independent variable.

Experimental research: research where the independent variable can be manipulated, a cause-and-effect relationship can be found, and participants can be randomly allocated.

Experimenter effect: the expectations and behaviours of the researcher that may bias results.

External reliability: the degree to which a test produces consistent results each time it is used.

External validity: the extent to which results from a study can be generalised to other contexts.

Extraneous variables: unwanted variables that may impact the dependent variable.

Fine motor skills: skills involving the small muscle movements of the body.

Forced compliance behaviour: performing an action that is inconsistent with personal beliefs.

Forebrain: largest part of the brain that plays a key role in cognition, emotion, behaviour and processing sensory information

Free-rider effect: an individual reducing their effort when working in a group because they believe other group members can successfully complete the task without their input.

Frequency distribution table: a tabulated representation of the number of times values occur within a data set, grouped in sections called class intervals.

Frequency table: a table listing values and the number of times each value occurs in a data set.

Frontal lobotomy: procedure where the nerve fibres connecting the pre-frontal cortex and the thalamus of the brain are severed.

Functional imaging: neuroimaging techniques producing scans showing brain function in real time.

Functional magnetic resonance imaging (fMRI): scanning technique where a magnetic field and radio waves show where neurons are consuming oxygen in the brain in real time.

Galvanic skin response (GSR): measure of electrical conductivity of the skin.

Generalisability: the extent to which results gathered from a sample in research can be applied to other situations.

Grey matter: nerve tissue in the spinal cord and brain largely comprising of the dendrites, unmyelinated axons and cell bodies of neurons, giving it a darkish colour.

Gross motor skills: skills involving the large muscle movements of the body.

Groupthink: group members conform to make unanimous decisions without using critical reasoning.

Helping: voluntary actions that benefit others.

Hindbrain: lower back part of the brain that coordinates sensory motor messages entering and leaving the spinal cord and is responsible for balance and coordination.

Histogram: frequency of class intervals displayed in graph format.

Hypothalamus: structure sitting below the thalamus that regulates sleep, eating, body temperature and sexual drive.

Implicit attitudes: unconscious judgements held toward an attitude object.

Independent variable: variable that is being manipulated by the experimenter to observe its effect on the dependent variable.

Indirect discrimination: unfair treatment of an individual who is disadvantaged due to conditions or regulations applied to everyone.

Individualistic culture: societal group that values individual needs over the group.

Informational influence: occurs when people conform because they would like to be correct and currently lack the information needed to be sure of their opinion or belief.

Informed consent: researchers must obtain written consent from research participants (using a consent form).

Ingroup: the group an individual associates with.

Intergroup behaviour: interactions members from one group have with members of another group (also known as intergroup relations).

Intergroup contact: contact between members of different social groups.

Intergroup conflict: disagreement between members of two or more groups.

Internal reliability: the degree to which a test produces consistent results within itself.

Internal validity: the extent to which results from a study are due to the independent variable affecting the dependent variable, rather than confounding variables.

Interneurons: acts as the connection between sensory neurons and motor neurons and transfers messages from sensory neurons to motor neurons within the CNS.

Inquiry question: open-ended question that the research is aiming to answer.

Just world phenomenon: the assumption people make that

everything happens for a reason and that the world is just.

Likert scale: type of rating scale where a numerical score is allocated to each point on a scale determining an overall attitude or providing a score on a diagnostic test.

Line graph: graph displaying continuous data of two variables increasing or decreasing at regular increments.

Longitudinal study: data is collected more than once, using the same participants.

Magnetic resonance imaging (MRI): scanning technique where a magnetic field and radio waves produce pictures of the brain.

Maternal deprivation: refers to the consequences an individual experiences when they are separated from their mother (or mother-substitute) as a child and an attachment is unable to develop.

Mean: calculated by adding together values in a set of scores, then dividing by the number of values in the data set.

Measures of central tendency: descriptive statistics that produce the average value of a set of scores.

Median: calculated by listing the values in a set of scores in numerical order from lowest to highest and selecting the value that is located in the middle of the list.

Medulla: lowest part of the brainstem that relays information between the spinal cord and brain and regulates the respiratory and cardiovascular systems.

Midbrain: receives sensory messages from all the senses, except smell, and sends information to the forebrain.

Migration: movement of neurons throughout the brain.

Mixed methods: qualitative and quantitative data are collected from participants in the same study.

Monotropy: attachment with only one attachment figure.

Motor neurons: carry motor messages from the spinal cord and brain (CNS) to the muscles, glands, and organs of the body.

Mutual interdependence: groups depend on each other to meet their goals; they have a co-dependent relationship.

Myelination: the growth of myelin over the axons of neurons.

Myelin sheath: fatty covering of the axon that acts as an insulator protecting the axon from stimuli that could interfere with electrical nerve impulse transmission.

Naturalistic observation: researchers observe participants in their natural setting in an unobtrusive manner.

Negative correlation: a linear relationship where one variable increases and the other decreases.

Nervous system: the system that produces and relays messages between the brain, spinal cord and a network of neurons.

Neurons (nerve cells): cells of the nervous system that communicate with each other, as well as muscle and gland cells.

Neurotransmitters: molecules found within the nervous system that act as chemical messengers.

Non-directional hypothesis: statement that declares there is a difference between conditions but does not specify the type of difference.

Non-experimental research: research where the independent variable cannot be manipulated, a cause-and-effect relationship cannot be found

and participants cannot be randomly allocated.

Normative influence: occurs when people conform because they want to be accepted by the group and not stand out.

Obedience: changing behaviour in response to a direct order by an authority figure.

Objective data: data based on facts that can be supported through observation and measurements.

Object permanence: understanding that an object still exists even if it is unable to be touched or seen.

Observational research: technique used to study behaviour.

Observer bias: when an observer's expectations or beliefs influence what they record during observational research.

Observer effect: when the awareness of being watched causes participants to alter their behaviour.

Open-ended survey: pen and paper questions or online questions with space to respond in open-text format.

Optic chiasm: the crossing over of optic nerves at the base of the brain, directly in front of the hypothalamus.

Outgroup: any group an individual does not belong to.

Participant variables: type of extraneous variable relating to the individual characteristics of participants.

Parasympathetic nervous system: branch of the ANS that reverses bodily functions produced by the sympathetic nervous system by calming the body and maintaining an energy level suitable for normal bodily functioning.

Pearson's correlation coefficient (Pearson's r): strength and direction of a linear relationship showed in numerical form.

Percentage: the amount of a number shown in parts per hundred.

Peripheral nervous system (PNS): nerves outside of the brain and spinal cord that carry sensory information to the CNS from the body and motor messages from the brain to organs and muscles in the body.

Phineas Gage: railway worker who severely damaged his left frontal lobe in an accident and aided in the understanding of frontal lobe functioning.

Placebo: is a neutral treatment that looks the same as the real treatment being evaluated and is delivered in the same way

Placebo effect: a positive result that occurs due to the participant's belief that a treatment will be effective.

Population: the entire group of people that is of interest to the researcher.

Positive correlation: both variables increasing or decreasing in a linear relationship.

Post-synaptic neuron: neuron that receives a signal from the synapse.

Prejudice: negative feelings held toward members of an outgroup.

Pre-frontal cortex: the front layer of the frontal lobes that coordinates executive functions, such as the ability to predict the consequences of behaviours, as well as the ability to recognise and regulate emotions.

Pre-synaptic neuron: neuron that transmits a signal into the synapse.

Primary auditory cortex: an area within both temporal lobes that registers and processes auditory information that is received from the ears.

Primary motor cortex: a strip of cerebral cortex running through the frontal lobes that controls voluntary movement of the body.

Primary sensory cortex: a strip of cerebral cortex running through the parietal lobes that registers and processes sensory information.

Primary visual cortex: an area within both occipital lobes that registers and processes visual information that is received from the eyes.

Privacy: only information relevant to a study should be collected from participants.

Proliferation: growth and division of cells, including neurons, that leads to the increase in cell number.

Pro-social behaviour: voluntary actions that promote social acceptance and benefit society and its members.

Qualitative data: descriptive information in the form of words.

Quantitative data: information in the form of numbers that can be counted.

Racism: prejudice and discrimination against people based on their race.

Random allocation: random distribution of participants into experimental and control groups to reduce researcher bias and increase generalisability of results.

Random sampling: sampling method where every person in a population has an equal chance of being randomly selected to be a member of the sample.

Rating scale: quantification of abstract concepts through participant rating.

Realistic conflict theory: theory developed by Sherif who described how hostility between groups results from competition for limited resources.

Reduction: finding further information from animals currently planned to be used in research or finding alternative methods to collect similar information using fewer animals.

Reciprocity principle: the social norm where a person feels obligated to return the favour to a person who does something for them.

Refinement: assessing ways to minimise potential distress or pain for animals used in research.

Reliability: the degree to which a measurement tool produces consistent results.

Replacement: using alternative methods to eliminate the need for animals in research studies.

Reticular formation: network of nuclei located within the length of the brainstem that helps maintain wakefulness and alertness.

Researcher variables: type of extraneous variable relating to the personality characteristics, appearance and conduct of the researcher that unintentionally impact participant response.

Sample: a subsection of the population.

Sampling: the process of selecting participants from a population of research interest that will be used in a study.

Scatterplot: correlation between two existing variables plotted in graph form.

Schemata: experiences of the world organised as mental structures.

Self-awareness: the ability for an individual to observe their thoughts, emotions and behaviours.

Self-concept: the view an individual has of their beliefs, likes and dislikes, and strengths and weaknesses.

Semi-structured interview: set of pre-established questions that can be asked in addition to the participant being asked follow-up questions based on earlier responses.

Sensitive period: stages in life whereby the effects that experiences have on the brain are stronger than usual.

Sensory neurons: process sensory information from the sense organs and carry the messages to the spinal cord and brain (CNS).

Seriation: the ability to arrange a collection of items or situations in a logical series.

Sexism: prejudice and discrimination against people based on their gender.

Single-blind procedure: the experimenter is aware of the experimental conditions while the participants are unaware of them.

Situational attribution: assigning the cause of behaviour to environmental factors external to the person, for example, social situations and social pressure.

Snowball sampling: sampling method where initial participants in a sample recruit additional participants to join the study.

Social categorisation: often unconscious process of categorising people into groups based on shared characteristics.

Social identity: the sense of self in terms of group membership.

Social influence: occurs when the real or implied presence of people influences the behaviour and attitudes of others.

Social loafing: the tendency for an individual to reduce their effort when working in a group.

Social responsibility: the theory that individuals are accountable for acting in a way that benefits society.

Somatic nervous system: branch of the PNS that carries sensory information received by sensory receptor cells to the CNS via sensory neurons and carries motor messages from the CNS to skeletal muscles via motor neurons.

Spatial resolution: ability to differentiate which specific part of the brain is active.

Spinal cord: cable of nerve fibres that runs from the base of the brain to the lower back and connects the brain to the PNS.

Split-half method: assessing the internal consistency of a test by comparing results produced by each half of the test.

Stereotypes: an oversimplified belief about an outgroup pertaining to either positive or negative thoughts about its members.

Still pictures: single static images that are two-dimensional.

Stratified sampling: participants are selected from subgroups of the population in the same proportions they appear in the population.

Structural imaging: neuroimaging techniques producing scans showing brain structure.

Structured interview: set of pre-established questions asked in real time face-to-face or over the phone.

Subjective data: data based on personal opinions and judgement.

Sucker effect: an individual reducing their effort when working in a group after realising other group members are not putting in effort.

Summary table: a table that visually summarises the key findings of a study.

Superordinate goals: goals both groups want to achieve, but that can only be achieved if both groups cooperate.

Symbolic thinking: the use of symbols, such as words or objects, to represent other concepts.

Sympathetic nervous system: branch of the ANS that regulates the glands and internal organ function to physically prepare the body for increased activity during heightened physical or emotional arousal.

Synapse: the axon terminal of a pre-synaptic neuron, the synaptic cleft, and the dendrite of a post-synaptic neuron.

Synaptic cleft: the space between two neurons.

Synaptic pruning: reduction in the number of neurons allowing remaining neural connections to strengthen and grow in complexity.

Temporal resolution: ability to detect when brain activity occurred.

Test-retest reliability: administering a test twice to a group of participants to assess external reliability.

Thalamus: double-lobed structure located just above the brainstem that receives sensory information, except smell, and transmits information to the cerebral cortex.

Tip-of-the-tongue

phenomenon: an individual knows what they would like to say but are unable to recall the specific word required.

Tripartite model of attitudes: describes an attitude as being comprised of three components that are associated with an attitude object; affective, behavioural, and cognitive components.

Unanimity: when people all agree about the same thing.

Validity: the degree to which a measurement tool evaluates what it is designed to measure.

Verbal fluency: the ability to produce words that are retrieved from memory.

Voluntary participation: participants partake in a study because it is their choice to do so.

Wernicke's aphasia (fluent aphasia): impairment in the ability to understand language and produce meaningful speech due to damage of Wernicke's area.

Wernicke's area: region within the left temporal lobe responsible for the comprehension of language and production of meaningful speech.

White matter: nerve tissue in the spinal cord and brain largely comprising of myelinated axons, giving it a whitish colour.

Withdrawal rights: participants can end their participation in a study, or have their results removed during or at the completion of the study without pressure or penalty.

Achieve great ATAR results!

Found this resource helpful? Academic Group offers a range of ATAR programs to help you achieve your academic goals.

About our ATAR Help Programs

Term Programs



Tuition Classes

Small group tutoring classes available throughout the year to provide on-going help as you need it. For years 7 - 12.



Master Classes

Weekly teaching classes by top ATAR teachers who will extend you and teach you how to gain maximum marks.



Exam Boost Workshops

Exam Boost Workshops provide targeted exam preparation answering practice exam questions. You will receive feedback from an exam marker and tips and strategies to improve your exam performance.

Holiday Programs



Head Start Program

Held in the January School Holidays. You will gain an overview of the syllabus for your ATAR courses, preview important concepts and get an academic boost for the year ahead.



ATAR Holiday Revision Program

Specially designed programs to help revise ATAR course content and teach you how to maximise your results. Held in the April, July and October school holidays.

Enrol in programs at www.academicgroup.com.au

Get in touch with us.



(08) 9314 9500



learn@academicgroup.com.au



872 Canning Highway Applecross

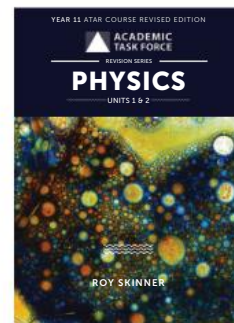
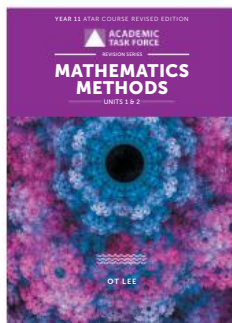
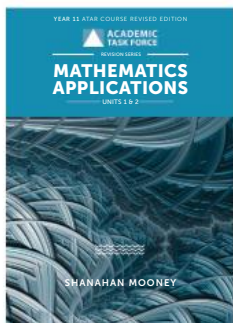
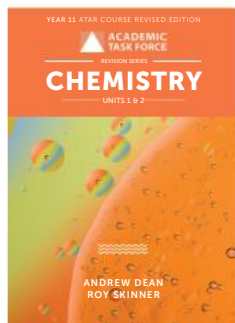


YEAR 11 ATAR COURSE BOOK

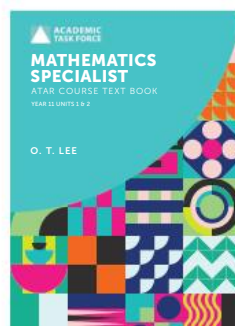
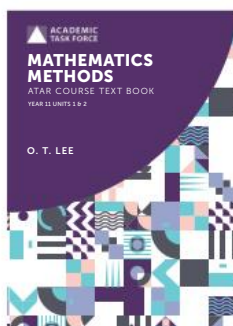
ACADEMIC TASK FORCE

ATAR COURSE BOOKS

REVISION SERIES



TEXT BOOKS



SOLUTION MANUALS



- This book provides a comprehensive set of revision/review questions for the Year 11 Psychology ATAR Course, Units 1 & 2.
- The review questions are written at test/examination level for both the Calculator Free and Calculator Assumed Sections and presented in a write-on format in topical order.
- This book exposes students to questions and problems at test/examination level.
- These questions are suitable for end-of-topic reviews and pre-test and pre-examination reviews.

- Questions are accompanied by a set of fully worked solutions with which students can measure their answers.
- Use this book alongside your school textbook and lesson notes to review and improve your understanding of each concept.
- The worked examples demonstrate, step by step, important concepts and calculation methods.
- Problems and exercises are at a level appropriate for successful preparation for ATAR course assessment. The marking system is based on that used by markers in the ATAR examinations.

*Achieve success with this essential student guide
for test and exam preparation.*



**ACADEMIC
TASK FORCE**

ISBN 978-1-74098-330-3



9 781740 983303 >